The Smart City – how smart can 'IT' be?

Discourses on digitalisation in policy and
planning of urban development

Malin Granath

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Abstract

Cities are facing many challenges; challenges linked to world-wide trends like urbanisation, climate changes and globalisation. In parallel to these trends, we have seen a rapid digitalisation in and of different parts of society. Cities and local governments have been appointed an important role in overcoming these world-wide challenges, and subsequently, in policy practices digitalisation is perceived as an important dimension in delivering better and sustainable services to its citizens. As a result, the smart city has emerged as a concept and approach to contemporary urban planning and development. There is still no common understanding of the concept and what components and dimensions it covers. However, in all definitions digitalisation constitutes one dimension, but the role and function of it is still not clear.

In this study I have examined how different stakeholders talk about digitalisation in policy and planning practices of urban development. The aim has been to identify and analyse different repertoires of discourses on digitalisation to advance our knowledge on how goals related to the smart city and digitalisation are put into practice. The results are based on a qualitative and interpretative case study with a social constructionist approach. An analytical framework based on discourse analysis, stakeholder theory and (new) institutional theory has been constructed to analyse the case.

Main results show that repertoires on digitalisation are limited in both policy and planning of urban development. In these practices, digitalisation is primarily seen as a means or as a communication infrastructure in relation to two city services/functions; i.e. services related to governance and to environment. Results also show that practices of urban planning and development are institutionalised, where different stakeholders' salience and stakes in urban development and in digitalisation differ, but it is clear that digitalisation is a secondary issue. Implications of these results are that the taken-for-granted discourses in policy and planning practices of urban development limit both practice and research when developing a smart city.

FOREWORD

Information Systems Development (ISD) is a research discipline within the Faculty of Arts and Sciences at Linköping University (LiU), Linköping Sweden. ISD is a discipline studying human work with developing and changing different kinds of IT systems in organisational and societal settings. The research discipline includes theories, strategies and policies, models, methods, co-working principles and artefacts related to information systems development. Different development/change situations can be studied as planning, analysis, specification, design, implementation, deployment, evaluation, maintenance and redesign of information systems and its interplay with other forms of business development, processes of digitalization and innovation. The discipline also includes the study of prerequisites for and results from information systems development, as e.g. studies of usage and consequences of information systems.

The research in ISD at LiU is conducted in collaboration with both private companies and public organizations. Collaboration also includes national and international research partners in the information systems research field.

This work, *The Smart City – how smart can ‘IT’ be? Discourses on digitalisation in policy and planning of urban development*, is written by Malin Granath, Linköping University. She is also a member of the research group VITS. She presents this work as her PhD dissertation in Information Systems Development, Information Systems Division, Department of Management and Engineering, Linköping University, Sweden.

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At this moment, I have finally reached the end station of this journey, and new ones are to begin, and I am looking forward to see where they will take me in the future.

Malin Granath

Valla, Linköping
22 August 2016

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PART I

INTRODUCTION & RESEARCH STRATEGY

Chapter 1: Introduction

In line with the heading – The smart city - how smart can “IT” be? – this thesis explores and examines how digitalisation is spoken of by different stakeholders in the context of urban planning and development. Hence, the aim of this introductory chapter is to set the investigated phenomenon, digitalisation, in a context, and give a brief account of the underlying premises of the study. The chapter is organised as follows: presentation of problem background and description, presentation of research aim and research questions, account of knowledge contributions, target audiences, and delimitations.

Problem background and description

Challenges that coincide with urbanisation¹, and globalisation, such as climate changes for example, are on a worldwide basis discussed as major tasks for society (cf. in conferences like UNCED², Habitat II[I]³). Depending on who is talking and in what contexts these challenges are mentioned, different aspects of the problems are emphasised and acted upon. In China for example, urbanisation has caused “about 130 million Chinese migrants [to] live in tiny, subdivided rooms rented out by former farmers whose villages have been surrounded by sprawl” (Lee on Urbanization in China in New York Times, 2013-04-01). Lack of housing has thus become a topic of discussion in the wake of urbanisation; however, not only lack of housing is emphasised as problem in these discussions, but also building new affordable housing. Clos, former mayor of Barcelona and now executive director of UN-habitat, means that effects of urbanisation, like lack of housing or unaffordable housing, are problems that can be handled through urban design. Instead, he means that the problem lies in the understanding of what urban design is (Clos on “We have lost the science of building cities” by Herd in the Guardian, 2016-04-18).

Other aspects brought up in the discussions on urbanisation and globalisation, are the negative effects on the climate. Recently, the intergovernmental panel on climate change (IPCC), which is an international organisation established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO), stated in their assessment report on climate changes that

¹ Cities are growing rapidly and already in 2030 it is estimated that more than half of the world's population will live in cities¹ (www.unfpa.org)

² United Nations Conference on Environment and Development

³ United Nations Conference on Housing and Sustainable Urban Development

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[h]uman influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems.
(SYRAR5SPM, 2014, p. 3).

IPCC's statement indicates that humans not only are affected by climate changes, but also are central to the problem itself. Albeit, several examples of "alarm reports", it seems to be hard to come to *global agreements* on what actions to take regardless if it is urbanisation or climate changes that are discussed. This together with the wicked nature of these problems and the many stakeholders involved on a global level makes urban development a difficult area. As a consequence, nowadays rhetoric appears to emphasise the important role cities have in handling and leveraging the challenges that coincide with urbanisation and globalisation (Holden, Roseland, Ferguson, Perl, 2008; Albino, Berardi, Dangelico, 2015). However, this is not an easy task for cities and city planners, which Clos corroborated above. For local governments, urban planning has become a question of answering to global needs, and at the same time meeting the needs of its citizens, and this without compromising the needs of future generations (cf. the Brundtland report, WCED, 1987). Rhetoric has thus shifted from global agreements to local responsibility, and in this context *cities are discussed as having a pivotal role for a sustainable development* (Kievani, 2010; Holden et al., 2008). In effect, this shift is easier in theory than in practice. Returning to Clos' discussion on how to handle challenges connected to urbanisation, he means that in practice the problem is that "the urban community has become lost in strategic planning, masterplanning, zoning and landscaping"; activities that he means have purposes in their own, but do not address the real problem, i.e. the lack of understanding what urban design is (Clos on "We have lost the science of building cities" by Herd in the Guardian, 2016-04-18). Also in this narrower context, Clos' statement reveals that there are different interpretations and understandings of what the problem is and what actions to take in practice.

In parallel with these discussions and trends, we have also seen how the development and use of information and communication technologies (ICTs) have exploded in society – a trend referred to as digitalisation (Tilson, Lyytinen, Sørensen, 2010; Brennen and Kreiss, 2014). If urbanisation and globalisation are discussed in more pessimistic ways, digitalisation has, in the context of urban planning and development, come to have a positive connotation. In urban strategy digitalisation is put forward as an important part in achieving sustainable development (Albino et al., 2015; Alawadhi et al., 2011; Hollands, 2008), and an important aspect in this thesis being the information systems domain. Attributing technology an important role in urban development is not something new. Instead, technology, according to Angelidou (2015), always has had an important role in strategic planning of cities. Today, according to Viitanen and Kingston,

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there is even a trend among global institutions like “the World Bank, World Economic Forum, OECD, and EU [to] back the idea of digitising urban systems and infrastructures as a viable proposition for securing environmental sustainability and economic growth” (2014, p. 803). Thus, digitisation⁴ of cities appears in the rhetoric as one appealing solution to many of the pressing problems policy-makers are facing. At the same time, this also indicates that many institutions and stakeholders in the context of urban planning and development have adopted an optimistic view of technology (cf. Calzada and Cobo, 2015). As a consequence, the concept of a smart city has emerged in recent discussions on urban strategy. This concept has come to encapsulate both the work with urban planning, i.e. initiatives taken to become smart (Albino et al., 2015; Washburn et al., 2010), and urban development as such, i.e. visions of a future urban state (Angelidou, 2015; Gil-Garcia, 2012). When spoken of as digitising urban systems and infrastructures, it basically refers to implementation and use of ICTs to analyse and act on city activities (Kitchin, 2014). In effect, this means that cities are equipped with digital devices and a digital infrastructure to produce large amounts of data (also referred to as big data). This could for example mean that sensors are implemented in buildings, streets, vehicles, and open spaces in order to inform city management on ongoing activities. This instrumentation of cities is sometimes referred to as “embedded spatial intelligence” (Kominos, Schaffers, and Pallot, 2011) or “urban cybernetics” (Goodspeed, 2014). According to Goodspeed (ibid.) and Nam and Pardo (2011b) the purpose of digitising cities is of course to tackle some of the wicked problems cities are facing. However, little is said on the complexity of doing it, or on the spectrum of effects caused by it. In the literature on the smart city it is also clear that there is still no unanimous interpretation of what it is (Angelidou, 2015; Albino et al., 2015), it is only just recently that studies have started to conceptualise smartness in the literature (Gil-Garcia, Zhang, Puron-Cid, 2016).

Policy-makers could be seen as those who turn discussions into actions by producing policies. Thus, policies are outcomes of policy processes and also manifestations of actions to take in a specific area (cf. Lowi, 1970). However, it was not until recently that the smart city emerged as a policy framework in its own (Angelidou, 2014), which also explains why there is still little academic understanding of it in practice (Meijer, Gil-Garcia, and Bolívar, 2015). In line with this development, the European Commission published in 2015 their view of a Smart City, where they see the smart city as a place where “digital technologies translate into better public services for citizens, better use of resources and less impact on the environment” (European Commission, 2015). This is a broad and inclusive interpretation of the concept. However, what we do know is that the smart city has come to encompass several dimensions of urban development, e.g.

⁴ The process of digitising. See Chapter 2 for a discussion on the two concepts digitalisation and digitisation.

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economy, mobility, environment, people, living, and governance, and where digitalisation is *one* dimension (Caragliu et al., 2011; Lombardi et al., 2012). When it comes to realisation of smart city visions and goals in practice in urban development projects, we can expect necessary actions in relation to development and implementation of digitally-based solutions to be complex for several reasons. First, due to the wicked nature of problems that these solutions intend to address (solve), these solutions span several areas (e.g. administration, transport, education, energy), which means that these types of undertakings call for collaboration to span organisational, and sometimes geographical, borders and contexts. Second, these kinds of societal undertakings call for collaborations between public and private sectors, which also entails the involvement of different stakeholders (cf. Freeman, 1984), whose incentives to drive digitalisation and smart city solutions might differ. The involvement of different stakeholders could in the worst case scenario indicate competing objectives and values (Chourabi et al., 2012), which might lead to power issues. Third, technical developments often call for shared technical standards and interoperability (Perera et al., 2013) and unless this is done technical solutions might fail in the long run. Forth, similar to the problem Clos pinpoints above connected to urban design, I argue that the lack of understanding of the concept of a smart city on a strategic level also will have effects on how digitalisation is spoken of and acted upon in practice of urban planning and development. Different interpretations risk leading to misunderstandings.

Digitalisation and digitisation⁵ being important dimensions in smart cities and smart city developments motivates as such further research from an information systems (IS) perspective (cf. IT artefact in Orlikowski and Iacono, 2001). Even though digitalisation, and digitally based innovations in particular, are attributed an important role in urban development, it is at the same time emphasised (often by IS researchers) that technology development is not enough. For example, information systems research (hereafter referred to as ISR) on the smart city emphasise that transforming the public sector, and urban planning and development in particular, also calls for innovation in management and policy, that is in governance (Meijer and Bolívar, 2015; Meijer, Gil-Garcia, Bolívar, 2015; Alawadhi et al., 2012; Chourabi et al., 2012; Nam and Pardo, 2011a-b). Hence, I argue that understanding phenomenon like digitalisation and smartness in the context of urban planning and development does not only call for knowledge concerning the *technical artefacts* (the digital resources to be developed and/or used), but also knowledge concerning *contextual* and *organisational* influences as well as *human* influences. By disregarding the complexity and the spectrum of effects of design and use of digital resources, like has been the case in many e-government developments

⁵ Digitalisation and digitisation are further discussed and defined in Chapter 2, cf. Research focus and philosophical assumptions.

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(Heeks and Bailur, 2007), there is a potential risk for an overly optimistic view of digitalisation also in the smart city context. Meijer, Gil-Garcia, and Bolívar (2015) even argue that contextual conditions, along with governance models and public value, are crucial issues to advancing academic understanding of smart cities. However, there are still very few empirical studies in the area.

If we are to understand issues related to digitalisation and smart city initiatives in urban planning and development and if we want to answer Walsham's (2012) call for 'true' contributions in practice, I argue that we need to understand how the digitalisation *is spoken of* and understood by different stakeholders in policy and planning of urban areas. A too narrow focus or a too naïve view on digitalisation and the smart city at this early stage might result in an overly optimistic view of its role and impact in urban development. Consequently, we might risk ending-up with unstable and inflexible digital solutions that, in the worst case scenario, will not be used or will be met with resistance, thus resulting in unsuccessful investments (cf. Larsson and Grönlund, 2014; Dawes, 2009). Hence, if we want to achieve the promising things with digitalisation in the context of urban development and avoid shortcomings I argue that we need to start out in the political visions – the policies that set the general course of direction for future urban development – and unpack how policy-makers talk about the phenomenon and what actions they seek in practice in relation to digitalisation and smart city developments. We also need to examine and understand how the phenomenon is spoken of in practice by different stakeholders involved in the process of urban planning and development. By doing this we can gain knowledge and understanding of the smart city.

Research aim and questions

Following the account above, an underlying assumption of this thesis is that various discourses on digitalisation exist. Discourses refer to meanings, understandings, representations, and statements used to construct and construe different versions of digitalisation and smart in the context of urban planning and development. Discourses cover thus both words and deeds and are dependent on both the context and on the individual/collective that manifest them. Hence, in order to advance our understanding of how goals related to the smart city and digitalisation are put into practice, we need 1) to identify how it is spoken of and by whom, and 2) to understand the contextual conditions. Hence, the *overall aim* of this thesis is to identify and analyse repertoires of discourses on digitalisation in the context of urban planning and development in order to advance knowledge and understanding of smart cities. Three research questions are put forward to guide the analysis and these questions are:

RQ1: What repertoires of discourses on digitalisation are there in policy and planning of urban developments?

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- RQ2: What relations are there between different repertoires of discourses on digitalisation and smart, and how can these relations be understood?
- RQ3: How can gaps in understanding of digitalisation and smart be handled in the future in urban planning and development?

The first research question intends as a first step to *identify and analyse discourses on digitalisation* in two separate and overarching discourses in urban planning and development, that is a policy discourse and a planning discourse. Concerning the policy discourse, two types of policies are targeted, i.e. policies on digitisation per se and policies on urban development. In addition to type of policy, different policy levels are also covered, i.e. EU, national and local levels. The second discourse that is explored is a planning discourse, which is based on an actual planning processes of a new district (Vallastaden) in Linköping in Sweden, and how digitalisation is spoken of and used in this context. The aim of the discourse analysis is, apart from identifying discourses on digitalisation also to *identify interrelations and/or gaps between discourses*.

The second research question intends as a next step, after having identified and characterised the discourses on digitalisation, to explain the found variances and interrelations. Thus it is a sort of “meta-analysis of the discourse analysis”. An analytical framework has been developed to work with these explanations. As urban development projects often are large-scale projects spanning both public and private sector, involving many actors along the line, I have worked with explanations that lie in the *broader context of urban planning* (an institutional context and institutionalised process) as well as with explanations that lie on *organisational and managerial level* (stakeholder influences on project level). I find it essential to pinpoint where and what the plausible reasons are to gaps in understanding of digitalisation in order to address the third research question concerning propositions on how to handle the gaps and thus contribute to a better understanding of 1) what of the hindrances of digitalisation are, and 2) what the necessary actions are for realising smart city developments. Depending on whether the hindrances lies within the broader context (institutional elements) or within the project context, (e.g. managerial elements), the possible actions will differ.

To summarise, focus in the analysis is on identifying and explaining repertoires of discourses on digitalisation in urban planning and development. This is done in two different discursive practices – policy practice and planning practice on and in urban development. By doing this, recommendations are given on how to approach issues related to digitalisation in a smart city context.

Knowledge contributions and target audiences

The goal of this thesis is of course to generate new knowledge. In accordance with the posed research questions, I seek to generate three different types of knowledge; *descriptive*, *explanatory* and *prescriptive/normative* (cf. knowledge categories in Goldkuhl, 2011).

I see that my study can make a contribution to two different practices. First, I find my study to be relevant to the academic practice. In this context I find my main target audience to be information systems researchers who are interested in advancing their knowledge on digitalisation and the smart city. One contribution in this area concerns my results of the analysis of the smart city literature, where I have identified different discourses on the smart city and smart city developments, and how they relate to different dimensions of urban development. In addition to this I have also developed a theoretical model to analyse and discuss smart city developments, which I see as a relevant contribution both to academics and to practitioners. A third contribution concern the reporting and the results derived from a contemporary case study. Yet, another contribution is of a methodological kind, where I see that the analytical framework that I have developed to identify, explain and analyse discourses could be useful to analyse other similar cases.

Second, I argue that the results of this study can be useful for *practitioners in the field of urban planning and development*. The descriptive part, the identification and mapping of relations concerning elements and repertoires⁶ of discourses on digitalisation in both policy and planning of urban development, together with the prescriptive part (the recommendations) have potential to affect future work in the area. In policy for example, these kinds of findings could in the future result in further alignment of goals related to digitalisation and the smart city, or clearer use of concepts in policy documents, or development of guidelines (thus contributing to a policy practice). A target audience in this context would of course be those who work strategically with urban planning and development as well as with digitalisation (e.g. politicians, civil servants). I think that the results of this study can be interesting at all levels, ranging from EU, national, to local levels.

To a planning practice (in addition to policy practice), these kinds of findings might be fruitful for those involved in urban development projects who are interested in advancing their understanding of digitalisation and smart city issues. First of all, for project management these results might be an eye-opener concerning the phenomenon as such (digitalisation) and hopefully the prescriptive results pinpoint managerial issues related to phenomenon, e.g. on who is to take lead in issues regarding digitisation. For

⁶ Elements and repertoires are further discussed in Chapter 2, cf. Data analysis approach.

architects and builders these results might be an eye-opener to the issue as such. In this context, I also see that the results of this study can be valuable to the project team behind Vallastaden (this thesis' empirical case). It is also my hope that they will find parts of this thesis useful in their documentation of their work with developing urban planning as such. Yet another target audience is those working with IS development in practice, I think that the results concerning the context and how elements in the institutional and organisational context affect discourses on digitalisation, that is how the phenomenon is spoken of and used by different stakeholders, could be useful and of strategic value to IS provider/developer practices. Especially as urban planning and development is a context where digitalisation is only in an early stage.

Delimitations and foci

There are a number of delimitations that have been done in this thesis work. First of all, as this is a thesis in the field of information systems, and not in urban studies, this means that digitalisation has been in the foreground and that the context of urban planning and development has been in the background (see illustration in Figure 1:1 below). More specifically, I have focused on how digitalisation is spoken of and used by different stakeholders in this context. The foreground and background and the central concepts of *digitalisation*, *discourse* and *urban planning and development* are further discussed in the introduction of the method chapter (Chapter 2). Yet, given this initial delimitation of foreground and background, there are still many ways to go. Therefore, the first delimitation concern *areas of interest* within this broad context of urban planning and development and smart city developments. There are several service areas within local administrations, where digitalisation and the use of digital resource are emerging as important instruments to deliver better services to its citizens, some of which are more or less prominent to urban planning and development. Example of areas are e-health, intelligent transport systems, and emergency response systems. However, it would have been impossible to study all the service areas that a city is in charge of in detail. Therefore, in Figure 1:1 below I illustrate my delimitations and main focus. The context in large is urban planning and development, within this larger context I have focused on what I denote as two particular discursive practices (type of practice which includes both words and deeds). The first practice is a *policy practice* and the second is a *planning (and building) practice*.

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Figure 1:1. Delimitations and foci

Already at an early stage I was interested in the two discursive practices – policy and planning – and I had an inductive and explorative approach to them. This has meant that it was the data material that have helped me to focus and delimit the study to the major part. As my interest also is to contribute to both the IS field and to the context of urban planning and development this has also helped me to focus the study. A large amount of work has been given to understand and delimit the context as such, that is what is covered in the use of the concept of urban planning and development. This was something that was not clear to me in the beginning. Urban planning (and building) is one of the many services/functions that municipalities are in charge of in Sweden (examples illustrated in right section in Figure 1:1 above). Planning and developing urban areas in a city also affect or involve other services/functions that municipalities are in charge of. In this study urban planning and development has come to mean both the physical process of planning a new urban area as well as the services/functions that this includes (see Chapter 2 for a more elaborate discussion). However, like I said above, this definition is still very inclusive as it can mean almost anything that has to do with local governance. Therefore, I have chosen to focus more on the planning part, how digitalisation is spoken of in this context and what the consequences are for physical planning. This in combination with the inductive and explorative approach has helped me to focus the material and the study as such. Another delimitation in this thesis work concerns the *scope and depth* of the empirical study. Planning and constructing new urban areas take several years, and this also means that it has not been possible to follow

a single development from the beginning to the end. However, I have had access to a real time case during almost four years and thus been able to follow several phases of such a development, i.e. planning phase, exploitation and procurement phase, and early stages of a building phase. This is not an ethnographic study, but in a sense inspired by it. In effect this means that I have tried to observe the evolvement of an urban development project and how different stakeholders talk about digitalisation both from an “inside point of view” and an outside point of view. This I have done by taking part in different events (see Chapter 2 for more detailed information) arranged by different stakeholders in the particular development project called Vallastaden 2017⁷.

Outline of thesis

Part I consists of two chapters (see Figure 1:2 below). The introductory chapter, *Chapter 1*, sets the focus and aim of this thesis. Research questions, envisioned target groups and knowledge contributions are presented above. The second chapter, *Chapter 2*, presents the design of the inquiry, methods used to explore, identify and analyse the discourses on digitalisation in the context of urban planning and development and how they are related to the concept of a smart city. In short, this could be presented as a qualitative case study with an interpretative approach.

Part II, the theoretical foundations, is divided into three chapters. In *Chapter 3*, the concept of a smart city is explored and characterised and related to the IS field by exploring the literature. In *Chapter 4* different discourses on the smart city are identified in the literature and related to the larger context of urban planning and development. Both chapter 3 and 4 could be regarded as a literature review on the topic of a smart city. Altogether, they form a pre-understanding of what can be expected of digitalisation in policy and planning of urban development. Further, in *Chapter 5*, I present the theoretical foundations upon which the identification and analysis of repertoires of discourses rely, and these are: discourse analysis, stakeholder theory and new institutional theory. In this chapter (5) I build an analytical framework (DiSSIPE framework) based on these three theories; a framework which is then used to analyse and understand relations between discourses on digitalisation and smart.

⁷ The project was from the beginning called LinköpingsBo2017 and the district named Vallastaden. The project later changed name to Vallastaden 2017, which I also have chosen to use in this study.

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Figure 1:2. General thesis composition and outline⁸

Part III, the empirical foundations, is divided into two sections, where the first section focuses on the policy practice and discourses on digitalisation in urban planning and development, and the latter focuses on a real-time urban development project and how digitalisation is spoken of in planning and building of a new district – Vallastaden. The policy practice is represented in three chapters. *Chapter 6* presents a European policy perspective on digitalisation in urban planning and development. This presentation is followed by a national (Swedish) perspective on the same in *Chapter 7*, and to be ended by a local perspective in *Chapter 8*. The intention of the first three chapters in the empirical part is to set the EU, national and local policy scenery in which the studied urban development project takes place. Important to note is that parts of the analysis (of identified discourses) are done in and at the end of these chapters. Hence, *Chapter 9* is devoted to the urban development as such and is presented as the story of Vallastaden.

Part IV, *discussion and conclusions*, is divided into two chapters. In *Chapter 10* the results of the discourse analysis are analysed and discussed. In short, the results of the study show that repertoires on digitalisation are limited in policy and planning of urban development, where digitalisation primarily is seen as a means or as a communication infrastructure in relation to services/functions in governance and environment. Further,

⁸ City image in the figure is inspired by Figure 2:1 in SOU 2012:18, p. 17.

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practices are institutionalised, practices in which stakeholders' salience and stakes in urban development and in digitalisation differ. In these practices digitalisation appears to be a secondary issue. In *Chapter 11* I proceed to draw conclusions from these discussions, where the main conclusion is that both the context of urban planning and development and how digitalisation is spoken of and used is that they are both powerful discourses and as such they are hard to change. This chapter ends with propositions for future work.

To conclude, in this chapter I have presented the aim and context of this study. In the next chapter I will continue to discuss the consequences of the aim and the context on chosen research method as well as elaborating the philosophical assumptions this entails.

Chapter 2: Research strategy

In order to answer the posed research questions in the previous chapter several methodological issues need to be addressed and clarified. Hence, this chapter aims to describe and discuss 1) the philosophical assumptions upon which this study relies, 2) the strategy of inquiry, 3) data collection techniques and analytical approach, and 4) reflections on the research process and the quality of the results.

In previous chapter, I have argued that digitalisation is a trend in society and that digitalisation often is promoted as an important dimension in solving challenges cities are facing. I have also stated that this study addresses the topic of digitalisation (and smartness) in policy and planning of urban development. As a reminder, the aim of the study is to identify and analyse discourses on digitalisation in urban planning and development and to analyse how they map to the notion of the smart city. In order to explain discourses on digitalisation and smart, and relations between them, this work focuses on *what*, *where*, *how* and *why* questions, where I have sought explanations in the wide institutional context of urban planning and development as well as in the narrow organisational context, and how these might influence the discourses on digitalisation. Language is central in constructing and construing discourses, and to humans' language is central in sensemaking and communicating with the surrounding environment. Humans use language to influence and position themselves. In line with this reasoning, it has also been an important choice to focus on stakeholders and what their stakes are in relation to digitalisation. Thus, as I see it, we need not only to understand the institutional context in which digital solutions are to be designed and implemented, but also the organisational and managerial context that is supposed to drive this development, that is *who* the actors are and *how* they view/understand digitalisation as well as *what* their incentives are when it comes to put digitalisation and smartness into practice.

Based on the above (and on the presentation so far), I want to put forward three keywords that characterise this thesis: *digitalisation*, *discourse* and *urban planning and development*. In the next section, I will start out by unfolding these keywords; keywords that I also argue explain some of the philosophical assumptions that underpin the study.

Research focus and philosophical assumptions

Digitalisation

Digitalisation is what is in focus in this thesis (in foreground), and could thus be said to be the phenomenon under study. In this thesis, I see digitalisation as a contemporary phenomenon that is taking place in practice (as something we talk about), that is under construction (as something we do, e.g. plan for, design, develop), and that can be observed (materialised as in various artefacts), and used (as for different purposes, e.g. to market, to inform, to communicate). Thus, digitalisation can take different shapes depending on context and perspective. However, what is clear is that the phenomenon is an integrated part of our social world. This also means that it cannot be separated from its use (or intended use) in its social context (cf. sociomateriality e.g. Orlikowski and Scott, 2008; Cecez-Kecmanovic, Galliers, Henfridson, Newell, Vidgen, 2014). On the contrary, I see the phenomenon as intertwined in its social context through the discourse (see below), and it is in the discourse that digitalisation 'becomes' so to say. This is also in line with a social constructionist assumption of the world (Burr, 1995; Berger and Luckmann, 1966), which focuses on how things are constructed and reconstructed in social contexts. This means that the understanding of digitalisation is both culturally and historically situated (mine and others), and language becomes the instrument to access these understandings.

Before I continue to elaborate on the used strategies to investigate the phenomenon, I want to elaborate on the *concept* in itself, and how it is to be viewed in this study. I have already argued that digitalisation can take different shapes depending on context and perspective. Tilson, Lyytinen, and Sørensen, (2010) mean that we need to distinguish between *digitising* and *digitalisation*, where the former is seen as a technical process, and the latter is associated with a sociotechnical process, which also includes the contextual use of the technologies and the infrastructure they build. The technical process of digitising (digitisation) concerns transcription of analogue data into digital form, data that eventually will be processed by a computer (Brennen and Kreiss, 2014). In line with Tilson et al (ibid., 2010) and the sociomaterial stance above, I see *digitalisation as a sociotechnical process* involving design, development, adoption, and/or use of digital technology and infrastructure for information and communication purposes. To me digitisation is one aspect of digitalisation and therefore also important in this study. In sum, I mean that digitalisation involves different aspects;

- 1) *data and information* (one type of digital resource),
- 2) *technology* (one type of digital resource)
- 3) *infrastructure* (digital infrastructure),
- 4) *actions* (e.g. usage, design)
- 5) *context* (application).

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I argue that all of these aspects are central to the information systems field in general and information systems development (ISD) in particular (Davies, 1991; Galliers, 2003). Hence, we can note that digitalisation can vary from making data digital (converting to a 'readable' format) and creating an infrastructure for storing and sharing of data/information, to designing applications and using technology as a means for new services. Thus, in relation to urban development I see digitalisation to be a sociotechnical process consisting of different aspects, i.e. technical aspects (e.g. equipping cities/city services/functions with different technical artefacts and social aspects (e.g. information and communication infrastructures, services, cf. Figure 2:1).

Figure 2:1. Examples of digital resources

The digital infrastructure could be seen as a “shared, unbounded, heterogeneous, open, and evolving sociotechnical systems comprising an installed base of diverse information technology capabilities and their user, operations, and design communities” (Tilson, Lyytinen, Sørensen, 2010, p. 748-9). Studies in information systems often acknowledge that technology is used to improve or alter the current situations especially in organisations (Markus, 2004; Agarwal and Lucas, 2005). I would also like to emphasise that these change processes already start in the ‘talk about’ rather than in the ‘actual doing’ (designing and implementing digital solutions). I would say that it is in the ‘talk about’ that we can identify different representations/understandings of digitalisation and thus identify how different actors view digitalisation in this particular context. One way of approaching these representations are through discourses, which leads me to the next keyword.

Discourse

The second keyword – *discourse* – is often used in negligent manner in research and with this I mean that it is often taken for granted and not really defined (cf. Alvesson

and Kärreman's [2000] discussion on the concept). Discourse in this study refers to *systems of meanings, representations, statements used to construct or construe different versions of reality* (Jørgensen and Philips, 2002). This means that discourses are contextual and situated. Discourse analysts stress that meaning is gained through language, where they argue that "[w]ith language, we create representations of reality that are never mere reflections of a pre-existing reality but contribute to constructing reality" (ibid. p. 9). Hence, *language itself is seen as a form of practice used to do things* – not separating words from deeds (Edley, 2001). In the context of this thesis, I see language as central in achieving and accomplishing digitalisation and thus also an important instrument in identifying and analysing discourses on digitalisation in the context of urban planning and development. By actively talking about new phenomena such as digitalisation or the smart city, we also construct and construe the phenomenon. Hence, what we say in specific situations also creates the very same. In the same line of reasoning, we can say that the discursive practice also drives the 'material' ones, and could thus be seen as inseparable from each other. Digitalisation is thus accomplished in course of social interaction (cf. social constructionism, Burr, 1995). This means that I do not foresee one objective account of the studied phenomenon but rather several depending on the studied (social) context, e.g. in policy or in planning of an urban development. Thus language (both written and spoken) is in this thesis regarded as a central instrument to access the different accounts (discourses), and to examine interrelations and gaps in discourses on digitalisation in urban planning and development, which leads me to the next keyword – urban planning and development.

Urban planning and development

In this thesis *urban planning and development is the context* in which digitalisation is studied (the background). Urban planning and development is a very wide area in its own, referring to both the *process* of planning, designing and developing new urban areas and functions as well as to the *end product* itself, the new neighbourhood/community with all the necessary services/functions. This also indicates that urban planning and development not only focuses on individual buildings and their design (like in architecture), but rather on larger scale *planning*, i.e. buildings in plural, streets, public areas, public services/functions. Hence, this means that urban planning also takes into account many of the *public services* that cities are to provide, e.g. public transport, utilities, schools, nurseries, senior residencies (illustrated in Figure 2:2 below). Digitalisation could be seen as an issue cutting across all aspects of planning, designing and building new areas and services, sometimes as a prerequisite (e.g. infrastructure like broadband) and other times as a means for planning, or for providing services. I think that this illustrates that the context in which digitalisation is to be studied is complex and not necessarily easy navigated. Therefore, I have chosen to have an explorative and inductive approach to the context when investigating the phenomenon,

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meaning that the data (identification of discourses) has determined my course of interaction in the context.

Figure 2:2. The study context of urban planning and development⁹

Given what I have described above it is probably not surprising that this thesis draws on a *qualitative* and *interpretative* research approach. According to Stake qualitative research focuses on how things work in particular situations, “at certain times with certain people” (2010, p. 14). Also my study could be said to focus on particular things as I want to know how digitalisation is spoken of in policy and planning of urban development. I started out by having an *exploratory approach* to phenomenon, which also Myers (2009) means is a suitable approach for new topics and topics that you want to go into depth to. At the same time, as my intention has been to explain and analyse identified discourses, I have also had an *explanatory approach* to the phenomenon. Below, I will continue to elaborate on the design of the study.

Research method and design

Research method is here to be understood as “a strategy of enquiry” (Myers, 2009, p. 53). In this section, I will discuss the two major strategies used to carry out this work, i.e. *case study* and *discourse analysis*, and how I have designed the course of inquiry. Above, I have argued that this thesis has a qualitative and constructionist approach to the world and to knowledge. This also entails that the produced knowledge in this thesis is a result of a cumulative work. Generally, the process has been characterised by both inductive elements when working with theory and empirical data and deductive elements especially when working with coding and meta-analysis of the discourses. This

⁹ City image inspired by Figure 2:1 in SOU 2012:18, p. 17.

iterative way of working with theory and empirics would Alvesson and Sköldberg (2000) refer to as abduction (reflexive).

In Chapter 1, when discussing the delimitations in the study, I have already explained that I have chosen to focus on two particular discursive practices – policy practice and planning practice – in the larger context of urban planning and development. These two practices can also be seen to reflect the research design in general and an important relation in the study. I see the policy practice to be important to the planning practice (also illustrated in Figure 1:2 in Chapter 1). In this context I see policies as results of a policy practice, and thus, they are manifestations and carriers of policy discourses and theses discourses contain normative, cultural and regulative elements (Scott, 2014) that are to be implemented/realised in practice, and thus, central to planning practices. This could indicate that I see it as a one-way type of relation between policy and planning, but I am also aware that policies are influenced by practice, meaning that policies as such are products of policy-making processes. However, as my focus has been on identifying and analysing repertoires of discourses on digitalisation, I have chosen to design the course of inquiry in accordance with these practices and thus divided the study in two sub-studies – a *policy study* (based on a document analysis) and a *project study* (based on analysis of observational data and documents). However, the design that holds these two studies together (the glue) is discourse analysis and case study approach, I will explain how below.

Case study

In short this study is a *qualitative and interpretative case study* (Walsham, 1995; Eisenhardt, 1989). A case study could be described as a detailed study of a “contemporary phenomenon within its real-life context” and is particularly suitable “when boundaries between phenomenon and context are not clearly evident” (Myers, 2009, p. 74). Case studies can be used for different purposes. First, in an early stage it can be used in an exploratory purpose, this approach is characterised by a “discovering” attitudes toward the topic and/or the context. Second, case studies can have an explanatory purpose, meaning that they can be used to “test theory, to develop causal explanations, or [...] to compare theories” (ibid., p. 72). In this thesis the case concerns the *phenomenon digitalisation* and how it is spoken of and used in policy and planning of urban development, and how it is related to the smart city. I find my discussion above to illustrate that I mean that we (as researchers) can and should not separate the digitalisation from its context (urban planning and development). By seeing digitalisation as a sociotechnical process and a sociomaterial product, I argue that a case study was a suitable way to go. Turning to practical details on the design of the case study – it consists, like I said above, of two separate studies – a policy study and a project study (for a summary see also Table 2:1) – and these will be discussed further below in

the section about data collection. First, we will turn to the other overarching approach of this inquiry – discourse analysis.

Discourse analysis

Above, in my presentation of the three keywords, we can note that discourse analysis contains “philosophical (ontological and epistemological) premises regarding the role of language in the social construction of the world” (Jørgensen and Philips, 2002, p. 4). In addition to philosophical premises, it also contains theoretical models and *methodological strategies* on 1) how to approach the topic, and 2) techniques of analysis. In this section focus is on how the topic (the phenomenon in my case) has been approached and techniques for analysis are covered later in this chapter.

Focus in this work has been on how different stakeholders view digitalisation. My way of approaching this has been through identification of what I call *repertoires of discourses*. This is not to be confused with interpretative repertoires; an approach within discursive psychology (Potter and Wetherell, 1987; Wetherell, 1998). Discursive psychology is an approach in discourse analysis which focuses on what the discourse constructs as well as what it achieves in social practices – words and deeds (Whittle and Mueller, 2011; Mueller and Whittle, 2011). My choice of labelling it repertoires of discourses could be seen as a middle way between discursive psychology and another approach within discourse analysis, i.e. critical discourse analysis (CDA). Critical discourse analysis, in contrast to discursive psychology, focuses on a critical analyses of changes in large-scale discourses (Wodak and Meyer, 2001, macro level discourse). Discursive psychology on the other hand, takes the particular into account, focusing on both micro and macro discourses at the same time as a sort middle range way (these aspects are further discussed in Chapter 5, cf. situating discourse analysis as a theoretical lens). Qualitative research, like we have seen above, is generally thought of as micro research focusing on how particular things work (Stake, 2010), thus being closer to discursive psychology. As previously stated, this study aims to identify and analyse repertoires of discourses on digitalisation in policy and planning of urban development. Hence, my interest could be seen to be in the middle of discursive psychology and critical discourse analysis, i.e. meso level discourses. I see *repertoires of discourses* as *the stock of/the range of* discourses on digitalisation. These repertoires can be more or less prominent in different contexts. However, to be able to identify repertoires micro research and analysis has to be done (textual analysis inspired by CDA). Hence, the close-up picture is in this study denoted as *elements of discourses*, referring to identified *parts/fragments of discourses* on digitalisation identified in the material (this is further described in the section focusing on data analysis approach). The design of the inquiry has of course also affected how I have chosen to collect data, which I will proceed to in the next section.

Data collection techniques

In this study I have mainly relied on two types of techniques to collect data, i.e. participant observations and documents. According to Myers (2009) triangulation “is the idea that you should do more than just one thing in a study” (p. 10) or as Moran-Ellis et al. put it: “triangulation is an epistemological claim concerning what more can be known about a phenomenon when the findings from data generated by two or more methods are brought together” (2006, p. 47). Understanding digitalisation in the context of urban planning and development is a complex undertaking. Digitalisation exists at different levels and in different contexts. In order to identify and explain how different discourses on digitalisation and smart are related, I found it necessary to cover several perspectives. In the light of this, I find triangulation of perspectives, different types of data, and thus also different kinds of data collection techniques to be useful. In my explorative approach, I have tried to gather as much data as possible (see Table 2:1 for a summary) meaning that I have gathered *different types of data*, e.g. documents, recording of meetings, observational data. I have also tried to look at the phenomenon (digitalisation) from different perspectives. Already at an early stage in my research process, I identified digitalisation as a general trend in society and something that policy-makers spoke optimistically about and a trend starting to be investigated more critically in research. Consequently, I wanted to examine how digitalisation was spoken of by different policy-makers at different levels – ranging from EU level to local project level. In addition to levels, I wanted to focus on digitalisation as such as well as in the broader context of urban planning and development. This resulted in a selection of several policy documents at each level (e.g. EU 2020 strategy, Digital Agenda, Visions for Sweden 2025). All the chosen documents are either of more general urban policy character or particular to digitalisation, this in order to identify interrelations between discourses. These different policy documents also represent *different perspectives* on digitalisation. In addition to this, I have also explored how different stakeholders speak of the phenomenon in practice in an ongoing development project of a new district in Linköping (5th largest city in Sweden) called Vallastaden. The different people involved in the development project could also be seen to represent different perspectives, e.g. civil servants, local politicians, architects, planners. I found the development of a new district to be suitable for my purposes as it brings about many of the issues associated with smart city development. Being a whole new district, it could also be seen to represent a miniature city in its own with many of the basic services that cities (local governments) are to provide. In this project I have had the opportunity to take part and follow it close by (see below). Hence, I have had good access to the project Vallastaden 2017. Altogether, this gives a solid ground for identifying and analysing discourses on digitalisation in both policy and planning of urban developments. Access and closeness to practice are also important dimensions when conducting qualitative and interpretative studies.

Before I elaborate on the techniques of data collection I have to comment on my choice of data. As this thesis is based on a constructionist approach (Burr, 1995), it also compels a discussion on the employment and role of different types of data. In discourse analysis one seeks to analyse 'natural data' (as opposed to contrived data like in interviews) (Potter and Edwards, 2001; Jørgensen and Philips, 2002). Documents and observational data could be seen as natural types of data as they are not (or at least very little) influenced by the researcher when collecting them. This also explains why I have not chosen to carry out interviews. In the next section, I will elaborate on the particular techniques – documents and participant observations.

Documents

Discourse as I have already covered is about text and talk and documents are carriers of both text and talk. In this study I have divided my use of documents into two categories: policy documents and other documents. Policy documents (which are central in the study and the analysis) could be seen as a specific type of discourse (practice) – a policy discourse – with a certain type of rhetoric and with a specific purpose. Traditionally policy-making is seen as a result of politics and a rather closed process. However, recently this process (policy practice) has become more open and interactive, meaning that policy documents are products that already have been exposed to opinions and suggestions prior to their implementation (Hajer, 2003). In a governmental context the purpose of a policy document is to set the course for action in specific areas (like urban planning). This course of action is sometimes more explicit (e.g. regulative documents) and sometime less explicit (e.g. normative documents). Hence, these texts generate political and practical – social – consequences (Potter and Wetherell, 1987) and that is why they could be seen as discourses as such.

In Figure 2:4 I have illustrated how I see the role of policy documents in this study. I find policy documents to be produced by certain people (policy-makers) for certain purposes (to regulate, to influence), to be disseminated to target audiences who produce and reproduce (construct/construe) the contents in various contexts and thus also produce particular versions of reality (cf. Burr, 1995; Berger and Luckmann, 1966). This also means that policy documents are products in their own and are treated as such in the analysis. They could be seen as contemporary instances of different policy-makers' views of digitalisation and urban development, which is in line with a discourse analysis perspective (Jørgensen and Philips, 2002).

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Figure 2:4. The role of policy documents

Thus, policy documents are both universal and particular at the same time (cf. Stake, 2010). Universal in the sense that they are to set the direction on a macro level and particular the moment they are interpreted and acted upon in practice in specific situations. This also illustrates why there are variances in discourses on digitalisation (Jørgensen and Philips, 2002; Potter and Wetherell, 1987). I find these documents to be important as they convey information about what course of action is sought in urban planning and development and at the same time they give an idea of what is expected of digitalisation in this context.

In this thesis I have chosen to focus on one type of policy documents, that is *normative policy documents* (as opposed to regulative). This means that I have focused on different strategies and visions. I find these relevant in setting the normative frames on digitalisation in the broader context of urban planning and development. The selection of policy documents varies from overarching *strategies on urban development* (e.g. EU 2020 strategy, vision for Sweden 2025) to specific *strategies on digitalisation* (e.g. digital agenda for Sweden, Digital Agenda for Linköping [which is the municipal context of the case Vallastaden]) at different levels (EU, national, local project). The process of selecting documents started in the different digital agendas (a given choice in relation to my interest and focus). However, as the context of study was urban planning and development I also saw a need to investigate how policy-makers in this area viewed digitalisation. However, finding strategies focusing on urban development as such was more difficult. In this work the Digital Agenda for Europe was helpful as it was part of an overarching strategy, i.e. Europe 2020, and this is also one reason to why I chose this policy document. I also found similar documents on a national level, i.e. Visions for Sweden 2025. At local level I chose to focus on the particular development as such and how an urban development was portrayed in practice, hence the choices of Visions for Vallastaden 2017 and Vallastaden Competition Program. These documents mirrored the both the European and the national perspectives, but in narrow and concrete sense. A

rightful question in this context is why I did not choose to focus on policy documents on smart cities. The answer is simple; they did not exist at the time.

This also means that there exists “interpretations of interpretations” of digitalisation and urban development between the documents (illustrated in Figure 2:5). Thus, an interesting dimension in this context is intertextuality, that is how similar texts differ or reflect each other (a dimension that is important in CDA, Jørgensen and Philips, 2002). This is also a way of investigating how different discourses on digitalisation are constructed and reconstructed in different policy documents.

Figure 2:5. *Inter-relations, construction and reconstruction of documents*

In addition to the policy documents, I have also used *other documents* as data sources. These documents are public documents, like newspaper articles, official project documents (booklets, brochures, annual reports, visions, etc.), minutes of meetings, postings in social media (Facebook). These documents (together with observations – see below) have been used to get a rich picture of the development project Vallastaden 2017 as such, and how digitalisation is spoken of and used in this particular context. I have used and analysed these different types of documents and written records to create the Story of Vallastaden (Chapter 9). Like Myers (2009) I have found these documents to be invaluable for providing the case with both details (e.g. data on project decisions, on data events) as well as background information. In the next section, I will proceed to my use of observational data.

Participant observations

First of all, I want to reflect on the attribute *participant* given observations in this study. This type of observation differs from observations in general. Walsham (1995) discusses the different roles a researcher might have when conducting interpretative case study work, i.e. the outside observer versus the involved researcher (p. 77). In Figure 2:6 these

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two archetypes of observations are illustrated – where a distant observer is an outsider who passively takes part in the context meanwhile the participant observer is an active insider. Of course reality is not as simple (or as black or white) as this categorisation might indicate. As a distant observer you sometimes might be drawn into the conversation or you might have to ask clarifying questions and as a participant observer you might still be regarded as an outsider (Myers, 2009).

Figure 2:6. Archetypes of observations

From the beginning I had an explorative approach to both the chosen topic and to the study context (urban planning and development). The reason for choosing an explorative approach in the beginning was that the context itself was rather new to me, and I felt a need to better understand the context, e.g. characteristics, challenges, issues, actors. Hence, I wanted to build my own idea of both the context of urban planning and development, and of what could be of interest in this particular context from an information systems perspective. As a consequence, I decided to participate in any kind of activity which had some kind of relation to the context (see Table 2:1 for a summary). Initially, I tried to see where digitalisation (information technology) were spoken of. However, the more I attended events like workshops, partner meetings, information meetings about the project, the more known and the more involved I got in the development of Vallastaden. Hence, my journey could be illustrated like in the figure below (2:7), where I started out as a distant observer and ended up as a participant one. This journey has also meant that I have gotten access to “inside” perspectives on the project, e.g. ongoing internal discussions.

Figure 2:7. My role and movement in the observations

In order to identify discourses on digitalisation in practice in urban planning and development and to identify who is involved in the process, it was important to get access and get engaged in practice. An important strand within in the Scandinavian information systems research tradition also focuses on this type of participative research,

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referred to as engaged scholarship (Mathiassen and Nielsen, 2008; Van de Ven, 2007). It is argued that this type of close collaboration with practitioners in the field not only provides better insights on different actors' views, but also renders results that are not only relevant from a scientific point of view, but also in practice (see knowledge contributions in Chapter 1). In order to understand and explain discourses on digitalisation a close relationship with practice was necessary. In the next section, I will proceed to the analysis of the gathered data.

Table 2-1. Overview levels of analysis and data collection methods and numbers of instances

Data collection		Instance		Authors/actors involved	
Level/phase	method				
Policy study	EU	Documents	EU 2020 (1)	European commission	
			A Digital Agenda for Europe (1)	European commission	
	National	Documents	Resource Efficient Europe (1)	European commission	
			A Digital Agenda for Sweden (1)	Swedish Ministry of Industry, Employment and Communications	
Project study	Local	Observations	Vision for Sweden 2025 (1)	Swedish National Board of Housing, Building and Planning	
			Conference on the sustainable urban development	Delegation for Sustainable Cities	
			Conference on the digital agenda	County administration of Örebro	
	Planning	Documents	A Digital Agenda for Linköping (1)	Linköping municipality	
			Vision for LinköpingsBo2016 (1)	Project team (LinköpingsBo2016)	
			Competition program for Vallastaden (1)	Project team (LinköpingsBo2016), and experts	
	Exploitation and Procurement	Observations	Dialogue meetings (4)	Project team (LinköpingsBo2016), civil servants, strategic partner (LIU)	
			Inauguration architect competition (1)	Project team (LinköpingsBo2016), local politicians and civil servants, general public	
			Workshop cafés (4)	Strategic partner (LIU), and targeted interest groups	
			Hackathon planning (3)	Local utility provider, strategic partner (LIU), project team (LinköpingsBo2016)	
			Study visit city exhibition (1)	Project team (LinköpingsBo2016), interested/potential developers	
			Coordination meetings (10-15)	Internal working group strategic partner (LIU)	
			Citizen dialogue reports (3)	Project team (LinköpingsBo2016)	
Development All	Documents		Project communication plan (1)	Project team (LinköpingsBo2016) together with advertising agency	
			Site plan/local plan (1)	Civil servants, local government	
			Winning design proposal (1)	Architects	
	Observations		Booklet of ideas/Idea ball (2)	Project team (LinköpingsBo2016)	
			Idea and inspiration seminar (1)	Project team (LinköpingsBo2016) and developers	
			Procurement meeting with building committee (1)	Project team (LinköpingsBo2016), civil servants, strategic partner (LIU), a developer, architects	
	Documents		Workshop café (1)	Strategic partner (LIU), project team (LinköpingsBo2016), contracted developers in Vallastaden	
			Quality program Vallastaden (1)	Project team (LinköpingsBo2016)	
			Directions for construction proposals (1)	Project team (LinköpingsBo2016)	
	Observation		Study visit culvert infrastructure (1)	Local utility provider	
	Documents		Project facebook postings	Project team (LinköpingsBo2016)	
			Media reporting (82 articles)	Journalists	

Data analysis approach

Discourse analysis being a central dimension in this thesis also means that it has had effects on the data analysis approach. In previous sections, I have covered philosophical assumptions and strategies to approach the phenomenon from a discourse analysis perspective, and in this section I will describe and explain the techniques and the process used to analyse the data and to identify discourses on digitalisation.

Gill (2000) distinguishes, for example, between three steps in the discourse analysis process: *sceptical reading*, *coding*, and *analysing discourse*. I do not find these steps to be different from many other qualitative data analysis approaches, which start with organisation of materials, careful reading, coding, descriptions, and interpretations (cf. qualitative analysis model in Creswell, 2014, or hermeneutic analysis as described in Klein and Meyers, 1999). However, what distinguishes discourse analysis is its focus on language and language use. Hence, the purpose of the first step – sceptical reading – could be seen to be twofold; 1) read to get familiar with the data and 2) to identify nuances and contradictions in the language. I have already signalled that my main contribution does not lie within discourse analysis, which also means that I have not focused on the language use as such, but rather on *identifying different understandings of the phenomenon*; i.e. identifying different *elements* of discourses on digitalisation and eventually also *repertoires* of discourses. Focusing on contents and identifying elements of discourses could be seen to be close to content analysis. However, I have not carried out a traditional content analysis, which is more quantitative in its approach to data analysis (by counting words). Instead, I have searched for what I call elements of discourses on digitalisation, referring to parts/fragments of discourses on digitalisation. These elements have then been categorised into repertoires of discourses (which could be compared to themes). Basically this means that I have been inspired by both the methods, theoretical perspectives and philosophical assumptions that underpins discourse analysis (see section on design and Chapter 5). In line with Potter and Wetherell (1987) I mean that people actively use discourses to accomplish (social) actions. This also means that it has been important to focus on contents of discourses and how they are interrelated. My way of approaching contents in particular discourses – policy and planning – has been through what I denote as *elements of discourses*. Identification of elements could be seen as a representation of a close-up picture on digitalisation. I have also been able to identify and eventually analyse different *repertoires of discourses* on digitalisation (representing the big picture).

I have already presented the design of the study, where I focus on two particular discourses in my study: a policy discourse and a planning discourse. These two discourses have also rendered slightly different approaches to presentation of results. Generally, the results (the empirical chapters) are products of deconstruction and

reconstruction of the empirical material. However, what sets them apart is the different characters of study (policy study vs project study). Concerning the project Vallastaden 2017 I have chosen to present it with a narrative approach (a variant of discourse analysis, Czarniawska, 2004) as the Story of Vallastaden. This means that besides working with discourse analysis as presented below I have also worked with storytelling when presenting the material (cf. orientation, series of events, complication, and resolution).

The process of working with analysis

Identification of different repertoires of discourses on digitalisation constitutes one important part of analysis in this study. Another part of the analysis concerns advancing our knowledge on how digitalisation and the smart city is put into practice (in and through discourses). In the introduction I pointed out that in order to do that I need not only to identify discourses but also who the actors are, what their incentives are as well as the contextual conditions that might influence discourses on digitalisation. Hence, in order to both identify and analyse Discourses, Stakeholders' Saliency, and Institutional Patterns and Elements, an analytical framework (DiSSIPE framework) was developed. The development and the use of DiSSIPE framework is further described in Chapter 5. In the section below I will focus on the general approach to data analysis.

Like pointed out by several scholars (Cresswell, 2014; Potter and Wetherell, 1987; Gill (2000); Klein and Myers, 1999) qualitative analysis is about getting familiar with the material, understanding its contexts, looking for nuances and multiple interpretations and at the same time be sceptical/suspicious to what you find. In my analysis of the material I have started out by reading it carefully and make notes about what is said with special focus on digitalisation and what this could mean to different people in and to urban planning and development. Focus in the *initial reading* was on: What is said on digitalisation? What is not said? Who is talking and who is not talking? How is it said? This could be compared to a sort of deconstruction process (Czarniawska, 2004), where the material is taken into parts and analysed in their own.

Initially when working inductively with coding of the material I identified what I call *elements of discourses*, which basically are the representations/meanings attributed to digitalisation in the given material. This first level coding could be compared to what van Maanen (in Lee and Baskerville, 2003) denotes as first level constructs. These codes are also traceable in the presentation of the empirical data by using [square brackets] in the text and summed up and denoted as *elements of discourses* in tables. In Table 2:2 I present an example of a first level coding (derived from an early version of Chapter 6). These elements are close to the understanding in their given context in the particular documents and at the same time they are codified by me (my constructions).

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Table 2:2. Example of first level coding

Dimension in the text	Elements of discourses
Smart growth	Digitisation as precondition for economic growth
	Digital resources as communication means and knowledge carriers
	Digitisation as a means/basic condition for innovation
	Digitisation as a market for innovation

Being close to the text (denoted as dimension in the text the tables) also meant that I in the beginning ended up with different types of elements. Hence, the next step in the analysis was to categorise them in a meaningful way. This work has been characterised by sensitivity to the context of the material (e.g. policy documents, project documents) and to the applied context, as well as to my theoretical knowledge in the area. This step could also be described as a second level construct, which concerns my understanding of how these elements of discourses on digitalisation can be understood in relation to urban development. In Table 2:3 below, I present an example of how I have gone from first level constructs to second level constructs; a work that has resulted in a categorisation of elements in eight categories (categories which have been both inductively and deductively driven). These categories are: governance, environment, communications, education, culture, welfare, and economy. I have come to denote these categories as *dimensions of urban development* (whereas the former were dimensions in the text or in the project). In Table 2:3 below I present an example how this looks like in practice (derived from the same chapter as the previous example).

Table 2:3. Example of second level coding

Dimension of urban development	Elements of discourses
Governance	Digitisation as a means to address societal challenges (climate changes, ageing population) (DAE)
*administration	Digitisation as a precondition for online contents and services (DAE)
*participation/engagement	Digitisation as a means to render administration more effective (DAE)
	Digitisation as a means to make government transparent and open (DAE)
	Issues concern making public data available for commercialisation (DAE)
Environment	Digitisation as a means to achieve resource efficiency (EU2020)
*housing	Digitisation as a means to calculate resource costs (REE)
*energy	Digitisation as a means to decrease emissions and improve energy efficiency (DAE)
*water	Digitisation as a communication infrastructure (smart grid) (EU2020; DAE)
*safety	Digitisation as a means to decrease emissions and improve energy efficiency (DAE)
	Digitisation as a means for modelling, analysings, monitoring and visualising energy data (DAE)

By doing this it also became clear in what contexts of urban development and planning digitalisation was spoken of and where it has a reduced role. This was however, only the first step in identifying discourses, a second step concerned how these results could be aggregated and abstracted into different themes, i.e. *repertoires of discourses*. This work is a result of an intertextual analysis on how digitalisation has been spoken of in the two overarching discourses – policy and planning. This systematic work with analysis has been my way of addressing consistency and coherence in the material; a criterion which is also important in validation of the results, i.e. the internal logic of

interpretations. Hence, the analysis could be characterised as seen as interpretative and constructionist work in its own. Some would argue that this is problematic when it comes to evaluation and validation of results (Burr, 1995). Validity in this context refers to trustworthiness, authenticity and credibility of the results (Cresswell, 2014). Below I will proceed to discuss some criteria for conducting qualitative analysis; criteria that I also will return to in Chapter 11 when discussing the design, the results and the implications of this study.

On validity

There are several ways of addressing validity in qualitative research, e.g. triangulation (here covered above), consistency (see above), rich descriptions, clarification of bias, scope and time spent in the field (see below concerning the research process). In my work with the empirical data I have tried to provide the reader with as *rich descriptions* as possible, both contextual and detailed (using quotes). In this chapter I have also provided the reader with clarifications on the design and the used methods (for collecting and analysing data), and eventual *biases*. I think this allows the readers to make their own judgments of the validity of the results of this study. Another criticism that this type of analysis might encounter concerns *abstraction* and *generalisability* of the results of such an inquiry. Generalisability is about the usefulness and applicability of the research results. First, realists might react negatively on the usefulness of the result of this thesis as it is heavily influenced by discourse analysis and social constructionism. This entails a view that discourses are “always occasioned – constructed from particular interpretative resources and designed for particular contexts” (Gill, 2000, p. 186). This also indicates that generalisations are not possible. Qualitative research and especially case studies are often criticised for being difficult to generalise (Myers, 2009; Yin, 2003). However, I find that this criticism is often made from a more quantitative point of view where opponents of qualitative research often compare generalisation from the quantitative field (from a sample to a population) with generalisation in the qualitative field (from a case to theory – analytic generalisability) (cf. Myers, 2009; Flyvbjerg, 2006). However, when it comes to generalisation in qualitative research I find it to be different in nature from the ones made in quantitative and more positivistic type of research. Instead, in line with Cresswell (2014), I find that the value of my study lies in the particular, in the descriptions of both the policy discourse and the planning discourse, in the identification of repertoires of discourses on digitalisation and how these are related to urban planning and development in general and smart cities in particular. This close-up study could also constitute a learning example.

Reflections on the research process and the writing up of the thesis

Above I have given you bits and pieces of the research process, from the design of the study to the collection and analysis of data. In this section I will try to summarise the process and reflect upon some of the consequences of the choices I have made. First, I

start out by giving a short presentation of the research project; a project that have set the general frames of this study.

The Smart cITy project

This study has been carried out as a part of a research project named The Smart cITy – involving stakeholders in urban development. This research project was led by prof. Karin Axelsson at the Division of Information Systems, Department of Management and Engineering, LiU, Sweden, and ran from 2012 to 2016. The Smart cITy project was financed by the Swedish Energy Agency, with an overall aim to study how IT was used and could be used in urban development with special focus on services related to smart grids and smart homes. Two senior researchers and myself have participated in the project.

The research process

In Figure 2:7 I present an overview of my research process. The left-hand side in the figure represents the empirical work and the right-hand side represents the theoretical work. I will start out by reflecting on my empirical work.

My empirical journey began in the spring of 2012, when I started to follow and explore the context of urban planning and development in general and issues related to digitalisation. Consequently, I looked for all types of events where I could get a better understanding of the context. I found practitioner conferences on sustainable urban development and on regional digital agendas, which I attended. Already at this stage, I identified concepts like sustainable cities and smart cities; concepts that, in an early stage, led me to the literature on smart cities and smart city development. In parallel with this work I also had the opportunity to follow an ongoing urban development project in Linköping, Vallastaden 2017. In the spring of 2012, this development project was in a start-up phase and, due to its high ambitions, project management sought to invite different stakeholders in the process (where the university was one of them – also seen as a strategic partner in the development project). I saw this as an opportunity to “jump on the train” so to say and follow the process by attending all kinds of activities that I could, e.g. workshops and planning sessions that both the municipality and the university arranged, information sessions aimed at developers and architects, the launching of the architectural competitions, etc. My aim was to explore how IT (which was my initial focus and later shifted to digitalisation) was spoken of in these contexts.

The more I attended all the activities, the more known I became, and eventually, I also became a part of the ‘internal working group’ at the university; a group that initially was coordinating research interests in the project. In this process I have been clear to everyone that my interest in attending project activities, and later also the internal coordinating work from the part of the university, has been for scientifically purposes

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as a part of my research. At the same time, I have contributed to the development project in several ways, e.g. with input in the various workshops and meetings, in coordinating and arranging workshops for developers and researchers, and eventually by collecting data and describing the process (where this thesis is an important part). Most of these activities have been carried out over the years of 2012 and 2014, thus focusing on the planning part (see Figure 2:7) in the development of the new district (Vallastaden). In 2015 I have had more random interactions with the project management. In a sense I have returned to the outside participant once again by following the project from a distance, mainly through media (both social and traditional).

Figure 2.7. Overview of the research process

Parallel to the project study, I have also worked with analysis of policy documents, denoted as the document study in the figure above. Much work has been put into this study and it has been a long and demanding process in many ways. In 2013 I attended a PhD course on discourse analysis, and in connection with this course I found this to be an interesting approach to the analysis of documents and as way of structuring my thesis. Yet, working with discourse analysis is not an easy task (as there are many different schools choose between and a craft in its own). Consequently, the first part of my analytical framework was sprung out of readings on discourse analysis (cf. theoretical focus in Figure 2:7). It might appear as an easy task to identify discourses, but much of my work has been put into this particular part (see also data analysis approach above). In this work my first part in the research framework has been helpful in focusing the analysis. Along this process I identified other things in the project context as well as in the larger context to be of importance. For example, I realised that some processes (e.g.

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planning processes) were routinized and that different actors interpreted digitalisation (IT) and smartness differently. It was also obvious that these actors had different interests in the development. As a result of these insights, I decided to use stakeholder theory and (new) institutional theory as lenses to understand both the context and the actors involved in it. Of course I could have chosen other theories, e.g. actor-network theory, but at the time these two theories suited my purposes well.

One of the last stages in this research process has been to write up the thesis. Stake (2010) points out that when preparing for and writing up your final thesis you have many ideas that need to be put together. This could be seen to be an iterative process between working with your research questions and the material at hand and while doing this tensions in patterns and posed questions are revealed and synthesised (illustrated in Figure 2:8. below).

Figure 2.8. *Iterative synthesis of an outline for the report (my own version of Stake's, 2010, p.184)*

Qualitative case studies often 'suffers' from huge amounts of data, which becomes problematic when reporting it. Flyvbjerg (2006) means that case studies often contain "a substantial element of narrative", which "typically approach the complexities and contradictions of real life" (p. 237). Faced with a large amount of data, I decided already before starting 'the writing up of the thesis process' on a structure and an idea of what I wanted to achieve. But we all know that it never turns out as we plan, so of course the end-product is not exactly what I first had anticipated it to be. It was in the process of analysing and writing up my results that my two overarching discourses – policy and practice – became clear (even though they had been with me from the beginning). The two discourses also helped me to organise "the narratives" in a meaningful way, where the two are reported in slightly different ways. It was also in this process that the work of denoting elements of discourses in a similar and comparable way became clear and

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how they were relevant to urban development. I assume that everyone that writes a PhD thesis goes through these stages where “the material starts to talk to you” and where patterns and relations all of a sudden become clear. In the section below, I will proceed to discuss how I have been working with publications and presentations during the research process.

Publications and presentations

My way of working with both rigour and relevance in this study has been through *publications* and *presentations/seminars*, where I have either written or presented/discussed research ideas and results. For me, this way of working with rigour and relevance have also been a way of “validating” the results both scientifically and practically. During the research process I have written up ideas and results mainly in the form of conference papers (see Table 2:4) and most of these papers are co-authored and peer-reviewed. My target group has in this context been information systems researchers. Being conference papers have also meant that they have been presented and discussed in scientific settings.

Table 2:4. Summary publications

Publications
Granath M (2013) Identifying shared values of ICT in the context of urban planning and development - A thesis proposal. Paper presented at the PhD Colloquium at EGOV2013, Koblenz, Germany, 15-16 September.
Granath M, Axelsson K (2014), Stakeholders' views on ICT and sustainable development in an urban development project, Proceedings of the European Conference on Information Systems (ECIS) 2014, Tel Aviv, Israel, June 9-11, 2014, ISBN 978-0-9915567-0-0
Axelsson K, Melin U, Granath M (2016), In search of ICT in Smart Cities - Policy Documents as Idea Carriers in Urban Development, Proceedings of the 15th IFIP Electronic Government (EGOV) 2016, Vol. 9820, pp. 215-227
Axelsson K, Granath M (submitted manuscript), Stakeholders' Saliency and Stake in Smart City Development: Insights from a Swedish Urban Development Project

In addition to publications, I have also actively worked with taking part in events and seminars to both present and discuss ideas and results along the process (see Table 2:5). The purpose has been twofold; to validate and to spread results. In the table below (2:5) I have categorized the presentations/seminars according to type and target group. Concerning target groups, there are groups belonging to both academia and practice. In the academia, I have presented my research ranging from next generation students (popular science week) to scientific peers in my own research field but also in other fields (Scandinavian workshop on e-government and IEI¹⁰ Sustainable). In practice, I have presented and discussed my result with practitioners (E.g. SymCity), that is with

¹⁰ IEI stands for the Department of Management and Engineering.

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people working with urban planning and development. As a final step in working with validations of results I have also had a seminar focusing on this particular thesis (Manuscript seminar), where the manuscript was reviewed by an (external) opponent and my fellow research colleagues.

Table 2:5. Summary presentations/seminars

Presentations/seminars			
Name	Type	Date	Target group
IEI Sustainable	Research seminar	December 2015	Researchers working with sustainability
Thesis manuscript seminar	Research seminar	November 2015	IS researchers
Popular science week, LiU	Research presentation	October 2015	Surrounding society
Sweden Green Building Conference	Practitioner conference	September 2015	Practitioners in urban planning and development
Research Friday	Research presentation	September 2015	Surrounding society
EKTA, LiU	IS research seminar	April 2015	IS researchers
Popular science week, LiU	Research presentation	October 2014	Surrounding society
Research Friday	Research presentation	September 2014	Surrounding society
Developer meeting, Vallastaden	Practitioner seminar	April 2014	Practitioners in urban planning and development
Scandinavian Workshop on E-Government	IS research workshop (paper)	February 2014	IS researchers
SymCity	Practitioner conference	January 2014	Practitioners in urban planning and development
Popular science week, LiU	Research presentation	October 2013	Surrounding society

Hence, in this chapter we have learnt more about the philosophical assumptions and the research methods used in carrying out this work. In the next chapter I will continue to present the results of the literature review on digitalisation and smartness in the context of urban planning and development.

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PART II

THEORETICAL FOUNDATIONS

Introduction to theoretical foundations

This part of the thesis – the theoretical foundations – fulfils two purposes, i.e. to better understand the context (urban development/smart city development) and the phenomenon as such (digitalisation), and to create an analytical framework for identifying and analysing discourses on digitalisation in policy and planning of urban development. Before I proceed to elaborate the purposes, I find it necessary to raise our eyes above the context of this study and put the phenomenon of digitalisation in an historical perspective.

As discussed in the introduction to this thesis, the world is characterised by several trends and one of these trends is referred to as digitalisation. In recent years we have seen an immense technology development (cf. Baskerville, 2012; Walsham, 2012); where we have gone from pure computing machines and computerised information systems in the 50's and 60's to, today, interconnected and interdependent networks and ubiquitous technology (Hirschheim and Klein, 2012; Dahlbom, 1996). This development not only has had effects on how organisations work and do business, but also on individuals and society in general (Hirschheim and Klein, 2012; King et al., 2010; Agarwal and Lucas, 2005). Recent discussions on technology development – especially in a city context – indicate that interconnectedness is not enough. The next generation technology focus on achieving intelligence (Gil-Garcia, Helbig, Ojo, 2014). Hence, digitalisation could be seen to permeate every level of society and thus something that merits more attention.

Turning to the purposes of this part of the thesis, the first purpose is to develop an *understanding of the context* in which digitalisation is spoken of and in which it is supposed to transform. Hence, the purpose is to understand the role of digitalisation the smart city and in urban planning and development. Focus in this part lies on unpacking the timely concept of a smart city. One dimension in this concept is digitalisation. Another dimension is the function of the concept; where it is used as an approach to urban planning and development. The work carried out connected to this first purpose could be described as a literature review on the smart city, where focus also has been on identifying dimensions as well as discourses on smartness. This work has been important in developing expectations on what to be anticipated of digitalisation in policy and in planning of urban development.

The second purpose is to *create an analytical framework* to be able to analyse and explain the results of this study. The developed framework is to be used to identify discourses and things in the context (e.g. institutions, stakeholders) that can explain both the discourses as such but also why certain discourses get footing and why others fall between the cracks.

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This part is organised as follows:

Chapter 3: Harnessing digitalisation in the smart city

Chapter 4: Smart city discourses

Chapter 5: Theoretical foundations for analysis

Chapter 3: Harnessing digitalisation in the Smart City

This chapter aims to discuss and define digitalisation in relation to the smart city phenomenon. The chapter is introduced by a discussion on the phenomenon per se and how it is related and relevant to information systems as a research field and discipline. Thereafter, digitalisation in and of cities is problematized and theorised. Altogether, this forms the baseline to understand what digitalisation is in relation to the smart city and in relation to urban development.

Information systems research and the smart city

We have already seen in the introduction to this thesis that the smart city has emerged as both a concept and an approach to handle challenges connected to current trends in society and to fuel sustainable development (Tranos and Gertner, 2012; Hollands, 2008). We have also learnt that digitalisation is central to the phenomenon as such (Alawadhi et al., 2012; Caragliu et al., 2011;). When I refer to *smart city developments* in this context I mean both ideas and applications, and approaches to become “smart”. In other words, when we talk about smart city developments, digitalisation could either be part of a product or part of a process (cf. Gil-Garcia, Pardo, Nam, 2015). This also means that digitalisation can have different roles and functions in different contexts related to the smart city phenomenon.

In information systems research (referred to as ISR) there is a tradition of studying the *contextual use and design of the IT artefact* (Ehn, 1995; Goldkuhl, 1996), which means that in addition to technical aspects, social, organisational or individual aspects are also of importance. In fact, it is argued that the design of “the IT artifact encapsulates, the structures, routines, norms and values implicit in the rich contexts within which the artifact is embedded” (Benbasat and Zmud, 2003, p. 186). An interesting point is made by Brey (2000) who argues that technology often is (mis)taken to be a neutral tool, indicating that technology influences the context in which it is to be used. Altogether, this shows that the context is of importance, and for me one of the strengths of ISR is its focus on understanding and improving information systems in its given context (also a reason to why IS research is important in a smart city context). This has also been one of the guiding principles in this thesis, where I have focused on identifying repertoires of discourses on digitalisation in the *context* of urban planning and development and the smart city. The aim of this approach has not only been to identify and analyse discourses, but also to understand and explain them by taking into account both the wider

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institutional context as well as the narrower organisational context of urban planning and development.

So far, we can note that digitalisation is spoken of in different terms, sometimes referred to as information and communication technologies (ICT) or information technology (IT), and other times as digital solutions, digital resources, digital infrastructures, or digitalisation. This might be confusing, however, I believe that ISR can be helpful in sorting out these different concepts. In its most general sense information systems as a discipline focuses on *how information systems and information technology are developed and used, and how they impact individuals, groups, organisations, and society* (Sidorova et al., 2008; Benbasat and Zmud, 2003; Baskerville and Myers, 2002; Davies, 1991). In this short description, I see two important aspects of the discipline, i.e. *information systems* (IS) and *information technology* (IT). In my view, information systems could be seen as a superior concept to information technology; an assumption which I think I find support in by several other scholars. Iivari and Hirschheim (1996), for example, interpret information systems as “computer-supported system[s]” (p. 552) and Galliers (2003) describes information systems as social systems in which information technology is but one component. To resemble an information system with a social system, as Galliers do, also puts focus on human activity and in particular the activity concerning interpretation and communication of information. Also Beynon-Davies (2009) emphasises the human side of information systems, systems which he means “involve people in producing, collecting, storing and disseminating” information (p. 103). Both *digitisation* and *digitalisation*, (cf. Chapter 2) could be seen to be sociotechnical processes with a sociomaterial perspective (cf. Tilson et al., 2010; Brennen and Kreiss, 2014; Orlikowski and Scott, 2008). An example of such a sociotechnical process in a smart city context could be the development, deployment and use of smart grids. The aim of this development is to gather, communicate and act on real-time data concerning electricity consumption and pricing in order to be more efficient and create a sustainable electricity provision for the future (European Commission, 2011; Naus, Spaargaren, van Vliet, van der Horst, 2014). Here, the smart grid is the computer-supported system (information technology) that makes the processing of data and data analytics possible. The system consists of a collection of integrated technologies and devices which are embedded in and used in particular contexts. I think this is a representative example of how *information technology could be seen as an integrated part of a larger information and communication system* (cf. Avgerou, 2000), and I think this example strengthens the idea that information systems are what emerges when technology and human action coincide (Baskerville and Myers, 2002; Paul, 2007). I find this holistic (cf. Agarwal and Lucas, 2005) and contextual understanding of design and use of information technology to be helpful when analysing

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and understanding digitalisation in the context of smart city developments and urban planning in practice.

Hence, a central assumption in this thesis is that information systems primarily are sociotechnical systems including both social and technical systems (Bernroider et al., 2013; Iivari and Hirschheim, 1996 – cf. my previous discussion on digitalisation/digitisation in Chapter 2) and should thus be acknowledged as such in the design and development process (Mumford, 2006; Mumford, 2000). An analysis of discourses on digitalisation in policy and planning of urban development will most likely reveal variances in understanding of the phenomenon, where some are more prone to have a strong orientation toward a technical view while others are more oriented toward a social view (cf. Iivari and Hirschheim, 1996). In this context, I mean that lessons can be learnt from prior research in the e-government field where there are examples of studies that show the importance of exposing and considering different stakeholders' views, beliefs and assumptions (cf. Irani et al., 2005), especially as these stakeholders change over time (Axelsson, Melin, Lindgren, 2013b). By identifying variances in discourses on digitalisation we can avoid future misunderstandings on where digitalisation can make a contribution in both the planning process and in the design of urban areas, buildings, infrastructure or services.

Further, the smart city, which we will see in this chapter and the next, touches upon many topics within the information systems field, and as a result I think the information systems field can contribute with knowledge to practice within more than one area. First, the smart city is often brought up as a topic in its own within e-government research. In this context it is understood as an approach to transform the public sector, e.g. smarter governance (Gil-Garcia, Zhang, Puron-Cid, 2016; Gil-Garcia, Helbig, Ojo, 2014; Nam and Pardo, 2012), and better service delivery (Allwinkle and Cruickshank, 2011). In the literature on the smart city, we can also note that digitalisation varies from being a central dimension to a less central dimension of the phenomenon (cf. Nam and Pardo, 2011a and 2011b). Hence, so far there is no unanimous interpretation of the centrality of digitalisation in these kinds of undertakings. I find this interesting as it also reflects the debate concerning the core of ISR (cf. concerning the centrality of the IT artefact, e.g. Orlikowski and Iacono, 2001; Alter, 2003; Benbaset and Zmud, 2003; Galliers, 2003; Weber, 2003; Agarwal and Lucas, 2005; Hidding, 2012). Returning to information systems topics which could be of relevance when investigating how digitalisation is spoken of in policy and planning of urban development and the smart city, I see that the phenomenon also appears to touch upon many recent topics within ISR. One aspect of a city being smart is the pervasive use of ubiquitous computing to collect, analyse and manage information in real time (Kitchin, 2014), which is closer to the traditional interpretation of *digitisation*. In ISR there is an increasing interest in open data or big data and big data analytics (cf. Chen, Chiang, Storey, 2012), and, in relation

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to open government, research shows that in practice it often exists a too simplistic view of distribution and use of open data (Janssen, Charalabidis, Zuiderwijk, 2012; Hellberg and Hedström, 2015). Yet, in a smart city context the use of such data still is thought to contribute to more transparent and sustainable cities (Gil-Garcia, Pardo, Nam, 2015). In this context I think ISR can help to focus the implications of such development. This automatically leads us to the next topic that the smart city addresses, that is sustainability and resilience. In this area there is a branch within ISR that focuses on Green IS/IT (cf. Dedrick, 2010; Meville, 2010). This branch within ISR can contribute with knowledge on how digitalisation can both be a liability and a facilitator for a sustainable development. Last but not least, I want to emphasise that the smart city, perhaps more than anything else, involves traditional information systems topics like organisation and information management and technology development (Davies, 1991). Knowledge from similar undertakings (within the e-government field for example) could give insights on challenges linked to interoperability (cf. Pardo et al., 2012; Goldkuhl, 2008; Scholl and Klischewski, 2007).

Altogether, I argue that the emerging topic of the smart city reflects what many information systems scholars refer to as the diversity in the information systems field (Bernrioder et al., 2013; Córdoba et al., 2012; Robey, 2003; Baskerville and Myers, 2002). The short introduction above also witnesses how one given phenomenon can be approached from many perspectives, and given the different issues it touches upon, it strengthens the picture that developments involving digitalisation are complex, and thus demand understanding of not only the artefact per se, but rather of other issues related to the context of use (Meijer, Gil-Garcia, Bolívar, 2015). Dawes (2009) also means that future challenges are in fact so complex and dynamic that they demand a holistic and flexible perspective, as well as an ethical approach to what is an appropriate development and what is not. In sum, I argue that digitalisation in the context of the smart city and urban planning and development is a relevant and interesting area for further research from an ISR perspective for the following four reasons:

- It is a contemporary phenomenon touching upon core elements of ISR
- It is about development of information and communication systems
- It is about management and organisation of such development
- It is about infrastructures where IS/IT is a part (application and use)

Above, I have only given examples of a few areas where ISR can contribute with valuable knowledge both in analysing the phenomenon as such and to the development in practice. In the next section, I will present how digitalisation in and of cities has been framed and discussed in the literature over time. This brief overview will give a background to the emergence of smart cities.

The evolution of technical concepts used to characterise cities

The literature reveals a picture of an array of technology concepts used to characterise cities. Nam and Pardo (2011a), for example, provide an overview of different technological attributes given to the city, e.g. digital, intelligent, virtual and ubiquitous. These attributes show that phenomena, like the smart city, are changeable and under formation, which means that they are constructed and construed at the same time (cf. social constructionism, Burr, 1995). In effect, a change of attribute (digital, intelligent) not only reflects a new technological advancement, but also a change in meaning and content. From an ISR perspective, we know that technology is “a story about change” (Agarwal and Lucas, 2005, p. 391), where implementation of IT in organisations is about transforming or improving the current state. The different technical attributes associated with the city could thus be seen to represent or reflect such changes, hence mirror an urban development. In line with this reasoning, I argue that these different attributes are manifestations of the thoughts and ideas produced at that particular time and in that particular context. Thus, the smart city (like digitalisation) is something that is constructed and construed at the same time, which also means it not only changes over time, but also varies depending on context of use. In the next section I will proceed to the different attributes and what they manifest.

The digital city

In Chapter 2 I focused on one of these attributes, i.e. digital. A *digital city* is a city that makes data (or information) available so it can be processed or managed by using some type of information technology. According to Yovanof and Hazapis (2009) the digital city denotes

a connected community that combines broadband communications infrastructure; a flexible, service-oriented computing infrastructure based on open industry standards; and, innovative services to meet the needs of governments and their employees, citizens and businesses (p. 446).

I find this definition interesting as it implicitly pinpoints several things. First, it implicitly acknowledges a basic infrastructure of different technologies. Second, it implicitly denotes several information systems that are connected. Third, these connections presuppose common standards, which I think automatically raises questions on interoperability not only on a technical level but also on organisational and institutional levels. An effect of this development is that we as citizens, consumers, workers, business owners etcetera also leave “digital fingerprints” and from a city perspective these “networks of various kind (telecommunication networks such as cell phone and landline, banking networks, social networks etc.)” represent invaluable sources of information about activities in the city (Schaffers et al. 2012, p. II). I think this example illustrates the complexity of recent technology developments. From an

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individual perspective this kind of development can raise questions on privacy and security of information and from another perspective this huge volume of real-time data (cf. Kitchin, 2014) could be used to enact a more efficient and sustainable development in cities. Of course this kind of developments build on a certain technological maturity, i.e. that there is an infrastructure in place and that a service structure can be built and used on top of that. According to Schaffers et al. (2012), the first instances of digital cities were static web pages providing information about the city. Yet, recent trends, which we will see in the coming attributes, indicate a much more advanced and complex use of digitalisation. Altogether, I find the use of the digital concept in a city context to be a good example of where the effects of IT usage are wider than the artefact itself (cf. Sidorova et al., 2008; Benbasat and Zmud, 2003; Baskerville and Myers, 2002; Davies, 1991). The more digitalised the more connection and communication possibilities there are. And the more communication, the more information about city activities, information that could contribute to valuable insights linked to the challenges cities are facing. But this information could also be misused. However, we can expect that the more digitalised a city is the more information about the city will be available, information that eventually could be used to improve current situations.

The wired city

A similar concept to digital used to describe the technological development of the city is the *wired city* (Hollands, 2008 [originally used by Dutton, 1987]). According to Hollands (2008) wired literally refers to the “laying down of cable[s] and connectivity” (p. 306). This characterisation of the city is most likely a consequence of investments in basic infrastructure, such as broadband and fibre. In time one can assume that the wired city precedes the digital city, as the former could be seen as a basic condition for the latter. At the same time both of these concepts clearly refer to the technology per se, yet, very different aspects of it. The former (digital) appears to emphasise technology capabilities, i.e. its capabilities to collect, process, analyse and communicate data, meanwhile the latter (wired) stresses the physical side of it (cable installation). Hence, here we can see an example of how two different concepts (digital and wired) also reflect a technological development in society, where one represents preconditions for connectivity and the other focuses a capability of the technology involved, i.e. to process data. A conclusion we can draw from the wired city is that the more organised and developed the basic digital infrastructure (broadband, fibre) is, the better connectivity the city can offer. We can thus expect basic digital infrastructure (wires) to be an important part in planning discussions and development of new urban districts, as well

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as in restoring existing ones. We can also expect that these kinds of developments are issues that are driven by certain stakeholders¹, e.g. large technology businesses.

The intelligent city

According to Moser (2001), the *intelligent city* appears as a concept in the crossroad of the digital city and the emergence of the knowledge society. Intelligent cities are described by Komninos and Sefertzi (2009) as

territories in which the local system of innovation is enhanced by digital collaboration spaces, interactive tools, and embedded systems. Digital spaces, electronic devices, information systems and online services sustain a series of new urban functions related to knowledge creation, technology transfer, innovation, and global marketing and delivery. (p. 1)

According to the Oxford dictionaries intelligence is about having a capacity to learn and apply knowledge (Oxford dictionaries, 2014) and transferred to a city context this could refer to the city's ability to support this kind of capacity. In practice this often denotes three things 1) support actual learning, 2) support technological developments, and 3) support innovation processes. A difference between the digital and the intelligent city is according to Nam and Pardo that the former "involves every function of the city such as work, housing, movement, recreation, and environment" (2011a, p. 285), meanwhile the latter involves "functions of research, technology transfer, product development, and technological innovation, as a hotbed of innovative industries" (ibid.). Hence, the intelligent city appears to be more focused on the technology as such, either as an instrument for innovation or as a market for innovation itself. When it is seen as an instrument (or tool) we can note a connection to the ideas behind the rise of Web 2.0 where IT became a medium which made it possible to collaborate and interact to a higher extent (Schaffers et al., 2012). Hence, as a spin off, we can expect that digitalisation in the context of urban planning and development is also spoken of as an area for innovation or as market for innovation itself.

The ubiquitous city

According to Nam and Pardo, (2011a) the *ubiquitous city* can be seen as an extension of the digital city. The attribute ubiquitous could at the same time be interpreted as an allusion to ubiquitous computing which is

"a vision of computing power 'invisibly' embedded in the world around us and accessed through intelligent interfaces: 'Its highest ideal is to make a computer so embedded, so fitting, so natural, that we use it without even thinking about it.'" (Ley, 2007, p. 64).

¹ Stakeholder definition is presented in chapter 5. Stakeholders refer to those who either influence or are influenced by an organisation (e.g. organisations, groups, individuals) and thus have a stake in it (cf. Freeman, 1984)

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In a city context this kind of thinking is closely related to the development and use of sensor technology, often spoken of and used together with the concept of Future Internet (cf. Hernández-Muñoz et al., 2011; Schaffers et al., 2011; Perera et al., 2013) and the Internet of Things (IoT) and Internet of Services (IoS). The combination and integration of different technologies, like internet, mobile devices, and sensors, have recently made it possible to create “a built environment where any citizen can get any services anywhere and anytime through any devices” (Nam and Pardo, 2011a, p. 285). Kitchin (2014) even speaks about everywares, that is

*pervasive and ubiquitous computing and digitally instrumented devices
built into the very fabric of urban environments (e.g., fixed and wireless
telecom networks, digitally controlled utility services and transport
infrastructure, sensor and camera networks, building management systems,
and so on)(p. 2)*

These everywares are then used to “monitor, manage and regulate” city operations in real-time (ibid.). What we might not think of is that we as citizens, when we use smart phones, also produce data about our activities and/or our locations, and we are thus also part of such a development. As a result, in addition to basic infrastructure, we can expect digitalisation and implementation of sensor technology to be on the agenda when discussing and planning developments of new areas and buildings. And similar to the expectations expressed above, we can assume that there are some stakeholders that are more prone to drive digitalisation in this context. In the discussion linked to the transformation of the public sector, we can expect that these kinds of discussions are more frequent (cf. Kitchin, 2014).

In sum, based on the presentation above, we can see that digitalisation in and of cities have been framed differently over time (see Table 3:1 below). We can also note that the different characterisations used also have different meanings and focus, where the biggest difference in meanings is between the wired city and the intelligent city. Concerning usage, there is a shift from simple connectivity (being able to access and connect) to complex interconnected networks of use for different purposes. This also fits well with the development of digital resources (cf. Table 3:1 below), where earlier characterisations focus on basic infrastructure and later ones on the plethora of technologies as embedded systems.

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Table 3:1. Summary of city characterisations²

	Wired city	Digital city	Intelligent city	Ubiquitous city
Usage	To provide connectivity	To communicate, inform, collaborate, and share	To innovate through digitalisation or to innovate digitalisation	To provide services anywhere at any time
Technology	Basic infrastructure (e.g. like broadband, fibre)	Computer networks and computational power (Web 2.0)	Collection of technologies and applications (Web 2.0)	Collection of technologies (sensors, devices, Internet)
			Embedded systems	

Hence, these four characterisations of cities – wired, digital, intelligent, and ubiquitous – gives us a background to the emergence of the smart city. The frame-breaking change that internet represents (cf. Agarwal and Lucas, 2005) has made recent developments possible. Schaffers et al. (2012) have distinguished three succeeding and sometimes overlapping waves of technologies, that they mean have driven the development of the smart city. In Figure 3:1 below, I have summarised the main features of these waves.

Figure 3:1. Three waves of technology developments in cities (based on Schaffers et al., 2012, p. III-IV)

Earlier I discussed sociotechnical systems (cf. Iivari and Hirschheim, 1996) and digitalisation as a sociotechnical and sociomaterial process (cf. Tilson et al., 2010; Orlikowski and Scott, 2008), and I find that these waves also reflect this movement within the information systems discipline as it not only pinpoints the technical advancements but also the human activity that coincides with it. A quick comparison between the three waves and the four different characterisations of cities above, show many similarities where the first wave could be seen to represent earlier attributes connected to city (wired/digital) and later waves represent more recent attributes (ubiquitous/smart). In ISR we know that systems design is challenging and this

² Note that the smart city is not included in the summary as it will be covered later on, however, it could be seen as a development of both the intelligent and the ubiquitous city.

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development towards embedded systems creates challenges beyond the normal. Dawes (2009) means that these advances cannot be addressed in a narrowly manner, that is focusing on one category or topic at a time. She means that future challenges lie in addressing these technical advances in a holistic and flexible way, and I agree with her.

The description of the technical development above both sums up earlier discussions and ties it well with the next section where I will explore digitalisation in the context of a smart city. This development is part of the third wave above, where we have moved toward embedded and wireless IT system solutions.

Unpacking digitalisation in the context of smart cities

In this section we will “unpack” digitalisation in the context of a smart city and try “to move beyond a black-box characterization of the technology” (Agarwal and Lucas, 2005, p.395). The aim of characterising the technology in this context is to give us a basic understanding of what the expectations might be on the digitalisation in practice (as part of a technical process). And as a next step, this will also help us understand how different stakeholders have approached and how they view and understand the phenomenon. Consequently, this forms the basis for my theoretical understanding of digitalisation in the context of urban planning and development and the smart city, thus also the basis for identifying and analysing discourses on digitalisation in policy and planning of urban development in practice (the empirical analysis). However, before unpacking digitalisation in the context of the smart city, I will give a brief overview of how the purpose of digitalising cities have been framed. This will give us an understanding of how digitalisation in urban development generally is motivated.

Framing the purpose of digitalisation in and of cities

In the introduction of this thesis, it was discussed how different mega trends affect society in general and some of the challenges that coincide with these trends were mentioned. These challenges are more substantial in a city context. For example, the migration to cities has come to have consequences on the environment, i.e. causing greater ecological footprints (Rees, 1992). We can also note that urbanisation not only has physical consequences such as expansion of the city area and the physical infrastructure, but also on the service infrastructure, like for example energy services, transportation services, social services and healthcare services. Altogether this creates “many challenges for the planning, development, and operation of cities” (Harrison and Donnelly, 2011, p.2). In this context digitalisation is presented to have an important role. In an administrative context it is often pointed out that the use of digital resources opens up for involving citizens and other stakeholders in governmental affairs and decision making. This is also thought to increase the sense of inclusion and the transparency in the political and administrative process (Nam and Pardo, 2012; Gil-Garcia et al., 2014).

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Even though the above mentioned trends are discussed as global trends, much of the consequences and challenges are in recent discussions presented as local concerns. Here, we can see a shift in the discourse on *who* is to take lead and act upon these challenges and *how* it could be done. Up to this point global agreements have been sought (e.g. WCED, Earth Summit, Kyoto Protocol), but these agreements have been proven to be hard to achieve. Instead, focus now appears to lie on local governments and how they can (or must) take lead and pave way for a sustainable urban development. Hence, here we can see a shift from a discourse focusing on top-down driven solutions and changes (global) to bottom-up driven ones (local). Cities are in this new context put forward as change agents and drivers of innovation (Schaffers et al., 2011) and the city is attributed “a pivotal role” in achieving a sustainable development (Kievani, 2010; Holden et al., 2008).

From a local perspective, as citizens or business owners, we expect that the city provides us with basic services and infrastructures. In the example below (Figure 3:2), I have illustrated some of the services (functions) that could be considered as basic services/functions in a city context, e.g. ranging from services connected to welfare and healthcare to telecom, real estate and construction. Not all of these services are administrated by the local governments, but nonetheless local governments are in most cases responsible for providing basic infrastructures, such as utilities, transport and broadband infrastructure, which are critical infrastructures when it comes to service delivery. How these services are organised and managed can vary depending on cultural context.

Figure 3:2. Services in a city context³

³ Image inspired by Figure 2:1 in SOU 2012:18, p. 17.

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However, the problem today is that not only are these services costly in their own, but due to globalisation, urbanisation and climate changes, cities and local governments are pressured to *deliver better services with fewer resources* (cf. European eGovernment action plan 2011-2015). In the same line of arguing it is said that this will demand fundamental changes in how services are distributed and delivered. Better services with fewer resources call for new “innovative” ways of thinking when developing and providing services to citizens and businesses. Hence, it is a question of smarter use and delivery of services. It is argued by Gil-Garcia (2012) that the next step for governments is to “use sophisticated information technologies to interconnect and integrate information, processes, institutions, and physical infrastructure to better serve citizens and communicates” (p. 274). And much of the planning for these changes are part of urban planning and development.

The concept of a smart city has come to focus these sought changes; where the smart city denotes a future state, where people through using IT “are empowered /... / to shape urban change and [realise] their ambitions” (Schaffers et al., 2012, p. II). Hence, the smart city does not only include technology as an “intelligent” component, but also the people and their capabilities to innovate with the help of digitalisation. In this context, the development of digital infrastructures of cities constitutes a critical factor in achieving the sought changes; changes that affects almost every service/function in the city, e.g. healthcare, energy, education, environmental management, transportation and mobility, and public safety. Accordingly, digitalisation is framed as something that can reinforce efficiencies and at the same time drive down costs (cf. European eGovernment action plan 2011-2015). In practice we can thus expect digitalisation to have this double function both as a product and means and thus being a critical infrastructure, and therefore have a central place in the discussions and work of urban planning and development. In the next section, I will start to unpack the smart city developments to gain understanding of how digitalisation can be used realise this service transformation.

The smart city as an instance of digitalisation

One part of realising smart cities is the development of a digital layer (Schaffers et al., 2012). The concept of a smart city, however, occurred first in the late nineties and was at that point used to describe visions of urban areas. Today the concept is more used to “describe various alternatives of ICT-based solutions for the urban space” (Vakali et al., 2014, p.1). Already at this stage, we can note that we are not talking about *one* technology, but rather of several technologies depending on the particular solution (application) in focus (Harrison et al., 2010). According to Schaffers et al. (2012), it is not until recently (around 2010) that we could see these new types of collections of technologies in use in a city context (see the 3rd wave in Figure 3:1 above). This could, according to them, be seen to mark a turn towards smarter cities. To describe the technological development Schaffers et al. (2012) and Harrison et al. (2010) mean that

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smart cities are characterised by three different technical undertakings and capabilities, i.e. instrumentation, interconnection and intelligence. Below I will make use of these three concepts when unpacking digitalisation further.

1) Instrumentation

Instrumentation is about equipping the city with necessary tools (instruments) for delivering and managing services (Gil-Garcia, Pardo, Nam, 2015), and in this context the tools many times represent what I above spoke of as a new collection of technologies. The purpose of digitalisation in a city context is to connect digital applications and solutions with “the physical infrastructure, /.../, the social infrastructure, and the business infrastructure [this in order] to leverage the collective intelligence of the city” (Chourabi et al., 2012, p. 2290). Yet, depending on the particular service in focus, the instruments could vary, but the main idea is to use these instruments to measure city workings or operations or to gather information on city activities (Schaffers et al., 2012; Naphade et al., 2011; Harrison et al., 2010). By being measurable they could also be managed and controlled to a higher extent.

However, a precondition for instrumentation is that a *basic digital infrastructure for communication* is in place. In Figure 3:3 below there is an example of what this basic infrastructure for communication consists of; i.e. different broadband technologies (e.g. optical fiber, coaxial cables) and telecommunication technologies (e.g. GSM, WiMax, WiFi, 3G, 4G and the forthcoming 5G). This basic technical infrastructure represents preconditions to internet connection and to wired or wireless communication. However, these communication networks are not enough when the idea is to gather data on city operations, yet they constitute an important precondition (Schaffers et al., 2011). In addition to these networks, smart city solutions also involve the development and deployment of sensors, smart and connected devices (see Figure 3:3) such as for example smart meters and smart phones (Schaffers et al., 2012; Allwinkle and Cruickshank, 2011; Harrison et al., 2010) – hence, the instrumentation layer. The deployment of sensor networks also means more data points which is thought to facilitate the collection of data on different city operations (Naphade et al., 2011). Altogether, this forms a new type of infrastructure/platform – a type of smart object network, which could be seen as the “the backbone” of the creation of an intelligent infrastructure and the smart city (ibid; Chourabi et al., 2012). Hence, “infrastructures are central to the smart city concept” (Nam and Pardo, 2011b, p. 186). Thus, in practice, we could expect that basic communication infrastructures and instrumentation are issues that are discussed and prioritised.

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Figure 3:3. Instrumentation of cities⁴

This basic digital infrastructure for communication (cf. hard infrastructure SOU 2012:18), represented in the bottom layer the Figure 3:3 above, together with development and deployment of mobile phones, smart phones, tablets, and open data (open databases) and sensors and digital control technologies have made smart city solutions realisable. As a consequence, cities as such are “becoming like computers in open air.” (Schaffers et al., 2012, p II). Noteworthy is that these technologies, as well as the communication infrastructure, are provided by the private sector. Based on the presentation above, we can conclude that the basic digital infrastructure for communication is an important precondition for a city to become smart, but at the same time not enough. This leads us to the following concept, i.e. interconnection.

2) Interconnection

The concept *interconnected* means to be connected with one another. In a city context this could mean that “all parts of a city communicate with wired and wireless networks” (Schaffers et al., 2012, p. IV), connecting physical networks with software systems (Harrison et al., 2010). Thus, the basic digital infrastructure for communication is a

⁴ Image originating from SOU 2012:18, p. 17.

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precondition for being interconnected. In Figure 3:4 below I have illustrated the interconnection by adding another layer to the previous one. This layer could be seen to represent the operating layer of the service infrastructure (cf. soft infrastructure SOU 2012:18) and, in contrast to the previous layer, this layer assumes not only *interconnection of systems* but also *integration of systems* (cf. the discussion on smart cities as “systems of systems”, Naphade et al., 2011). Integrating in this context is about bringing different systems together and combining them to a whole. Hence, for gathering data about different city operations and provide new services, this might result in developments of technical platforms to handle and manage data transmission and/ data storage, interface designs, domain management, or result in designing, developing and integrating systems for identification, authorisation and/or signing (see Figure 3:4). By integrating all these systems and allowing “free flow of information from one discrete system to another”, there is a strong belief that this will increase “the efficiency of the overall infrastructure” (IBM, cited in Allwinkle and Cruickshank, 2011, p. 2). In this context, the free flow is a two-way flow, where the different systems “are increasingly both producers of information and consumers of one another’s information” (Naphade et al., 2011, p. 33). As a consequence, these kinds of service developments not only create cross-system dependencies, but also many times cross-departmental or even cross-organisational dependencies. In turn, this raises issues of *interoperability* on 1) *technical level* concerning for example developments of standards and standardised protocols, 2) *organisational level* concerning inter-departmental or inter-organisational collaborations and how they can be organised, 3) *semantic level* concerning concepts and terminology, and 4) *judicial level* concerning alignment of rules and legal frameworks, (cf. SOU, 2012:18; Gil-Garcia, 2012; Nam and Pardo, 2011a,b; Goldkuhl, 2008). All these issues are also part of the operating layer illustrated in the Figure 3:4 below.

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Figure 3:4. Interconnection and integration⁵

To sum up the discussion above, we could see that interconnection and integration of systems concern the operative layer of city services, and this use of a new generation of nanotechnologies (cf. Gil-Garcia et al., 2014) calls for a future-oriented approach to developments similar to e-government developments (cf. Larsson and Grönlund, 2014), as well as an effective management of the systems involved (Nam and Pardo, 2011b). Hence, in relation to operation of digital solutions, I expect that issues related to interoperability will be raised both in policy and in planning of urban developments. This also leads me into the next concept – intelligence (or smartness) – which could be seen to be the aim of the interconnection and integration of the technologies discussed above.

⁵ Image originating from SOU 2012:18, p. 17.

3) Intelligence

Intelligence is perhaps a more complex and complicated concept than instrumentation and interconnection. In general, it could be interpreted as the ability to both attain and apply knowledge and skills (Oxford dictionaries, 2014). The question here though, is what this might mean in a city context and to urban planning and development. Above we have seen that the recent technological developments, like the deployment of nanotechnologies (sensors, smart mobile devices et al.) and the integration and combination of these systems and technologies, constitute the foundation for a city being intelligent or smart (cf. Nam and Pardo, 2011b). Yet, the intelligence in this context refers to the “predictive [analytical] software and modelling for more informed decisions.” (Schaffers et al., 2012, p. IV). As we established above, this concerns the city’s ability to attain information about its operations. Thus, the idea is that the IT systems are provided with real-time data (through sensor networks), and then through advanced analytics it can “help people make more intelligent decisions about alternatives and actions that will optimize business processes and business balance sheet results”. (Chourabi et al., 2012, p. 2290; cf. Naphade et al., 2011). In other words, intelligence is achieved when new insights can be drawn on available information; insights that can improve city management (Gil-Garcia, Pardo, Nam, 2015; Gil-Garcia, Helbig, Ojo, 2014).

Hence, we can thus expect that the goal of developing and implementing smart technologies in a city context is to optimise and make operations (the services/functions) more efficient and at the same time influence user behaviours. Hence, concepts like *optimisation*, *efficiency* and *influence* can be expected to be part of the policy rhetoric and planning rhetoric connected to digitalisation in urban development. I will conclude this unpacking of digitalisation in the context of smart cities by quoting Nam and Pardo (2011a) in their review of smart cities where they have found that smart cities are compared to

[...] organisms that develop an artificial nervous system, which enables them to behave in intelligently coordinated ways. The new intelligence of cities, then, resides in the increasingly effective combination of digital telecommunication networks (the nerves), ubiquitously embedded intelligence (the brains), sensors and tags (the sensory organs), and software (the knowledge and cognitive competence). (p. 284)

Summary and reflections on the digital dimension in smart cities

To sum up this section, it is clear that digitalisation is not only about the IT artefacts as such. In effect, it includes a digital infrastructure for communication (cf. Tilson, Lyytinen, Sørensen, 2010), the ‘glue’, which holds the services together and enables the usage (cf. Agarwal and Lucas, 2005). According to Wilson et al. a digital infrastructure could be seen as a category of IT artefacts and is defined as “the basic information

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technology and organisational structures, along with the related services and facilities necessary for an enterprise of industry to function” (2010, p. 748). These infrastructures are also defined according to what entity they support or enable, ranging from global to local, where the latter could be a city infrastructure or a corporate infrastructure. Further, the unpacking of digitalisation in the context of a smart city show that the collection of technologies in use (or for future use) could be characterised by their task (Naphade et al., 2011)

- Sensing – to provide real-time location aware data and feedback
- Information management – to assess and allocate resources and coordinate information
- Analytics and modelling – to process and analyse large data sets
- Influencing outcome – to empower people to make timely and sharp decisions

This technical focus on smart cities presents a technocratic view of city development, where cities are “treated as technical problems” (Kitchin, 2014). Several researchers caution against this development (e.g. Kitchin, 2014; Viitanen and Kingston, 2014; Hollands, 2015). Viitanen and Kingston (2014) for example, advise against international technology firms (e.g. IBM, Cisco) having control over communication infrastructure, which eventually in the future will be an important source of power. Lack of technical knowledge within local administrations and outsourcing of IT services are also portrayed as risk factors. Also Hollands (2015) criticises the overly optimistic view of technology and the impact giant technology companies are attributed in illustrating the smart city concept. Hollands means that their take on the smart city reveals an ideological and a mechanistic view of cities, where there is little understanding on how cities “work sociologically and politically” (2015, p. 73). Kitchin also means that there is a tendency that accounts of the smart city are either idealistic and/or technical, or critical but lacking in nuance and/or empirical evidence” (2015, p. 135).

In this chapter I have focused on how the smart city and digitalisation is spoken of in the literature. I have presented how digitalisation is framed and motivated in this context and what digitalisation means (special focus on the technical perspective). In the end I have also addressed critical perspectives on the smart city. In the next chapter, I will continue to explore the concept of a smart city and discuss different discourses linked to the concept.

Chapter 4: Smart city discourses

This chapter aims to describe and discuss different discourses connected to the smart city. The chapter is introduced by a general discussion on the emergence of the smart city concept. However, the main discussion is on two different discourses on the smart city. Altogether, this forms a pre-understanding of how digitalisation is spoken of by different stakeholders in policy and planning of urban development.

The smart city could, as I have mentioned earlier, be seen as a way of dealing with the current urban situation and one aspect of this concerns transformation of services (cf. Gil-Garcia et al., 2014; Nam and Pardo, 2012; Perera et al., 2013). In chapter 3 we saw examples of how digitalisation could be used to transform and enhance service delivery from a technical perspective – focusing on instrumentation, interconnection and intelligence (Harrison et al., 2010; Naphade et al, 2011). However, it is not only a digital communication infrastructure that characterises a smart city. Instead, the aim of the smart city is to connect different infrastructures, i.e. physical, social, business, and digital with each other (Chourabi et al., 2012). As a consequence, we can note that the concept of a smart city denotes something more than implementation and use digital infrastructures and resources (cf. Caragliu et al., 2011; Nam and Pardo, 2011a,b). Connections of infrastructures call for investments. Apart from investments in digital infrastructures other types of investments are put forward in the smart city approach as being of equal (or more) weight, e.g. investments in human and social capital, and investments in traditional infrastructure (transport). This together “with a wise management of natural resources, through participatory governance”, will according to Caragliu et al. “fuel sustainable economic growth and a high quality of life” (2011, p. 70). The second type of investment (human capital) could in this context be seen to refer to knowledge and /or different capabilities either possessed by an individual or a group of individuals in society. From a city perspective this could be about attracting or keeping the right people in the community. In order to attract or keep people, local governments have to perform well along other dimensions, e.g. providing an attractive environment for both living and working. In the literature I have noted two overarching discourses connected to the smart city: the smart city as an arena for policy-making and the smart city as an arena for economic development. Below, I will describe them more.

The smart city as an arena for policy-making

According to the literature, the smart city emerged early as a concept in the *policy arena* (Caragliu et al., 2011; Tranos and Gertner, 2012). Subsequently, national and local

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governments have come to use the concept to fuel a certain direction or course of action of urban development often with the motive to strengthen socioeconomic progress (Kourtiti et al., 2012; Caragliu et al., 2011), or to promote a sustainable development and to improve quality of life (Batagan, 2011; Hollands, 2008). In this context several frameworks/strategies on the smart city have been developed. Frameworks and strategies that are used as a policy instrument. These frameworks focus on city services and functions (e.g. economy, transport, environment, energy, housing, and governance), as well as governance dimensions (e.g. citizen engagement, openness, efficiency, effectiveness, integration, sustainability, equality) (Caragliu et al 2011; Lombardi et al., 2012; Gil-Garcia, Zhang, Puron-Cid, 2016). The global trends and the challenges inherent to them are more or less prominent in these policy areas. Using the smart city as a policy instrument in this context could be seen as a political instrument to achieve change. Yet, Nam and Pardo (2011b) caution against a confusion between policies and visions, where the latter should be regarded as ideas of a future state, meanwhile the former concerns the way (the process) to get there. An overview of the concept used in a policy context indicates that the digitalisation is both part of the solution, i.e. development of digital products or services, and of the process, i.e. the use of digital resources to engage citizens or other stakeholders in the planning and developing process. Yet the products and processes can vary depending on the policy area, thus the contextual use is of importance.

As I discussed in Chapter 3, the problems cities are facing and the solutions they call for are complex and a “major element of a smart city is a fundamental change to the way that services are delivered” (Nam and Pardo, 2011b, p. 186), where Internet of Things (IoT) and sensing technologies are discussed as new service models (Perera et al., 2013). Hence, the way that city services are managed and controlled, could be expected to be a key issue in realising these changes in the service delivery. And as noted above, one strand within smart city literature focuses on *identifying key dimensions and indicators of smart cities* and *developing frameworks for smart city developments* (e.g. Albino, Berardi, Dangelico, 2015; Neirotti et al., 2014; Lombardi et al., 2012; Komninos, Schaffers, Pallot, 2011; Caragliu et al., 2011). Examples of core dimensions in urban development are economy, mobility, environment, people, living, and government. Smart city frameworks are often used to measure city performance and smart city progress (see example in Table 4:1 below, Giffinger et al, 2007). These types of frameworks, often developed by researchers to further our knowledge and understanding of the phenomenon, are aimed at people in leading or deciding positions to get data on city operations and progress.

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Table 4:1 Example of smart city indicators (Giffinger et al., 2007, p. 12)

Smart dimensions						
Characteristics and indicators	Economy	Governance	People	Environment	Mobility	Living
	Relating to competitiveness	Relating to participation	Relating to social & human capital	Relating to natural resources	Relating to transport and ICT	Relating to quality of life
	Innovative spirit	Participation in decision-making	Level of qualification	Attractivity of natural conditions	Local accessibility	Cultural facilities
	Entrepreneurship				(Inter-)national accessibility	Health conditions
	Economic image & trademarks	Public and social services	Affinity to life long learning	Pollution	Availability of ICT-infrastructure	Individual safety
	Productivity	Transparent governance	Social and ethnic plurality	Environmental protection	Sustainable, innovative and safe transport systems	Housing quality
	Flexibility of labour market	Political strategies & perspectives	Flexibility	Sustainable resource management		Education facilities
	International embeddedness		Creativity			Touristic attractiveness
	Ability to transform		Cosmopolitanism/Openmindedness			Social cohesion
			Participation in public life			

In the Table 4:1 above, we see an example of indicators of a smart city. From an IS perspective, it is interesting to note that these dimensions and indicators not necessarily involve usage of digital resources. In fact, digitalisation appears to have a diminished role. Yet, at the same time digitalisation can be seen to underpin several of these indicators, for example as an instrument to increase transparency in governance processes and decision making. This is also a theme in the smart city literature that focuses on smart governance and smartness in a governance context (e.g. Gil-Garcia, Zang, Puron-Cid, 2016; Gil-Garcia, Pardo, Nam, 2015; Meijer and Bolívar, 2015) Thus in practice, we can expect several of the city's functions to be supported by digital resources. Like in the example above we can expect that digital solutions are important when involving citizens in urban planning and development. This could range from getting input in the actual planning of new urban districts to getting input on specific aspects, such as housing, cultural facilities, or infrastructure.

Another take on the smart city in policy-making is its focus on *sustainability*; where the concept of a smart city could also be seen as a vision of a future sustainable state (Nam and Pardo, 2011b; Gil-Garcia, 2014). Sustainable development is a complicated concept with many and often vague meanings. However, the most renown and cited definition is the one presented in the Bruntland Report:

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (WCED, 1987)

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There are several examples in the literature where the smart city concept is associated with sustainable development (e.g. Hollands, 2008; Batagan, 2011; Juan et al., 2011; Schaffers et al., 2011; Tranos and Gertner, 2012). It is often pointed out that due to the problems cities are facing today, they are pressured to make management and resource use more *efficient*. At the same time, Chourabi et al. (2012) mean that the smart city is an abstraction of a “sustainable and *livable* city” (ibid., p. 2289), which also stress social values. Kourtit and Nijkamp mean that the smart city even has become a “landmark in urban planning” (2012, p. 93). The long term effects of urban planning and development and the use of digitalisation, naturally put questions of sustainability on the agenda. Hence, the discourse of sustainable development could thus be expected to be central to urban planning. However, as there are many stakeholders involved in these types of projects we also expect different interpretations of and perspectives on how digitalisation is to be used in a sustainable way.

In Chapter 3, we have seen that the local turn in handling inherent challenges to global trends calls for bottom-up solutions. Examples of bottom-up driven solutions where digitalisation plays an important role is the use of open data. In a city context open data on urban systems is put forward as one way to stimulate people-driven (local) developments (cf. Schaffers et al., 2012). Digitalisation is essential in the production, the collection, and/or storage of data (cf. Beynon-Davies, 2009). People-driven also means user *participation*, and this bottom-up model could be interpreted as a way of letting citizens (or other stakeholder groups) influence their community and thus addressing social sustainability (cf. Partridge, 2005). According to Partridge (ibid.) social sustainability is a vague term, and therefore there is no concise definition of it. However, she presents five dimensions that she finds characterise social sustainability; i.e. quality of life, equity, inclusion, access, a future's focus and participatory processes. These dimensions can be linked to the smart city concept. For instance, it is argued by Chourabi et al. (2012) that smart governance, which is designated as one important characteristic of a smart city, “is based on citizen participation” (ibid., p. 2292), which allows citizens to become active and participate in the “governance and management of the city” (ibid., p. 2293). Hence, the smart city touches upon many of the dimensions that Partridge (2005) means social sustainability stands for. Giving access to the governance processes by letting citizens participate in them, something which conventionally has been ignored according to Chourabi et al. (2012), is also a way to create a sense of *inclusion* and let people and communities *influence* their quality of life.

Another strand in the literature, which also could be seen as a part of the smart city as an arena for policy-making, focus on how cities (local governments) make use of the concept. There are several examples of *cities declaring themselves smart*, e.g. San Diego, San Francisco, Southampton, Amsterdam (cf. Allwinkle and Cruickshank, 2011; Caragliu et al., 2011; Deakin and Al Waer, 2011; Naphade et al., 2011), i.e. branding

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themselves as smart cities (Hollands, 2008). Yet, a review of the literature and homepages reveal very little of what these self-appointed smart cities actually refer to when they call themselves smart (see examples in Table 4:3 below). Here, it rather appears as if the cities want to project a picture of being at the forefront of technology deployment (being *modern*) and urban development, and used this as a *competitive* instrument to signal *attractiveness*. This interpretation and use of the smart city concept could be in line with the general marketing trend permeating the public sector, where branding is used as an instrument to promote competitiveness (cf. New Public Management). Nam and Pardo (2011b) even argue that image making is “pivotal to the transition to a smart city because a popular brand makes a city well-known to the outside world.” (p.189). The big technology companies (e.g. IBM, Cisco, Hitachi) also use this as a strategy when promoting smart city solutions. They mean that the smart city branding can be used as a way of attracting people and especially future generations (cf. Harrison and Donnelly, 2011). They argue that for officials it becomes a question of creating an attractive environment for young people, and their interpretation of what attractive is: to “offer pervasive public wireless network access” (ibid., p. 5). Below in Table 4:2, I present four examples of cities promoting themselves as smart or on their way of becoming smart. The four examples illustrate two things. First smart city initiatives many times appear to go hand in hand with sustainable development. Second, these initiatives are often taken in cooperation with the technology companies. (a movement that some researchers caution against, e.g. Kitchin, 2014; Viitanen and Kingston, 2014; Hollands, 2015).

Table 4:2. Examples of cities branding themselves smart

Cities	Declarations
Amsterdam, Netherlands	Amsterdam Smart City (ASC) is a unique partnership between businesses, authorities, research institutions and the people of Amsterdam. Together, our goal is to develop the Amsterdam Metropolitan Area into a smart city. A city is smart when investments in capital and communication infrastructure fuel sustainable economic growth and a high quality of life, in combination with an efficient use of natural resources. Over the past three years, the Amsterdam Metropolitan Area has worked successfully to become a Smart City. http://amsterdamsmartcity.com/about-asc Accessed 2014-10-17
Gothenburg, Sweden	Gothenburg on its way of becoming a Smart City in EU. It will lead European cities in their work with the climate. Gothenburg is on its way of becoming one of EU's smart cities and leader to a EU-project on development of district heating and remote cooling. http://www.vartgoteborg.se Accessed 2014-10-17
Dallas, USA	The city of Dallas A Smart + Connected City. The city of Dallas is proud to partner with Cisco to bring smart solutions to our citizens and the millions of people who visit our city every year http: Accessed 2014-10-16
Barcelona, Spain	BCN Smart city. Barcelona applies innovative solutions to managing its services and resources to improve citizens' quality of life. http://smartcity.bcn.cat/en/ Accessed 2014-10-22

According to Hollands (2008), this (self-) designated label could be problematic as it might downplay negative effects of the technology development. The marketing trend together with development of different smartness indicators to measure smart city

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progress and performance (cf. Kourtit et al., 2012; Lombardi et al., 2012), reveals a technocratic view of city governance (cf. Kitchin, 2014).

The smart city as an arena for economic development

As we saw earlier in this chapter, the smart city is seen as an approach to strengthen socioeconomic progress (Kourtit et al., 2012; Caragliu et al., 2011). Urban areas are however characterised by increased levels of contact points and interactions, concentration of power and culture, and as such, cities give more “opportunities for wealth creation, resource distribution and efficient use of scarce natural resources” (da Silva et al., 2012, p. 129). It can thus be argued that cities play a key role as generators of economic capital. Hence, economic sustainability has come to refer to a viable use of resources (monetary, human, natural); a question of using resources optimally to create a balance over time. New, wiser and smarter ways of managing challenges and resources by for example offering/delivering new services to citizens could be expected to drive *innovation* (cf. Nam and Pardo, 2012b), and thus in the long run, contribute to a “sustainable economic growth and high quality of life” (Caragliu et al., 2011, p. 70). Chourabi et al. (2012) mean that creating “an environment for industrial development is pivotal to smart city” and the “economic outcomes of the smart city initiatives are business creation, job creation, workforce development” (ibid., p. 2293). These outcomes could be linked to questions regarding social welfare and social justice.

An example of how the smart city have contributed to *business creation* (and job creation) is the development of the technology sector. Several technology companies, like Hitachi, IBM and Siemens, show interest in the area (Yoshikawa et al., 2012; Harrison and Donnelly, 2011; Naphade et al., 2011). These technology companies often appear to work in close cooperation with cities and city managers (cf. the Dallas example above, who works together with Cisco). According to Harrison and Donnelly (2011) at IBM, the smart city concept has been adopted from the part of the technology companies already since 2005 and at that time denoting “the application of complex information systems to integrate the operation of urban infrastructure and services” (p. 2). However, in their analysis they mean that today “one of the foundations for the Smart City Approach is that [...] we have access to real-time information at the level of individual citizen’s choices and actions” (ibid., p.8). In the introduction to this thesis several challenges linked to urbanisation, climate change and globalisation were brought up. Also the industry departs from these trends when motivating developments and they mean that city development needs to create

*well-balanced relationship between people and earth /.../ [which means]
cities that remain in harmony with the environment while providing a
lifestyle that is comfortable, safe, and convenient, without compromising
people’s quality of life (Yoshikawa et al., 2012, p. 111, Hitachi)*

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According to IBM these challenges have led to “new approaches to the planning, design, finance, construction, governance, and operation of urban infrastructure and services” (Harrison and Donnelly, 2011, p.1.), something which they argue is captured in the concept of smart cities.

From an IT industry perspective there is of course an obvious interest in the technology per se, something which Hollands (2015) and Viitanen and Kingston (2014), caution against. When writing about smart cities the technology companies tend to present different smart city models, which focus on how IT can be related to the city infrastructure, often referred to as a “system of systems” (IBM, Naphade et al., 2011, p. 33, IBM). These models are still on a conceptual level, often characterised by simplifications of layers of technology applications (like we have seen in Chapter 3). Yet, at the same time these models intend to illustrate the complexity of an information infrastructure at a city level, where a plethora of city systems are to be interconnected (e.g. emergency response systems, systems for planning and administration, transport systems). Further, much focus appears to lie on how to make use of sensors, wireless networks and computing power to produce real-time data in order to improve city management (cf. IBM, Harrison and Donnelly, 2011; see also Table 4:3 below). The technology companies appear to have an engineering focus, where they for example say that they seek “advanced fusion[s] of infrastructure with information and telecommunications” and this by drawing on its “total engineering capabilities” (Yoshikawa et al., p. 111, Hitachi, cf. also IBM, Harrison and Donnelly, 2011). Hence, in line with Hollands’ (2015) discussion, the industrial discourse on the smart city tends to have a mechanistic view of cities where technology is seen as the remedy of societal challenges.

Table 4:3. Examples of technology companies and how they characterise smart cities

Company	Definition of smart city
Cisco	“Cisco Smart+Connected Communities solutions use intelligent networking capabilities to provide the information and services needed to address these challenges [urbanisation] and create more livable cities. The Smart+Connected City solution portfolio includes remote access to government services as well as City Infrastructure Management solutions for connected parking, traffic, and safety and security” http://www.cisco.com/web/strategy/smart_connected_communities.html Accessed: 2014-10-17
Hitachi	“Hitachi sees its smart city approach as the best way to resolve the problems faced by individual cities. The approach takes into account both the economy and the environment, can handle changing times and social trends, and supports safe, interesting, and prosperous lifestyles. For this approach to work, we first need to identify the stakeholders and the structures and organizations that make up a smart city, and to understand their different points of view. Hitachi views the smart city as having a hierarchical structure comprising a variety of infrastructure with different functions and roles, and believes that, if each layer of this infrastructure hierarchy is highly integrated, the city can resolve problems and provide services more efficiently and more effectively.” White paper p. 9, accessed at http://hitachi.com/products/smartcity/vision/index.html 2014-10-17
IBM	“Smarter cities of all sizes are capitalizing on new technologies and insights to transform their systems, operations and service delivery. Competition among cities to engage and attract new residents, businesses and visitors means constant attention to providing a high quality of life and vibrant economic climate. Forward-thinking leaders recognize that although tight budgets, scarce resources and legacy systems frequently challenge their goals, new and innovative technologies can help turn challenges into opportunities. These

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	leaders see transformative possibilities in using big data and analytics for deeper insights. Cloud for collaboration among disparate agencies. Mobile to gather data and address problems directly at the source. Social technologies for better engagement with citizens. Being smarter can change the way their cities work and help deliver on their potential as never before." http://www.ibm.com/smarterplanet/us/en/smarter_cities/overview/ Accessed: 2014-10-17
Intel	"Intel technology delivers practical, cutting-edge intelligence. We're partnering to help cities use resources more efficiently and realize the many untapped possibilities of the IoT. Development and deployment of M2M communication via the IoT is simplified with Intel's extensive portfolio of open and scalable solutions. By delivering the advanced end-to-end solutions needed to harness data, we're powering the IoT future and driving improvements in everything from air and water quality to transportation, communication, and energy management systems." http://www.intel.com/content/www/us/en/internet-of-things/smart-city-san-jose.html Accessed 2014-10-17
Siemens	"With the need to improve the quality of life and economic competitiveness, cities have to become more resource-efficient and environmentally friendly. Technologies are major levers and base for further sustainable city development. An effective infrastructure contributes to economic prosperity, improving quality of life. Urban residents need clean air, potable water as well as security. They need efficient buildings, a reliable power grid and capable mobility solutions. The complexity involved requires a holistic view and sustainable solutions for cities. Siemens has the portfolio, know-how, and consulting expertise to make cities more livable, competitive, and sustainable." http://w3.siemens.com/topics/global/en/sustainable-cities/Pages/home.aspx Accessed 2014-10-17

In sum, practitioners, especially belonging to the technology industry, appear to view cities as a 'system of systems', and as such they are complex. It is not only the technical systems that are complex, but also social dimensions e.g. developments that call for cross-sectorial and intra-organisational collaborations (*public private partnerships*). We can also note that the industry together with public authorities and agencies already cooperate and many times this type of collaboration appear to result in different guides to help city managers or public officials assess or work with smart city initiatives (e.g. Smart Cities Readiness Guide, Helping CIOs Understand "Smart City" Initiatives). These guides being a product of collaborations between the technology industry and public authorities many times focus on the technology per se.

Consequently, business creation also generates jobs, and an example of job creation in relation to the smart city is the development of a consultancy market. In addition to the technology companies, we have the *commercial research institutes (CRI)*, such as Forrester and Gartner, who also show interest in the topic. These commercial research institutes often have an advisory function and work in close cooperation or on behalf of their clients, i.e. professionals such as CIOs. In Table 4:4 below we can see how the two major CRIs within the IT sector choose to define the smart city. Like in the case of the technology companies the CRI's focus on analysis of real-time data and the use of smart computing technology in order to create viable solutions.

Table 4:4. Example of CRI definitions of SM

CRI	Defines a Smart city as
Forrester	"The use of Smart Computing technologies to make the critical infrastructure components and services of a city — which include city administration, education, healthcare, public safety, real estate, transportation, and utilities — more intelligent, interconnected, and efficient." And their definition of smart computing is "A new generation of integrated hardware, software, and network technologies that provide IT systems with real-time awareness of the real world and advanced analytics to help people make more intelligent

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	decisions about alternatives and actions that will optimize business processes and business balance sheet results". (Washburn and Sindhu, 2010, p.2)
Gartner	A smart city is "an urbanized area where multiple public and private sectors cooperate to achieve sustainable outcomes through the analysis of contextual information exchanged between themselves. The sectors could include hospitals or emergency services or finance and so on. The interaction between sector-specific and intra-sector information flows results in more resource-efficient cities that enable more sustainable citizen services and more knowledge transfer between sectors." (working definition, Gartner, 2012. Available at http://blogs.gartner.com/andrea_dimaio/2012/08/10/technology-is-almost-irrelevant-for-smart-cities-to-succeed/ Accessed 2014-10-17)

Both of these developments (business and job development) reinforces the idea that the smart city is an arena for economic development. Altogether, I would say, this picture signals a technological determinism in the IT sector, where there is little understanding of digitalisation as a sociotechnical process (cf. Tilson et al., 2010). As ISR "examines more than just the technological system, or just the social system" but rather what emerges when "the two interact" (Baskerville and Myers, 2002, p.; cf. Alter, 2003; Galliers, 2003; Beynon-Davies, 2009) I believe that ISR can make a contribution also in this context.

Summary and reflections on smart city discourses

In sum, the review of the smart city concept shows that global circumstances or trends often are used as a motive to promote digitalisation in urban development. The aim of this is to achieve a sustainable development, i.e. to create an inclusive environment by engaging citizens in planning and development processes, to economise with existing resources and at the same time promote economic growth. In the literature I have identified the following services/functions that the smart city addresses and that focus urban development: *governance* (management/administration), *environment* (housing, energy, safety), *communications* (transport and ICT), *education* (school and workforce), *culture* (recreation and tourism), *welfare* (health and social), and *economy* (business/commerce). In Table 4:5 (below) I have summarised identified themes in the two overarching discourses on the smart city. A conclusion to be drawn from the discussion above is that the smart city has emerged as a discourse both in research and in practice in the public sector as well as in the private sector. Depending on focus in the discourse, different things are emphasised. Thus, the smart city could be seen as an instantiation of digitalisation (Tilson et al., 2010); involving design, development, and use of digital resources and infrastructures for communication in different contexts for different purposes.

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Table 4:5. Summary of themes in discourses on the smart city.

SC as an arena for policy-making	SC as an arena for economic development
Sustainability	Innovations
Holistic approach to urban development	Technology and service development
Openness / participation / inclusion	Entrepreneurship, businesses and jobs
Efficiency / effectiveness	Public private partnerships
Attractive / livable / quality of life	

In this chapter I have focused on different discourses on the smart city. I have identified two overarching discourses connected to the smart city. In the next chapter, I will proceed to the theoretical perspectives used to create my analytical framework.

Chapter 5: Theoretical foundations for analysis

In the previous two chapters I have characterised how the smart city is presented in the literature. Thus, these two chapters serve as a pre-understanding to how digitalisation is spoken of and used in urban development in general, and in smart cities in particular. This chapter, however, provides the theoretical lenses to identify and analyse discourses on digitalisation (and smartness) in policy and planning of urban development. The three theoretical lenses presented below are: discourse analysis, stakeholder theory and new institutionalism, and constitute important parts in the creation of my analytical framework presented at the end of the chapter.

Introducing the theoretical lenses

Based on the review of smart cities and my understanding of urban development projects in practice (gained through empirical data collection), I realised that I needed a combination of theories to be able to analyse and understand the complexity of digitalisation in urban development. As I was interested in what digitalisation meant (to different actors) in the context of urban planning and development and smart cities, it was a given choice for me to focus on discourses, i.e. meanings, understandings, representations, statements used to construct and construe the phenomenon. Hence, my first choice of lens was discourse analysis, which focuses on language and language use. This lens is perhaps more of a methodological choice than a theoretical choice, as I have mainly used it as an instrument to identify and code discourses (cf. Chapter 2). However, the choice still has some theoretical implications which I will return to in this chapter. In addition to my focus on discourses, I experienced a need of a theory to set focus on different contextual aspects influencing these complex undertakings. I found new institutionalism (Scott, 2014; DiMaggio and Powell, 1991; Meyer and Rowan, 1991) to set focus on the broader and deeper social structures and contextual aspects of such developments (a perspective also used in ISR, cf. Currie and Swanson, 2009). I mean that this theory can explain how different contextual patterns and elements, like regulations, values and norms, expectations, habits, and routines come into play and influence the discourse on digitalisation. If new institutionalism emphasises the broader macro structures, I find stakeholder theory (Freeman, 1984) to be more of a meso-theory focusing on actors especially in relation to management, i.e. actors who have some sort of stake in the project or in the planning process. In urban planning and development these stakeholders are not only those who can affect how digitalisation is played out in

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practice, but also those who are affected by the phenomenon (cf. Freeman's definition of stakeholder). Thus stakeholder theory can help identifying stakeholders and their salience (Mitchell et al., 1997; a theory also used in ISR e.g. Scholl, 2001; Flak and Rose, 2005) when it comes to either push, pull or ignore issues related to digitalisation in urban development projects. I will return to stakeholder theory below. Hence, as I see it, the three theoretical perspectives complement each other and when combined together in a framework they form a middle-range theory for analysing discourses on digitalisation in the context of urban planning and development. Before I elaborate on the chosen theoretical lenses, I will return to the context of urban planning and development and reflect on its particularities.

Reflections on the context of urban planning and development

Building new urban areas is often characterised by being a long and relatively complicated process. The process is complicated in the sense that 1) it involves many actors belonging to different organisations, 2) it is a process that is regulated and involves institutions, and 3) it spans both public and private contexts. Consequently, activities covering an urban development project are not taking place in a vacuum, on the contrary, they are very much affected by the environment in which they take place. Thus, I argue that the activities are part of a larger system of relations (Scott and Meyer, 1991; DiMaggio and Powell, 1991). Large-scale projects such as developing new districts normally involve several sectors, i.e. the housing sector building the houses, the energy, transport and ICT sectors providing with the basic utilities and infrastructures, etc. (see Figure 5:1). However, recent discussions on exploiting opportunities of digitalisation like the ones I presented on the smart city, might even put more focus on the fourth sector – the ICT sector – in future work.

Figure 5:1. Example of sectors involved in urban planning and development

In fact, many of the digital solutions need different sectors to cooperate. For example, so called smart home solutions could require collaborations between the housing (building) sector and the ICT sector in the design and implementation of digital solutions. Further, smart energy solutions could require collaborations between the energy sector and the ICT sector to come up with new efficient solutions. Hence, digitalisation could be a driver of cross-sectorial collaborations (cf. public-private partnerships). In order to take advantage of digitalisation and come up with viable

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solutions these types of collaborations are most likely necessary and at the same time they add to the complexity. Why so? Well, we can expect that the different sectors are characterised by their own practices and routines (Scott and Meyer, 1991). In practice, this could mean that they have their own taken-for-granted ways of doing things, and when put against other taken-for-granted ways, they give rise to value conflicts and can thus affect how digitalisation is put into practice. Therefore, I find it necessary to understand how circumstances embedded in the environment influence and affect discourses on digitalisation. Here I am not thinking of carrying out a statistical survey on cause and effect relations, but rather to use the theories as lenses to explain variances in discourses. New institutionalism, see below, attend to deeper social structures, for example how structures, routines, and norms are produced and reproduced (institutionalised) and how they come to serve as guiding principles for social behaviour (Scott, 2014; Zucker, 1987). In the next section, I will go further into what kinds of structures, routines and norms I expect to come into play in urban planning and development and how they supposedly influence the same. In order to do this, we have to understand the process covering the development of new urban areas and how this process not only takes place in an institutionalised context, but also could be seen as an institution in its own (Zucker, 1987). With this I mean that there are both elements outside the project and the process of planning and developing new urban areas as well as elements inside the project organisation that can affect how digitalisation is spoken of and used in practice in development projects. External elements could be state-related policies in the field that become rule like and internal elements could be an internal efficiency norm or routinized ways of doing things (cf. Meyer and Rowan's 1991 discussion on rationalised myths), etc., that either impede or assist the discourse on digitalisation.

Urban planning and development in Sweden, for example, often follow an established process (illustrated Figure 5:2). Generally, these types of projects are initiated by some sort of plan order which in turn initiates a *plan process* within the municipality. This plan process follows a typical pattern, with establishments of programs for the development, followed by a formation of a local (site) plan proposal which is discussed and consulted with different special interest groups. After an internal process the plan proposal is also open for review by the general public and other interest groups. Subsequently, the plan is adopted by either the building committee or the municipal council⁶.

⁶ This presentation is based on information given at the Swedish National Board of Housing, Building and Planning, 2015 and Stockholm municipalities' Land Allocation Agreement Policy available at: www.stockholm.se/PageFiles/77739/Markanvisningspolicy.pdf accessed 2016

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Figure 5:2. Typical Swedish urban planning and development process

Normally the municipality either chooses to allocate land through tender or allocate land directly to developers. When land is allocated through tender, the municipality can set special claims in the request for tender. However, normally the tender concerns pricing, meaning that the developer with the highest bid wins. When this negotiation process is finished, the municipality can decide on a land allocation agreement. This agreement is an option, meaning that the developers under a certain time have exclusive right to negotiate with the municipality. This is a separate process from the plan process – in the figure referred to as *exploitation and procurement process*. Exploitation and procurement processes (land allotment) are generally initiated at an early stage (even before deciding on the local plan). The *development process* is a process in its own and involve many entrepreneurs and the actual execution of the project.

This general overview of urban planning and development processes shows us several things. To begin with, we can note that building new areas requires cooperation between both public and private sector, e.g. between municipalities, agencies, building corporations, and entrepreneurs. Subsequently, this also means cooperation between different professional actors, such as policy-makers, architects, land surveyors, politicians, and developers. These actors do not only represent different competencies and skills, but sometimes also different interests, values and objectives when it comes to digitalisation. If we deepen this picture a bit more these actors also hold different roles in the project, e.g. planners, project managers, developers, and these roles are often socially constructed which means that they are associated with certain norms and behavioural patterns. Hence, only by looking at the ordinary processes and actors involved in planning and building of new districts, we can assume that there might be

challenges in realising digitalisation in practice. This, together with our previous insights concerning the wicked nature of problems intrinsic to urbanisation, and the pressure on cities to take advantage of digitalisation in order to build sustainable communities, complicate the picture even more.

Digitalisation can in this context mean everything from designing and implementing new digital solutions (or using existing digital resources) for a more efficient planning process or a whole new digital infrastructure for new types of services, e.g. smart energy solutions, or smart buildings. Hence, digitalisation in urban development entails an infrastructure that goes beyond one single organisation, like in the case of many e-government projects (cf. Dawes, 2009). Altogether, this shows that these developments are longitudinal and complicated processes, involving not only many actors with sometimes competing values and norms but also many institutions. In order to identify and understand *how* and *why* discourses on digitalisation occur, we need to understand *what* they are, *where* they occur, *who* the actors are, *what* their incentives and stakes are in urban development and digitalisation, and *what* might influence their behaviours. In the next section I will proceed to the theoretical lenses used to create a framework for identifying and analysing discourses on digitalisation in the context of urban planning and development.

Situating discourse analysis as a theoretical lens in the analysis

One central dimension in this study is the *identification of repertoires of discourses* on digitalisation, and I have already presented and discussed parts of how this has been done in Chapter 2, when presenting the research method. In Chapter 2 I focused on philosophical and methodological premises of discourse analysis (hereafter referred to as DA). In this section, I will address the theoretical premises that underpins DA and explain how they are to be understood in this study.

There are many approaches to DA and depending on approach, discourse is defined and used in different ways (Jørgensen and Philips, 2002; Alvesson and Kärreman, 2000). Examples of different DA approaches are: Laclou and Mouffe's Discourse Theory, Foucauldian discourse analysis, critical discourse analysis (CDA, often associated with Fairclough), Discursive Psychology (DP, where Potter and Wetherell's Interpretative Repertoires is but one approach), and conversational analysis. What unites many of the approaches to DA is that they rely on social constructionism (Potter, 1996; cf. Burr, 1995; Berger and Luckmann, 1966). This means that by applying a DA perspective a particular view of the world and of knowledge is also acknowledged (see Chapter 2). Gee means that "we always take a particular *perspective* on what the "world" is like", when we speak or write. (1999, p. 2), which also indicates that discourses are used to construct the lived reality (Potter and Wetherell, 1987). Hence, discourses could be said to both construct and construe the social reality at the same time. Language and the use

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of language is central in constructing and construing the world around us. Words “have multiple and ever changing meanings created for and adapted to specific contexts of use. At the same time, the meanings of words are integrally linked to social and cultural groups in ways that transcend individual minds.” (Gee, 1999, p. 40). Consequently, *language and language use is central to DA*. However, what distinguishes different approaches to DA is their view of the significance of the discourse and thus also focus in the analysis. In Figure 5:3 below, I have illustrated the different foci and variances in different approaches to DA.

Figure 5:3. Foci in DA analysis and discourse significance

According to Alvesson and Kärreman (2000) different approaches to DA have different range in interest in the discourse, ranging from a micro-discourse approach to a mega-Discourse approach. Approaches focusing on the micro context are for example conversational analysis (CA). According to Wetherell CA “study the way in which social organization is accomplished in talk” (1998, p. 391). Consequently, these approaches focus on a detailed analysis of language and language use in a specific setting (e.g. turn-taking, repair mechanisms in conversations). Approaches acknowledging both local and situational and macro structures are CDA (Meyer, 2001) and IR (Jørgensen and Philips, 2002). These two approaches to DA are both sensitive to language and language use in the narrow local context, and at the same time in finding broader patterns (thus placed between Meso-discourse and Grand-Discourse in Figure 5:3 above). Approaches within DA that focus on Grand or Mega-Discourses are Foucauldian DA or Laclou and Mouffe’s discourse theory. According to Alvesson and Kärreman, “Mega-Discourse typically addresses more or less standardized ways of referring to/constituting a certain type of phenomenon” (2000, p. 1133-4). As I stated in

my discussion on chosen research method (Chapter 2), I have been inspired by both CDA and IR and both these approaches attend to both local language use as well as in finding broader patterns. These two approaches to DA could thus be said to focus on both *discourses* (actual practices of language use) with a small “d” and *Discourses* (dominant systems of language) with a capital “D” (Alvesson and Kärreman, 2000; Gee, 1999).

There are examples of IS researchers using discourse analysis. Many times critical discourse analysis is used to examine the social context, where language is seen as a social practice and thus gives insights to how different actors think and act regarding specific issues. In ISR CDA has been used to examine people’s understanding and coping strategies of IT development and organisational changes through IT (e.g. Alvarez, 2001; Alvarez, 2008). Other examples are Bernhard et al. (2010) who make use of Laclou and Mouffe’s Discourse Theory to critically analyse IT visions in health and culture. In the next section I will go further into detail concerning the two approaches that I have been inspired by (CDA and IR), and how I have made use of them in this study. I will do this by drawing on central concepts in DA and their relations; i.e. social practice, discursive practice and discourse (see Figure 5:4).

On social practices and the role of discourse

In DA language cannot be separated from its practice. Instead, language is a central dimension of how we make sense of the social world. However, CDA and IR approach the (social) practice/world slightly differently. According to Fairclough (CDA) practice “is on the one hand a relatively permanent way of acting socially which is defined by its position within a structured network of practices, and a domain of social action and interaction which both reproduces structures and has the potential to transform them” (2001, p. 122, cf. institutionalism below). Hence, a social practice involves 1) actions which are concrete individual and context bound. Yet, these actions are at the same time 2) institutionalised and socially anchored. In CDA, *discursive practices* could be seen as the narrow practice “through which texts are produced (created) and consumed (received and interpreted)”. This narrow (concrete, individual, context bound) context could be compared to talk-in-interaction in IR (Jørgensen and Philips, 2002, p. 61, cf. community of practice, Lave and Wenger, 1991). In my case, both the policy practice and the planning practice could be seen to consist of different discursive practices (communities within communities): practices in which identities and social relations are produced and reproduced. Thus, in such social practices social and cultural reproduction as well as change take place (shapes and reflects social patterns). According to Jørgensen and Philips (2002) CDA also takes into account that discursive practices are influenced by societal forces (e.g. political systems, institutional structure). However, DA focuses on language and language use to produce and reproduce patterns and therefore other theories (like new institutionalism) could be helpful in focusing other

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influential elements in the context. In my case urban planning and policy-making could be seen as institutions in their own with their own characterising practices, norms, routines, and relationships (which I will return to later). DA's focus on the role that discursive practices have in constructing (or maintaining) power-relations could be seen to be close to stakeholder theory (ST). However, CDA focuses more on ideological effects on a larger scale meanwhile ST focuses on the narrow organisational practice and power distribution within this context. Above, I have covered the context of use and how discourses are to be understood in relation to this (discourse vs social world in Figure 5:4 below). In the next section I will proceed to discourses and what constitutes a discourse.

Figure 5:4. Illustration of discourse, discursive practice and social practice

What is a discourse?

In its most general sense, discourse could be defined as “a particular way of talking about and understanding the world (or an aspect of the world)” (Jørgensen and Philips, 2002, p. 1). Hence, one might say that discourses concern both text and talk as “parts of social practice” (Potter and Hepburn, 2008, p. 276). Gee (1999) points out that there are no clear boundaries or units of discourses. Instead, it revolves around a recognition work; a work characterised by a sense-making process reflecting on themselves and others. Therefore, according to Gee, discourse is “ways with words, actions, beliefs, emotions, values, interactions, people, objects, tools, and technologies” (1999, p. 20) that come to constitute social practices. Parker defines discourses as “an inter-related set of texts, and related practices of production, dissemination, and reception, that bring an object into being (Parker, 1992 in Phillips & di Domenico, 2009: 551). Interpretative repertoires (IRs) refer to “systematically related sets of terms, often used with stylistic and grammatical coherence, and often organized around one or more central

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metaphors.” (Potter, 1996). Further, Potter and Wetherell (1987, p. 139) also note that these representations whether they are metaphors, figures of speech, or register of terms, are used to “characterize and evaluate actions and events”, or other phenomena. Jørgensen and Philips (2002) mean that interpretative repertoires are used instead of discourses as a way to stress the use of discursive resources in text and talk (metaphors, figures of speech) and to stress social interaction, through which repertoires are shaped and changed depending on context of interaction.

Parker (1990) also provides a set of criteria that characterise a discourse, e.g. discourses as coherent systems of meanings, they are realised in texts, they are reflexive, they are about objects and subjects, and they are historically located. These criteria could be compared to what Gee (1999) refers to as building tasks to construct/construe a phenomenon. These tasks are: semiotic building (using words, cues to communicate), world building (using words to make meaning of the world), activity building (using words to perform), identity and relationship building (using words to make meaning of identities and relationships), political building (using words to construct power), connection building (using words to make meaning of the past and the future). Gee means that “we continually and actively build and rebuild our worlds not just through language, but through language used in tandem with actions, interactions, nonlinguistic symbol systems, objects, tools, technologies, and distinctive ways of thinking, valuing, feeling, and believing” (1999, p.11). These criteria and building tasks are helpful in defining what discourses are and how to approach them theoretically and methodologically. Based on the above, I have chosen to define *discourses as meanings, understandings, representations and statements used to construct and construe different versions of reality*.

First building block in DiSSIPE framework – discourse analysis

The first building block in the analysis concerns “Di” in the DiSSIPE framework⁷. Di stands for Discourse and thus the identification and analysis of repertoires of discourses. In the analysis I see language as an instrument for studying discourses on digitalisation (as opposed to language as a topic for analysis as such). In line with Potter and Wetherell (1987) I mean that language is used to accomplish things (to preform actions). Hence, focus in the first building block of the analysis is on what is being said or written (represented as text and talk in Figure 5:5 below) and on identifying the social consequences of the text and talk (illustrated as action in Figure 5:5 below). In the analysis focus is on finding meanings, understandings, representations and statements that construct and construe digitalisation in urban planning and development. However,

⁷ Framework to identify and analyse Discourses, Stakeholders' Saliency, Institutional Patterns and Elements

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these meanings cannot be analysed or understood in isolation, but rather in relation to other texts and in relation to its social context.

Figure 5:5. First building block – identifying and defining discourses

I have already in the method chapter explained that I have chosen to focus on identifying what I call *elements* and *repertoires* of discourses. Elements are to be understood as the constitutive parts (building blocks) of the repertoire and what I mean with a repertoire is the list, the stock of discourses. Further, different repertoires might vary in prominence depending on the context use (social practice). We could, for example, expect that discourses on digitalisation differ/vary in policy practices and in planning practices. Hence, there is also an assumption in this thesis that these practices make use of different repertoires of digitalisation to achieve different purposes. This ends the first building block in DiSSIPE framework and I will now proceed to the second building block on how to identify stakeholders and stakes and their salience. First, I will present the theoretical perspective behind it, i.e. stakeholder theory.

Situating stakeholder theory as a theoretical lens in the analysis

If discourse analysis focuses on identification and the role of discourses in social practice, a stakeholder approach could be said to attend to a special type of social context, i.e. an organisational context with a managerial focus. This also means that focus moves from identification of discourses to identification and analysis of individuals, groups and/or organisations and what their saliences and stakes are in digitalisation in urban planning and development. By identifying and mapping discourses on digitalisation and stakeholders we can further our understanding on how digitalisation is managed (or not) in practice. Like I mentioned in the beginning of this chapter, large-scale urban development projects and smart city developments call not only for intra-organisational collaborations but also for inter-organisational ones (illustrated in Figure 5:6) and often in the form of public-private partnerships. We can note a similar type of development in the work with digitalisation of the public sector (e-government). We have seen an increased need for cross-collaborations within the public sector (intra- and intergovernmental collaborations) in these types of developments (Dawes, 2009); a type of development that puts another pressure on management to coordinate actors with different values, and norms, and, most likely, also with different interests in digitalisation.

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Figure 5.6. Intra-organisational and inter-organisational collaborations

According to Scholl et al. (2012) recent technical developments together with alignment of business processes and information sharing have made these cross-organisational collaborations possible. And, in the smart city context, several scholars also point out stakeholders and stakeholder identification as “critical success factors” (e.g. Anttiroiko et al., 2014; Chourabi et al., 2012; Alawadhi et al., 2012). Similar to e-government developments, one can expect urban development projects to have to “balance relationships among different types of stakeholders” (Scholl et al., 2009, p. 6). Even though, we can find similarities between e-government developments, and digitalisation of cities (smart city developments), there are also differences. Differences concern, I would argue, *number* of stakeholders involved and *type* of collaboration, i.e. cross-organisational as well as cross-sectorial collaborations. Taking stakeholders into account is therefore an important issue for management (cf. Bryson, 2004). Scholl (2004) even means that involving salient stakeholders in large-scale change projects is crucial to avoid failure.

Hence, stakeholder theory attends to and explains influences stakeholders have on organisations, and on management in particular. In short, stakeholder theory seeks to describe and explain interests and relations that influence organisations (Donaldson and Preston, 1995). We have already seen that there are many actors involved in urban planning and development process; actors that might have different stakes when it comes to implementing digital solutions in practice. Thus in order to understand why digitalisation ‘gets footing in discourses or falls between the cracks’ in urban planning and development, we also need to understand who the different stakeholders are, what their stakes are and their salience. Hence, stakeholder theory might help explaining and understanding why some interests and discourses (on digitalisation) get priority from a managerial point of view, and thus also explain why there might occur variances and gaps in discourses on digitalisation in policy and practice of urban planning and development.

Stakeholders and stakes – who and what are they?

Stakeholder theory has its origins in management (Freeman et al., 2010) and came to be developed as a response to supplement traditional management theories which previously only had taken the shareholders of the firm into account. In accordance with this, stakeholder theory was from the beginning mainly associated with managerial issues in private organisations (Donaldson and Preston, 1995). Nevertheless, we can note a movement towards also applying the theory to the public sector context; a move that is also discussed by several scholars (e.g. Axelsson, Melin, Lindgren, 2013; Sæbø et al., 2011; Flak and Rose, 2005; Scholl, 2001). However, there are differences between public and private sectors and applying a theory that focuses on private organisations might be challenging in a public context. First of all, the number of stakeholders might differ (e.g. Kamal et al., 2011). Like in large scale IT developments, urban development projects (or smart city developments) cross several phases (cf. processes in Figure 5:2 above), and each phase is characterised by its own practices, i.e. stakeholders, roles, activities, and outcomes. This also implies that there are stakeholders either on the inside or the outside of the project organisation (cf. Gelders et al. 2007). This could be compared to primary or secondary stakeholders, where primary stakeholders are those who are crucial for survival, which also is in line with the earliest definition of stakeholders “those groups without whose support the organization would cease to exist” (Freeman et al. (2010, p. 31). Secondary stakeholders are those who still are affected by or can influence the actions of an organisation (Kamal et al., 2011: Donaldson, 1995; Freeman, 1984). Hence, in accordance with Freeman I define stakeholders as “*any group or individual who can affect or is affected by the achievement of the organization's objectives*” (my emphasis, 1984, p. 46). Stakes are in this context to be understood as interests. In the next section I will proceed to frameworks used as theoretical lenses to analyse stakeholders, stakes and their salience.

On how to identify stakeholders and stakes

In the literature we can find several frameworks for identifying stakeholders (e.g. Clarkson, 1995; Donaldson & Preston, 1995; Bryson, 2004). In accordance with Donaldson and Preston (1995, p. 70-71) I find stakeholder theory to be descriptive and instrumental, meaning that it is used to describe characteristics and behaviours, as well as identifying connections between different actors in practice. However, I have chosen to use Mitchell et al.'s (1997) classification of stakeholders in order to characterise and understand the salience of different actors and their stake in digitalisation in urban planning and development. This choice was mainly based on its usefulness due to the detailed descriptions of type of stakeholder. The typology builds on the possession of three types of attributes: (1) the stakeholder's *power* to influence the organisation, (2) the *legitimacy* of the stakeholder's relationship with the organisation, and (3) the *urgency* of the stakeholder's claim on the organisation. The notion of legitimacy is

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something that also unites stakeholder theory with institutional theory (and DA). In the latter legitimacy refers to common perceptions on how to act in social contexts (ideas of the legitimate way to act, taken-for-grantedness, cf. common sense discourses), thus corresponding to normative and cultural-cognitive elements in the environment (cf. Scott, 2014).

Returning to Mitchell et al.'s typology, depending on the number of attributes possessed, three overarching classes of stakeholders are identified (see Table 5:1 for a summary). The most influential class – the *definitive* stakeholders – possesses all three attributes. This category of stakeholders is expected to have direct impact on and to have a clear mandate to influence the digitalisation in practice in urban development projects. Similarly – though to a lesser extent due to the combination of possessed attributes – the second class of stakeholders (expectant) is also to be regarded as influential. In total, this class contains three types of stakeholders: *dominant*, *dependent* and *dangerous*. The third class, the latent stakeholders (*dormant*, *discretionary* and *demanding*) is characterised by not having or not using its power to influence how digitalisation is expressed in practice. In my view, the typology helps to focus the salience that each stakeholder could expect to have and their stakes, and thus is a useful instrument in combination with contextual elements to analyse and understand discourses on digitalisation in urban planning and development.

Table 5:1. Summary of stakeholder classes based on Mitchell et al. (1997).

Classes	Salience	Type	Attributes	Stance	Description
Definitive	High	Definitive	Power Legitimacy Urgency	Dynamic	Powerful stakeholder whose influence is guaranteed.
Expectant	Moderate	Dominant	Power Legitimacy	Active	Stakeholder whose influence is assured ("dominant coalition") and its claims lead to action.
		Dependent	Legitimacy Urgency		Stakeholder who is dependent of others for power. However, the claims are urgent and legitimate.
		Dangerous	Power Urgency		Stakeholder whose power is coercive, but they do not have the legitimacy to influence (e.g. activists).
Latent	Low	Dormant	Power	Passive	Stakeholder who has power to influence, but it remains unused.
		Discretionary	Legitimacy		Stakeholder who has no power to influence and no urgent claims, but still legitimate demands.
		Demanding	Urgency		Stakeholder who has urgent claims, but no power or legitimacy to influence.

My understanding of the typology presented by Mitchell et al. (1997) is that it should not be used just as a static instrument to map and categorise stakeholders, but as an approach to understand how interests and stakeholders (and their relations) evolve and change over time. This is also in line with a social constructionist and discourse perspective of how we view and construct our understandings of the reality, meaning

that our understandings of the world are historically and culturally produced and thus contingent (cf. Potter and Wetherell, 1987). This explains why we will find variations in interests (in discourses). In long-range projects like urban planning and development we can note that this is of utter importance as there are several processes involved (planning process, exploitation and procurement process, and construction/building process) and thus also many different stakeholders along the line. Thus we expect that their stakeholder salience will change over time, which also could explain variances in prominence of different discourses on digitalisation.

Second building block in DiSSIPE framework –stakeholder analysis

The second building block in the analysis concerns “SS” in the DiSSIPE framework⁸. SS stands for stakeholder salience and thus the identification of stakeholders and their salience to the project organisation. I find this managerial perspective on the project organisation to be necessary in order to understand the narrow context in which digitalisation is spoken of both as an instrument in the process itself and as an end product (e.g. new services). Hence, stakeholder theory will be used as an analytical instrument to 1) identify different stakeholders involved in urban planning and development and their stakes in digitalisation, and 2) identify their salience. I find the second part of the analysis utmost important as it can contribute to the understanding of how variances and gaps in discourses on digitalisation can be approached and eventually “filled”. Hence, based on Mitchell et al.’s (1997) typology the second building block focuses on the identification and mapping of stakeholders and their salience based on their possession of the three attributes power, legitimacy and urgency, illustrated in Figure 5:7 below.

Figure 5:7. Second building block – identifying stakeholders and their salience

Like in the case with the first building block these questions linked to identification of stakeholders and their salience are also to be seen as questions guiding the analysis. This perspective is to be treated as an additional perspective to the contextual one where it contributes with an agency perspective to *where*, *how*, and *why* variances in the discourse on digitalisation in and of cities might occur. This ends the second building

⁸ Framework to identify and analyse Discourses, Stakeholders' Salience, Institutional Patterns and Elements

block in DiSSIPE framework, and I will now proceed to the third building block on how to identify elements and patterns in the wider context (cf. social world in DA) that influence both discourses on digitalisation as well as the managerial context (project) discussed above. Before presenting the building block, I will discuss the theoretical perspective behind it, i.e. new institutional theory.

Situating new institutionalism as a theoretical lens in the analysis

If stakeholder theory attends to the managerial perspective of urban planning and development and digitalisation, institutional theory attends to the broader perspectives of why and how organisations act the way they do, and why social practices become institutionalised (Scott and Meyer, 1991; DiMaggio and Powell, 1991). I argue that the (social) context and the consequences it might have on how digitalisation comes to be expressed in urban planning and development, is important. There are many institutional elements in this context that can affect whether or not digitalisation (or smart city solutions) are pushed or pulled, or even left out in policy and planning of urban developments. However, before I go into detail with what I mean with this, I want to proceed to the concepts of *institutions* and *institutional elements*.

Institutions and institutional elements – what are they?

According to Oxford dictionaries the word *institution* basically has two meanings. First, it is some sort of organisation that is either well-established or fulfils some sort of purpose in society. Second, the word institutions denote some sort of well-established practice (cf. CDA perspective on social practice, Fairclough, 2001), law or custom⁹. The latter definition could from a more refined point of view be described as conventions that are self-regulated (Philips et al., 2004), meaning that there exists some sort of social agreement embedded in practice that we either unconsciously or consciously follow. According to advocates of new institutionalism, these embedded social agreements are both based on and shaped by past practices and understandings on how to carry out things (cf. discourses). Thus we can see today's actions as consequences of yesterday's actions and together they form a set of "shared rules and typifications that identify categories of social actors and their appropriate activities or relationships" (Barley and Tolbert, 1997, p. 96). From a municipal point of view, a shared practice in urban development could for example be the planning process (see Figure 5.2 above). This social practice is characterised by certain activities, e.g. establishment of a local plan proposal, review of the plan proposal, and by its routines and regulations, i.e. the way things are and is to be carried out. In these particular practices we also expect to find specific actors, e.g. architects, land surveyors. Zucker (1987) means that these shared practices form some type of pressure on the same, and these pressures could either arise from the surrounding environment or internally from the organisation itself (cf. internal

⁹ <http://www.oxforddictionaries.com/definition/english/institution>, Accessed 2015-06-09

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and external stakeholders). In a sense, institutions are “multifaceted, durable social structures, made up of symbolic elements, social activities, and material resources” (Scott, 2014, p. 57), and in this context language (discourses) is central in both the constructing and construing of these institutions (Jørgensen and Philips, 2002). Hence, there are a number of elements that contributes to sustaining the stability in the environment. First of all, by repeating the same types of activities, like for example in activities associated with planning which I mentioned above, there is an element of production and reproduction of these activities (social construction, cf. Burr, 1995; Berger and Luckmann, 1966). The production and reproduction of these activities could either result in stability or change of institutions, which, according to Scott (ibid.), also shows that institutions are not only a condition but also a process. In sum, we can interpret institutions as agreements that are:

- Historically and socially constructed and shared (common ways of doing things)
- Historically and socially embedded (deep-rooted and taken-for-granted ways of doing things)
- Historically and socially appropriate (legitimate ways of doing things)

Hence, if we want to understand discourses on digitalisation and smart cities, I argue that we also need to understand elements in the surrounding environment and how they come to influence activities and actions connected to digitalisation (cf. Parker's 1990, auxiliary discourse criteria). Digitalisation in the context of urban planning and development (smart cities) being a relatively new phenomenon could for example mean that it has not become a 'routinized' issue in practice yet, which could be one type of explanation to the variances in discourses. Having this said, I will now proceed to the different institutional elements as such.

Scott (2014), who is a central scholar in the field, points out three *institutional elements* – *regulative*, *normative* and *cultural-cognitive* – which he argues characterise institutions and “together with associated activities and resources [they] provide stability and meaning to social life” (p. 56). At the same time there are variances in how these elements are conceptualised, which we will see later on. First, the *regulative* or what DiMaggio and Powell (1991/1983) refer to as *coercive elements* could be rules, laws, and/or additional control mechanisms and sanctions and these elements are prescribing and forcing in character. An example of a regulative/coercive element in the context of urban planning and development could be laws that regulate the building process or policy documents such as recommendations, directives concerning sustainable development. Hence, the policy discourse on digitalisation as such could be viewed as an institutional element that most likely will affect local discourses in practice of urban planning and development. Further, in the context of urban planning and development, there are many regulative rules to adhere to. For example, there are plan and construction

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laws regulating both the plan process and the construction process. There are also many policy documents – strategies, agendas, programs – that regulate and influence urban developments in a less forcing manner, yet influencing it. Some of the practices connected to the different processes displayed in Figure 5:2 above (plan process, exploitation and procurement process, construction process) could also be expected to be routinized to the extent that they are taken-for-granted as the right way of doing things. This leads us to the second pillar, i.e. the normative pillar.

Normative elements are values and norms that are ideas of right and wrong (Ahrne and Brunsson, 2006), and by breaking these ideas there is a sense of shame. Thus values are conceptions of the preferred or the desirable together with the construction of standards to which existing structures or behaviours can be compared and assessed. Norms on the other hand specify how things should be done; they define the appropriate way to pursue valued ends (March and Olsen, 1984; Olsen, 2007). Normative systems include both values and norms. We have already seen that digitalisation as such is associated with certain values and norms, e.g. efficiency, sustainability, quality of life; however, the question is to what extent these values and norms influence how digitalisation is spoken of in practice of urban planning and development. Sometimes norms and values are also connected to roles, meaning that there are expectations connected to specific roles. In large-scale projects like urban developments, there are many actors (stakeholders) involved holding different roles and we can expect that these roles both constrain and empower discourses on digitalisation. These roles also come with certain rights and responsibilities as well as privileges and duties. Norms and values can be imposed by others, and we can expect different actors to use them in either a conscious or unconscious way as a means to achieve their goals. This could also mean that if digitalisation is to 'get footing' in practice someone needs to take the responsibility to drive it, if not it might fall between the 'cracks'.

Third, *cultural-cognitive elements*, which in a sense can be compared to what DiMaggio and Powell (1991/1983) referred to as *mimetic elements*, are typical for new institutionalism and has its roots in anthropology and sociology. Cultural-cognitive elements are about shared conceptions "that constitute the nature of social reality and create the frames through which meaning is made" (Scott, 2014, p. 67, cf. also discourse analysis and social constructionism). Cultural means that these shared conceptions are contextual, belonging to a specific culture. Cognitive on the other hand refers to mental processes of perception that is how we react to incitements in the surrounding environment and how we make sense of them through representations. Symbols like words, signs, gestures are central when we shape "the meanings we attribute to objects and activities. Meanings arise in interaction and are maintained and transformed as they are employed to make sense of the ongoing stream of happenings" (ibid.) Thus cultural-cognitive elements such as language and language use are central if we are to understand

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how digitalisations is produced and consumed in specific context. Here we can also note a link between new institutionalism and discourse analysis (Philips et al., 2004).

All these institutional elements appear to give stability and meaning to social life. Yet, at the same time these elements are not as distinct as they might appear in the presentation above and in the summarising table below (Table 5:2). There are most likely intermixes of elements in reality and we can expect these elements to both blend in and/or converge with each other. We have for example seen in previous chapters (3-4) that smart cities and smart city development is used as a policy framework and as such it is used as a regulative document for future urban planning and development. We have also seen that these particular frameworks contain normative elements, concerning sustainability and sustainable development, something which also is in line with the general discourse within urban development and thus could be seen as a cultural-cognitive element. The table below summarises the three pillars which are thought to characterise institutions.

Table 5:2. Summary of the three pillars of institutions, (Scott, 2014, p. 60) -

	Regulative	Normative	Cultural-Cognitive
<i>Basis of compliance</i>	Expedience	Social Obligation	Taken-for-grantedness Shared understanding
<i>Basis of order</i>	Regulative rules	Binding expectations	Constitutive schema
<i>Mechanisms</i>	Coercive	Normative	Mimetic
<i>Logic</i>	Instrumentality	Appropriateness	Orthodoxy
<i>Indicators</i>	Rules	Certification	Common beliefs
	Laws	Accreditation	Shared logics of action
	Sanctions		Isomorphism
<i>Affect</i>	Fear Guilt/Innocence	Shame/Honor	Certainty/Confusion
<i>Basis of legitimacy</i>	Legally sanctioned	Morally governed	Comprehensible Recognizable Culturally supported

What is interesting is that these elements form a sort of continuum and an interesting interplay between what is conscious and unconscious, what is enforced and what is taken-for-granted. In Figure 5:8 below I have illustrated this continuum, where regulative elements tend to be enforcing and conscious in character and yet with time they can move towards becoming cultural-cognitive elements, meaning that they are taken-for-granted and thus unconsciously sustained. In this study, we could expect policies to move along this continuum, and thus also the discourse on digitalisation.

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Figure 5:8. Institutions and their constitutive elements

Further, we can expect all these types of elements to be present in the context of urban planning and development. In one sense institutions could be seen as the rules of the game and in line with this analogy there is an interplay between institutions and people's actions and talk (illustrated in Figure 5:9). We have already learnt that these rules can be of three different kinds: regulative, normative, and cultural-cognitive. Together these elements form some type of order and predictability (March and Olsen, 2008). Sometimes institutional theory is criticised for only focusing on macro-processes, and even neglecting the micro-processes. By only focusing on macro processes, like the examples above with the different sectors involved in an urban planning and development process (see Figure 5:1), one might end up in a deterministic result and only interpreting human action as determined by external causes. However, neoinstitutional scholars recognise, in addition to organisations, the individuals' power to innovate, to act strategically and thus contribute to institutional change (e.g. institutional entrepreneurship – Battilana, Leca, Boxenbaum, 2009; Lawrence and Suddaby, 2006, micro-processes linked to institutional becoming and change – Thornton, Ocasio, Lounsbury, 2012; Meyer and Höllerer, 2010; Meyer, 2008; translation – Czarniawska and Sevón, 2005).

Figure 5:9. Agency in the institutional context

In the figure above (5:9) I have illustrated how institutions both influence the social context and are influenced by it by our words and deeds. I also think the figure illustrates an important relation between institutions and discourses. Further, according to Scott, there are even scholars that criticise that too much focus has been afforded to the processes “by which institutions guide and govern actors and not enough to the ways in which actors and their actions affect institutions” (2014, p. 94). I find the use of institutional entrepreneurs unsatisfactory in this context as it generally means an

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initiative and risk-taking person or individual who undertakes and manages a task or an enterprise of some sort. Institutional entrepreneurs do not have a managerial focus as have stakeholder theory. This is why I have chosen to also use the concepts of stakeholders and discourses in combination with new institutional theory.

In urban planning and development, we can expect the processes as such (planning, exploitation and procurement, construction) to be routinized and most likely taken-for-granted when it comes to carrying out urban development projects (cf. routine processes in political institutions, March and Olsen, 2008). In these processes we can see traces of all three elements regulative, normative and cultural-cognitive, all of which we can expect to influence the behaviour of those involved in planning, designing and developing new areas. In turn, we can expect that these elements also have effect on how digitalisation is voiced in these settings. Hence, the next question would be how to identify these elements. In this context I have chosen to turn to the concept of institutional carriers, which I discuss below.

On how to identify institutional patterns and elements

Scott (2014, p. 96) compares institutional carriers to messages (cf. discourses) that are delivered and circulated, and that the way these messages arrive also affect its interpretation and response. From the table below (Table 5:3) we can note how Scott (2014) promotes four categories of carriers: *symbolic systems*, *relational systems*, *activities* and *artifacts*. A carrier is some sort of vehicle or transmitter of something and this something is often conveyed through language (in DA referred to as discourses). Yet, we also know that as “ideas and artifacts move from time to time and place to place they are altered, modified, combined with other ideas or objects, translated and transformed” (Czarniawska and Sevón, 2005). In this study I am interested in identifying and analysing discourses on digitalisation in the context of urban planning and development. One way to approach explanations to variances in discourses on digitalisation is by also taking institutional carriers into account. In Table 5:3 below we see examples of such carriers.

Table 5:3. Institutional pillars and carriers (from Scott, 2014, p. 96)

	Regulative	Normative	Cultural-cognitive
<i>Symbolic systems</i>	Rules	Values	Categories
	Laws	Expectations	Typifications
		Standards	Schemas
			Frames
<i>Relational systems</i>	Governance systems	Regimes	Structural isomorphism
	Power systems	Authority systems	Identities
	Monitoring	Roles, jobs	Predispositions
<i>Activities</i>	Sanctioning	Routines	Scripts
	Disrupting	Habits	
<i>Artifacts</i>		Repertoires of collective action	
	Objects complying with mandated specifications	Objects meeting conventions, standards	Objects possessing symbolic value

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Above we have learnt what institutions are and how they can be identified. In the next section I will tie this discussion to how I make use of this theory in analysing my case.

Third building block in DiSSIPE – identifying institutional patterns and elements

The third building block in the analysis concerns “IPE” in the DiSSIPE framework¹⁰. IPE stands for institutional patterns and elements. Hence, this building block focuses on different elements (I carriers as interchangeable with elements) in the wider environment that might influence discourses on digitalisation. In order to understand these contextual elements, we need to identify what kinds of elements that come into play in the context of urban planning and development, hence what institutional elements that characterise the context. A way to approach this would be to identify institutional carriers (e.g. symbolic and relational systems, activities, artifacts). By identifying institutional carriers and elements in the wider context we can gain insights on the broader and more resilient patterns surrounding the organisational context of urban planning and development (illustrated in Figure 5:10 below). Hence, the identified institutional patterns can give insights to how contextual elements either impose constraints or provide opportunities for digitalisation in urban development. It can help us understand why and how it is produced and disseminated and also give us clues to why there might be gaps in the discourse.

Figure 5:10. Third building block – identifying and characterising institutional elements

Hence, above we have covered a contextual perspective to *where*, *how*, and *why* discourses on digitalisation in urban planning and development might occur. The next step is to put these building blocks together into a framework for analysis.

Putting together a framework for analysis

Above, I have discussed the three theoretical lenses in their own, and in this section I proceed to put the presented building blocks together into an analytical framework – a

¹⁰ Framework to identify and analyse Discourses, Stakeholders' Salience, Institutional Patterns and Elements

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framework for identifying and analysing Discourses, Stakeholders' Saliency, and Institutional Patterns and Elements (named DiSSIPE). In my view these different theories contribute to different pieces in the analysis and put together they form a basis for identifying and analysing discourses on digitalisation in the context of urban planning and development. Combining discourse analysis and institutional theory is not something new, where DA proponents even mean that a DA perspective provides an important "avenue to develop institutional theory" (Philips, Lawrence, Hardy, 2006, p. 482). In fact, depending on chosen DA perspective, these two theories are close to each other (cf. critical discourse analysis and Foucauldian discourse analysis). There are also conceptual papers on how a combination of stakeholder theory and institutional theory could be fruitful to further our understanding of how organisations respond to multiple stakeholders' and their often conflicting interests" (Oates, 2013, p. 58). In Figure 5:10 below the DiSSIPE framework is illustrated (a first version of the framework which is to be tested and used in analysis of the case in Chapter 10). The combination of these lenses have not been seen in previous studies.

Figure 5:11. DiSSIPE framework

As I see it, all kinds of developments, no matter if they focus on digitalisation or urban development as such, are contextual and situational. This means that they are embedded in a context both in the *narrow sense as in a process* within and/or in-between organisations, and in the *wider sense as in a surrounding environment/social world/practice*. Within these contexts different discourses, i.e. different meanings, understandings, representations, and statements are used to construct and construe the

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lived reality (as a way of making sense of things). All of these dimensions are illustrated in the DiSSIPE framework and seen as important parts in the identification and analysis of discourses on digitalisation in the wider context of urban planning and development. Concerning the identification of discourses, the framework pinpoints that discourses are realised in text and talk, and text and talk have social consequences (cause actions). As large scale development projects are characterised by different phases and processes, we can also expect that stakeholders' (those who can affect or are affected by the achievement organisation's objectives, cf. Freeman, 1984) salience change over time. In the framework this is illustrated by the reoccurring typology focusing on power, legitimacy and urgency attributes. Hence, by applying DiSSIPE framework I argue that we can both pinpoint discourses on digitalisation as well as understanding them in their organisational and institutional context.

In this part I have on the one hand covered how digitalisation and the smart city is spoken of in the literature, and on the other hand I have built a theoretical framework for analysing the empirical results. Hence, in the next part I will proceed to the empirical foundations of this study.

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PART III

EMPIRICAL FOUNDATIONS

Introduction to empirical foundations

In this part I present the analysis of both the policy study on digitalisation and urban development, and how digitalisation is spoken of in planning practices in an urban development project (project study). Findings of the analysis are then to be discussed in the next part of the thesis – part IV Discussions and Conclusions. Thus the aim of this particular part is to give a broad understanding of how digitalisation is spoken of and used in the context of urban planning and development. Two types of (discursive) practices are presented – *policy practice* and *planning practice*.

Policies are in this study interpreted as courses of action proposed by governments. In this study the *policy practice* is accessed through various policy documents (e.g. strategies, agendas, visions) and the analysis concern how digitalisation is spoken of in relation to urban development (see Chapter 2 for more details on methodological issues). Analysing the policy discourse on digitalisation in this context is thus important as it sets the agenda and the course of action for how digital/smart solutions are to be implemented in practice in actual planning and building of urban areas. Hence, in this study there is an assumption that policy discourses are important in guiding practice and, consequently, they ought to be visible in actual planning of urban developments. Policy practices that are covered in this analysis ranges from an EU level to local project level (see Figure III below). Two types of policies have been analysed; 1) policies focusing on digitalisation in particular, and 2) policies that focus on urban development in general.

Figure III. Representing empirical material and covered discourses in the analysis

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In connection with the analysis of the different documents brackets [] have been used as an instrument to code elements of identified discourses. The found elements have then been summarised in tables. In conjunction with the tables analysis and reflections on digitalisation as such as well as in relation to urban development have been done from my part (cf. Chapter 2, data analysis approach).

The *planning practice* is in this study represented by an urban development project; a project I have followed during 4 years. The physical location is named Vallastaden and the project as such is called Vallastaden 2017¹. Focus in the analysis has been on how digitalisation is spoken of and used in the planning process of Vallastaden 2017. Processes like exploitation/procurement, and building have been more peripheral (background), yet important to understand the development as such.

In sum, in this part – the empirical foundations – I unpack digitalisation in policy and in planning and analyse how this map to urban development. As a reminder, this part is organised in four chapters:

Chapter 6: European policy perspective on digitalisation and urban development

Chapter 7: A national policy perspective on digitalisation and urban development

Chapter 8: A local policy perspective on digitalisation and urban development

Chapter 9: The story of Vallastaden 2017

¹ In the first stages of the project called LinköpingsBo2016 and LinköpingsBo2017

Chapter 6: European policy perspective on digitalisation and urban development

In this chapter a European policy discourse on digitalisation and urban development is presented. The analysis is based on three policy documents on EU level. These documents represent a contemporary picture of how the European policy-makers view digitalisation and urban development. It also gives an idea of what challenges, future needs and actions they see linked to digitalisation in and of society.

In Chapter 3 and 4, I have presented how digitalisation in and of cities, sometimes referred to as smart city developments, is discussed in the literature. In those chapters, I argued that digitalisation², and especially in the context of urban planning and development, crosses sectorial borders and functions. According to both OECD³ and the World Bank⁴ cities are seen as economic centres and nodes for economic activities. At the same time, due to urbanisation, cities also face many challenges. As a result, urban planning and development focuses on designing urban areas to be functional and viable from a range of perspectives, reaching from providing basic services to creating attractive environments for both people and businesses. In this context policies could be seen as instruments for governments to influence actions in these areas. Thus, in my analysis of how digitalisation is spoken of in urban planning and development I have been sensitive to the range of areas/functions that can be of concern to an urban planning and smart city development perspective, e.g. governance, economy, education, environment, transport, building. On a European level I have chosen to depart from the overall strategy Europe 2020, followed by the two sub strategies on digitalisation and resource efficiency. Altogether, I find these three policy documents to represent a European policy-making perspective. I also expect this policy discourse to influence national and local discourses concerning the same issues.

Europe 2020 – A strategy for smart, sustainable and inclusive growth

In 2010, under the Barroso administration⁵, *Europe 2020* was decided as the new strategy for Europe. Europe 2020 is a strategy that addresses issues connected to at

² As a reminder, digitisation is in this analysis seen as a sociotechnical process, involving both technical aspects (data, digital artefacts and digital infrastructures) and social aspects (usage, context, information) – see also chapter 2.

³ OECD on urban development <http://www.oecd.org/gov/regional-policy/urbandevelopment.htm>

⁴ World Bank on urban development <http://www.worldbank.org/en/topic/urbandevelopment/overview#1>

⁵ Europe 2020 is a successor to the Lisbon Strategy for Growth and Jobs.

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the time ongoing economic crises. In this context, it is pointed out that Europe is lagging behind due to

differences in business structures combined with lower levels of investment in R&D and innovation, insufficient use of information and communications technologies, /.../ (Europe 2020, p. 7).

In other words, lack of digitalisation is, by the Commission, pointed out as one reason (among others) to why Europe is lagging behind economically [digitalisation as precondition for economic growth]⁶. Based on the economic situation in Europe, European policy-makers push for several actions and *digitalisation is one of them*. On the overall, Europe 2020 is a strategy focusing on reinforcing and stimulating the European economy. The permeating theme in the strategy is denoted as a *smart, sustainable and inclusive growth*. The three characteristics attributed to growth also represent three underpinning priorities upon which challenges are to be met. Seven initiatives corresponding to these priorities are put forward by the Commission in the strategy. These initiatives are denoted as “flagship initiatives. Table 6:1 below gives an overview of these flagship initiatives and how they are distributed in relation to the three priorities smart, sustainable and inclusive growth. In accordance with the distribution below, we can note that digitalisation as such is associated with the attribute smart [digitalisation as a dimension of smart].

Table 6:1. The seven flagship initiatives (Europe 2020)

Priority areas	Flagship initiative
Smart growth	Innovation union
	Youth on the move
	A Digital Agenda for Europe
Sustainable growth	Resource efficient Europe
	An industrial policy for the globalisation era
Inclusive growth	An agenda for new skills and jobs
	European platform against poverty

In the overall strategy, digitalisation and the use of digital resources are only (explicitly) discussed in relation to two of these priorities, that is *smart* and *sustainable* growth. When it comes to the third priority – inclusive growth – digitalisation is not mentioned at all. In this strategic context, inclusive refers both to inclusion in the job market, and social and territorial inclusion. As a result, sought actions concerning inclusion revolve around competence and skill development, modernisation of the job market and fighting poverty and social exclusion. Not mentioning the use of digital resources in this context is a bit surprising [lack of discourse on digitalisation in relation to inclusive growth – social sustainability and participation]. In the public sector, for example, digitalisation

⁶ [brackets] are in the empirical material used to indicate my coding of elements of discourses

and the use of digital resources are often spoken of as an important means for participation and democracy, thus contributing to social inclusion and promoting democratic values. In the coming sections, the two priorities smart and sustainable growth are in focus in the analysis as they explicitly mention digitalisation.

Smart growth and digitalisation

The first priority, denoted *smart growth*, focuses on how to achieve economic progress. Research and development, education, and efficient use of resources are promoted as essential to economic growth. In Table 6:1 above, the three flagship initiatives that are to underpin economic progress are summarised. One of the proposed initiatives concerns digitalisation as such. Thus, only by looking at the initiatives that underpin the first priority, digitalisation appears as one important (but not the single) component of what is considered as *smart* [digitalisation as a driver of economic growth; digitalisation as a dimension of smart]. Knowledge and innovation are two other components pointed out by the Commission as being drivers of economic growth. In the quote below, “making full use of” denotes that current digital resources are not used to its full potential, something which is in line with earlier argumentation on Europe lagging behind due to inadequate digitalisation.

Smart growth means strengthening knowledge and innovation as drivers of our future growth. This requires improving the quality of our education, strengthening our research performance, promoting innovation and knowledge transfer throughout the Union, making full use of information and communication technologies and ensuring that innovative ideas can be turned into new products and services that create growth, quality jobs and help address European and global societal challenges. (Europe 2020, p.11-12)

It is the *usage* of digital resources that is stressed in this context. Yet, this also indicates that there is an infrastructure already in place, however, this infrastructure and what digital resources to be used are not clear in this context. Digitalisation and the use of digital resources are in a way black-boxed and taken for granted at the same time. Black-boxed in the sense that the digital resources per se are not made explicit and taken for granted in the sense that “making full use” also, like I said above, denotes that there is some kind of resources and infrastructure already in place and in use (though not used to its full potential). Perhaps this is not a striking observation as it is a strategic document covering many topics and areas and thus conforms to the expected format. European policy-makers appear to view digital resources as means for communicating information. In the context of innovation and knowledge, the use of digital resources is presented as playing an important role when it comes to exchange of ideas, thoughts, and/or knowledge. Digital resources are thus presented as important means in knowledge and innovation processes; processes which the Commission appears to view

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as drivers of economic growth [digitalisation as an information and communication means]. Yet, by using the word transfer in the context of knowledge and innovation, it also shows a rather naïve and instrumental view of digitalisation and the use of digital resources, not taking into account the constructive and collaborative perspective of it. On the other hand, the Commission refers to digitalisation in relation to innovation and new products and services. This indicates another view of digitalisation, where the relation indicates that European policy-makers view digitalisation as a market in its own [digitalisation as a market in its own].

Subsequently, it is established that Europe must act in three different areas to stimulate smart growth: innovation, education and learning, and digital society (Europe 2020, p.12). These three areas also correspond to the three separate flagship initiatives proposed by the Commission – Innovation union, Youth on the move, and A Digital Agenda for Europe – all of which are thought of as economic catalysts. In the overall analysis of the three initiatives, it is clear that both the role and prominence of digitalisation in the policy discourse varies; where it either is an explicit part of the discourse or not existing at all. Digitalisation is, for example, not mentioned in the context of the second initiative Youth on the move [lack of discourse on digitalisation in relation to youth on the move].

In the first flagship initiative, the Innovation Union, digitalisation is not in explicit focus but yet an important part of the discourse. Digitalisation is in this particular context presented as a precondition for innovation and knowledge transfer. European policy-makers mean that Europe is

falling behind on high-speed internet, which affects its ability to innovate, including in rural areas, as well as on the on-line dissemination of knowledge and on-line distribution of goods and services. (Europe 2020, p. 12),

In the quote above, internet could be seen as a precondition to innovation, especially in relation to business and new business models. By talking of digitalisation in relation to dissemination and distribution of both goods and services, it reinforces this particular image [digitalisation as a communication infrastructure; digitalisation as precondition for business innovation]. At the same time, it is established that the current capacity of the digital infrastructure is not enough, and, as a consequence, several actions are sought. These actions are directed to the Commission itself and to the member states. Actions touching upon cross-national interests are directed to the Commission and necessary actions at an EU level revolves around interoperability and investments in digital infrastructures [issues concern interoperability; issues concern investments in digitalisation]. Besides being pointed out as a precondition for innovation and knowledge transfer, digitalisation is in this

context discussed in terms of a market of its own, i.e. a branch of its own that can spur economic growth. Hence, digitalisation and the use of digital resources not only represent means to achieve innovation, but also an area for innovation and economic progress in its own [digitalisation as a market in its own].

Digitalisation is of course at the heart of the flagship initiative called A Digital Agenda for Europe⁷. This initiative could be seen as a direct response to what European policy-makers have identified as “insufficient use of” digital resources. This flagship initiative addresses infrastructural, technical and regulative issues connected to what the EU policy-makers label as the creation of a “Digital Single Market” (Europe 2020, p. 14) [digitalisation as a market in its own]. However, in this strategic overview there is little information on what is actually meant with this digital single market. It is said that the Commission will work “to create a true single market for online content and services” (Europe 2020, p. 14). Necessary actions on a EU (and global) level are to develop regulatory and legal frameworks in relation to this market. Actions on national level are more prone to be connected to operational aspects, like deployment and usage of digital infrastructures and resources [issues concern interoperability (infrastructural, technical, regulative)]. Sought actions are seen as preconditions to achieve smart growth. To conclude, digitalisation is in the context of smart growth both an implicit and explicit dimension of the discourse.

Sustainable growth and digitalisation

The second priority in Europe 2020, denoted *sustainable growth*, refers according to the strategy to “building a resource efficient, sustainable and competitive economy”, and this is to be achieved by developing

*new processes and technologies, including green technologies, **accelerating** [original emphasis] the roll out of smart grids using ICTs, /.../, and reinforcing the competitive advantages of our businesses, particularly in manufacturing and within our SMEs, as well through assisting consumers to value resource efficiency. (Europe 2020, p. 14)*

In the quote above digitalisation is referred to in two terms, smart grids and ICTs. Put together in this context it appears as EU policy-makers' separate the two. Smart grids and ICTs are also separated from other type of technologies. In the context of smart grids digitalisation becomes a dimension of what is considered smart, and this type of grid is a new type of power grid with an additional infrastructural layer to traditional ones, i.e. communication layer [digitalisation as a dimension of smart; digitalisation as communication infrastructure (smart grid); digitalisation as an information and communication means]. However, it not explicitly discussed what the smart grid is and

⁷ This flagship initiative is analysed and presented further in section 6.2

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how it functions. Digitalisation is also pointed out by the European policy-makers as important in “the roll out” of this infrastructure, indicating that digitalisation also is a part of the implementation process and that this type of infrastructure is not in place yet. However, it is not explained further how this is to be done in practice. Actions sought by the Commission in this area will most likely affect both national and local urban planning and development. The infrastructure as such – the smart grid – is presented as an infrastructure that is both to drive and sustain business success, and to guide consumers in making resource efficient choices [digitalisation as a driver of economic growth; digitalisation as a means to achieve resource efficiency].

In addition to resource efficiency, the Commission pinpoints two other areas for action, i.e. competitiveness and climate change (Europe 2020, p. 14-15); two areas which are spoken of in relation to resource efficiency. Concerning competitiveness, it is established that the EU has been “a first mover in green solutions”, and that it “should maintain its lead in the market for green technologies as a means of ensuring resource efficiency throughout the economy” (Europe 2020, p. 15). Green in combination with technologies can be seen to reinforce the ecologic dimension of sustainable growth. Similar to the digital market, green technologies are also considered to be a strategic area for development, and thus an enabler of economic growth [digitalisation as a market in its own (green technologies); digitalisation as a driver of economic growth]. In relation to the second area, climate change, the Commission notes that by “exploiting the full potential [of the] new technologies” (p. 14) climate change can be combatted. In this context it is neither clear what is meant with “exploiting the full potential” nor what is meant with “new technologies”. Digitalisation is not, however, explicitly mentioned in this context [lack of explicit discourse on digitalisation in the context of climate changes]. Consequently, the European policy-makers have proposed two flagship initiatives to address these pinpointed areas for action, namely Resource Efficient Europe and An Industrial Policy for the Globalisation Era (Europe 2020, p. 15-17).

In the first of the two initiatives, Resource Efficient Europe⁸, different necessary measures and sought actions are discussed in relation to different sectors. For instance, in the transport sector it is said that EU will work for “deployment of grid infrastructures, /.../, intelligent traffic management” (Europe 2020, p. 15) and in the energy sector they will work for upgrading the European energy network to “smart grids” (Europe 2020, p. 16) [digitalisation as a dimension of smart]. At the same time, they leave to the member states to “develop smart, upgraded and fully interconnected transport and energy infrastructures and make full use of ICT” (ibid.). In this context, digitalisation is put forward as a means to unite (interconnect) different infrastructures [digitalisation as a means to interconnect infrastructures]. However, no information on how this is to be

⁸ This flagship initiative is analysed and presented further in section 6.3

done in practice is given. Yet, as transport and energy services are essential parts of urban planning and development, the call for new interconnected infrastructures could be expected to be a central issue in national and local planning discourses. The second of the two initiatives, Industrial Policy for the Globalisation Era, targets the industry as an important focus area for achieving a sustainable growth. In this context digitalisation and the use of digital resources are not explicitly spoken of. For example, it is said that the Commission will work to “promote technologies and production methods” (ibid. p. 17) and in this context we cannot be sure of what kind of technology they refer to, whether or not it includes a digital dimension [lack of explicit discourse on digitalisation in the context of industry and globalisation]

To conclude, digitalisation is in the context of sustainable growth only an implicit but yet important dimension of the discourse. Interestingly, in this particular context we can note a shift in the usage of the technology concept. When discussing infrastructure developments there is a tendency to include and differentiate the digital dimension, meanwhile when discussing industry developments more generic terms, like technologies, green technologies, are used. The different uses of the terms appear to be more or less consciously made, where concepts closer to digitalisation are used in the context of the first initiative (Resource efficient Europe) meanwhile the generic use appears in the context of the second initiative (Industrial policy for the globalisation era). The generic use of the term technology does not necessarily include ICT, nor does it exclude it. The technology is in a sense black-boxed as it is not further discussed who the stakeholders are that are supposed to develop, implement and use the technology. It could thus be expected that these matters will be further elaborated in the strategic documents regarding each of the two flagship initiatives.

Summary and reflections

In the analysis above, we can note that the discourse on digitalisation takes different shapes in the overall strategy for Europe (Europe 2020). Depending on the objective and the context in which digitalisation is spoken of in the strategy, the phenomenon either has a more central or a more peripheral role in the discourse. In certain areas it is referred to in specific terms like ICTs, smart grids, and in other areas it is referred to in more generic terms, e.g. new technologies, or not referred to at all. Apart from characterising one of the flagship initiatives, the attribute *digital* mainly appears to be used to characterise a timely phenomenon and its context, e.g. a digital era, a digital society, digital market. The attribute *smart* on the other hand is used to characterise different “objects” or phenomena, e.g. smart economy, smart home, smart energy metering, and smart growth. Smart does not primarily appear to be associated with technology, but rather as a general capability. However, when associated with digitalisation it is mainly used to characterise a new type of infrastructure, e.g. smart grids, smart upgraded and interconnected infrastructures

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(see summary below). At the same time, digitalisation appears as one component of what is considered smart, other components are innovations and human capital.

In Table 6:2 below I have summarised elements of discourses on digitalisation in Europe 2020. Digitalisation is mainly spoken of in relation to the two areas; *economy* and *sustainability*. Concerning the third area, *inclusion*, digitalisation is not mentioned at all. Like I discussed above this is surprising as the use of digital resources often are promoted as means for involvement in decision-making and in democracy. Less surprising is it that digitalisation is spoken of in relation to economy and economic growth. The time when the strategy was written, was a time characterised by economic crisis in Europe. Consequently, at the time, European policy-makers appear to view digitalisation as *strategic area for innovation and business development* (a market in its own, administration, production of goods and services). Concerning the second area sustainability, digitalisation is discussed in relation to ecologic sustainability, and in this context new digital infrastructures – smart grids – are promoted as important in achieving sustainability. Normally ecologic sustainability would be regarded as one out of three dimensions of sustainable development. However, as European policy-makers have chosen to focus on economic progress as an overall aim in EU2020, they appear to also have chosen to integrate the ecologic dimension as part of the economic dimension of sustainability.

In the summary below, we can see that digitalisation is either *attributed different roles*, e.g. a driver, precondition, a means, or *objectified*, e.g. infrastructure, market. European policy-makers mainly use the term information and communication technologies (ICTs) when referring to digitalisation. Even though the communicative aspect of the technology is emphasised, European policy-makers still appear to have a rather instrumental view the technology, where they see technology as an information and communication means. ICTs are, for example, mainly portrayed as means for information and knowledge transfer and dissemination, which indicates a one-way type of communication. Apart from the smart upgraded infrastructure (high speed internet and broadband), there is little evidence on a dynamic and constructionist view of the technology.

When it comes to different issues and sought actions, these issues could be categorised in two categories, i.e. issues concerning interoperability and issues concerning investments. Investments in digital infrastructure is mainly an assignment for the private sector, meanwhile the public sector has to take a global responsibility when it comes to developing legal frameworks. Issues connected to interoperability are not just portrayed as technical matters, but also legal matters.

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Table 6:2. Summary of elements of discourses on digitalisation in Europe 2020.

Dimension in the text		Elements of discourses
Smart growth	Innovation Union	Digitalisation as a precondition and driver of economic growth
		Digitalisation as a dimension of smart
		Digitalisation as an information and communication means
		Digitalisation as a market in its own
		Digitalisation as a communication infrastructure
		Digitalisation as a precondition for business innovation
	Digital Agenda	Digitalisation as a market in its own
		Issues concern interoperability
		Issues concern investments in Digitalisation
	Youth on the move	Digitalisation as a market in its own
Issues concern interoperability (infrastructural, technical, regulative)		
Sustainable growth	Youth on the move	Lack of discourse on digitalisation in relation to youth on the move
	Resource efficient	Digitalisation as a dimension of smart
		Digitalisation as a communication infrastructure (smart grid)
		Digitalisation as an information and communication means
		Digitalisation as a driver of economic growth
		Digitalisation as a means to achieve resource efficiency
		Digitalisation as market in its own (green technologies)
		Lack of explicit discourse on digitalisation in the context of climate changes
		Digitalisation as a dimension of smart
	Industry and globalisation	Digitalisation as a means to interconnect infrastructures
Lack of explicit discourse on digitalisation in the context of industry and globalisation		
Inclusive growth		Lack of discourse on digitalisation in relation to inclusive growth

Above, I have presented how digitalisation is spoken of in the larger economic and societal context of urban development. Below, I will continue to the phenomenon as such and how digitalisation is spoken of more explicitly by European policy-makers in the Digital Agenda for Europe.

A Digital Agenda for Europe

In this section, I start out by giving a brief overview of this flagship initiative, i.e. the Digital Agenda for Europe (hereafter referred to as DAE). DAE is as pointed out above one out of three initiatives (see Table 6:1 above) that is proposed to stimulate economic growth and is a separate policy document in relation to Europe 2020.

As the heading of the flagship initiative reveals this is a strategic document focusing on digitalisation as such. It is pointed out in the DAE that

The overall aim [...] is to deliver sustainable economic and social benefits from a digital single market based on fast and ultra fast internet and interoperable applications. (DAE, p.3)

The purpose of the agenda is to “set out to define the key enabling role that the use of Information and Communication Technologies (ICT) will have to play if Europe wants to succeed in its ambitions for 2020” (DAE, p. 3). Thus, this policy document sets the course for action concerning issues relating to digitalisation in Europe and is aimed at European governments, businesses and citizens. The digital agenda was the first to be launched out of the seven flagships. DAE was decided in May 2010 only a couple of months after Europe 2020, indicating a parallelism in work. In the agenda EU policy-makers have pointed out seven priority areas to work with. These areas are: a digital market, interoperability and standards, trust and security, fast internet access, research and innovation, digital literacy and inclusion, and societal benefits. I will present them more in detail below.

Digital market

The first priority area in DAE concerns obstacles and necessary actions for a *digital single market*. We have already learnt in the overall strategy (Europe 2020) that Europe is lagging behind in using the capacity of digitalisation. In DAE this reasoning is taken one step further pointing out that Europe is especially lagging behind when it comes to using and realising the benefits of the internet era. Consequently, four areas are pointed out as fundamental to *creating a digital market*, i.e. creating “attractive” content and services, eliminating legislative obstacles for commerce, building confidence for digital solutions, and a single market for telecom services [digitalisation as a market in its own]. When it comes to creating online contents and services EU policy-makers pinpoint public authorities as vital actors. They mean that “[p]ublic authorities should play their part in promoting markets for online content” and this could be done by “making public sector information available” (DAE, p. 9) [digitalisation as a precondition for online contents and services]. Opening up of public data is by EU policy-makers seen as an action that would stimulate “growth of innovative online services” (ibid.) [issues concern making public data available for commercialisation]. It is also pointed out that “public bodies must be obliged to open up data resources for cross-border application and services” (ibid.). Opening up of public data could be expected to have impact on urban planning and development and smart city initiatives, where visualised future solutions many times are to be based on access to real-time data on city activities. Other actions put forward by EU policy-makers concern elimination of transactions obstacles, in this case lack of a common standard for electronic payments and electronic identification. A fragmented digital market with deficiencies when it comes to technical standards for transactions raises consumer issues related to trust and rights [issues concern interoperability (technical standards); issues concern trust in digital solutions (services)]. As a consequence, the Commission has identified a demand to review current regulatory documents when it comes to data protection and the right of the individual [issues concern legislation of digital commerce]. Eliminating transactions

obstacles might not have a short term impact on urban planning and development and smart city initiatives; however, in the long run new products and smart city services can be dependent of agreements in this area.

Interoperability and standards

The second priority area concerns obstacles and necessary actions for *interoperability and standards*. In this section the Commission focuses on technical interoperability where they mean that the “fast-moving technology market” call for a framework for standard setting. They argue that “standards are vital for interoperability” (DAE, p. 15) [issues concern technical interoperability and standard setting]. In addition to the technical standards they also mention developing policies for intellectual property rights, licensing terms, and cooperation agreements [issues concern legislation and regulations]. In this context public authorities are once again pointed out as important actors in promoting a better use of standards. For example, it is explicitly said that public authorities

should make best use of the full range of relevant standards when procuring hardware, software and IT services, for example by selecting standards which can be implemented by all interested suppliers, allowing for more completion and reduced risk of lock-in. (DAE, p. 15)

Development of standards could be expected to be vital to smart city developments, especially if the sought solutions involve digital resources. Smart city solutions drawing upon the notion of instrumentation, interconnection and intelligence could be expected to be preceded by discussions and decisions on standards and interoperability. Another key action put forward by EU policy-makers in this area is the adoption of a European Interoperability Strategy and an Interoperability Framework, where they argue that one important part is to promote interoperability between public administrations. EU policy-makers do not elaborate on what is to be interoperable nor on what is meant with interoperability. Based on previous understanding of the concept we know that there are different kinds of interoperability, e.g. technical, organisational, and legal, and we can expect that development of smart city solutions evokes issues related to different kinds of interoperability.

Trust and security

The third priority area in DAE concerns obstacles and necessary actions for *trust and security*. Some of these aspects have already been touched upon in the area of creating a single digital market. Yet, under this priority area EU policy-makers acknowledge a user perspective, where they argue that unless users feel safe and secure, they will not embrace new digital solutions and online services [issues concern how to create trust and security in provided solutions]. Cybercrimes like identity thefts or the spread of malicious software also need to be addressed [issues concern cybercrime and malwares].

The Commission means that we all – individuals as well as private and public bodies – have a shared responsibility for solving these issues and strengthening security. Policy-makers at this level mean that the right to privacy and protection of personal data are important [issues concern privacy and integrity]. As mentioned before this could be expected to be a relevant issue in the context of urban planning and development as many of the new smart solutions like e-health, e-government, or smart grids, potentially also open up for misuses.

Fast internet access

The forth priority area concerns obstacles and necessary actions for *access to fast and ultra-fast internet*. Internet as a communication infrastructure is portrayed as vital to economic growth, and to ensure citizens and businesses to access information and services [digitalisation as an information and communication infrastructure; digitalisation as a precondition for economic growth]. Sought actions in this area are twofold; actions taken to guarantee widespread high-speed broadband coverage in Europe, and actions taken to adopt the next generation access networks. Concerning broadband coverage, it is pointed out by EU policy-makers that they foresee a combination of both fixed and wireless solutions [digitalisation as a communication infrastructure consisting of both fixed and wireless solutions]. At the same time, it is said that wireless broadband “can play a key role to ensure coverage of all areas including remote and rural regions” (DAE, p.19). It is also acknowledged that this could burden the radio spectrum even more, something which users already today experience as congestions on the network [issues concern possible congestions in the communication infrastructure]. To guarantee full coverage also means investments from the part of national governments in areas where private interests are weak [issues concern investments in communication infrastructure]. Thus this would be an issue for regional planning and perhaps not as much for urban planning, yet, at the same time, we can expect broadband development to be on the general agenda for urban planning and development. Concerning adoption of next generation access networks this is mainly about going from copper and TVT cable networks to fibre. Hence, in the planning of new areas we can also expect development of fibre networks to be on the agenda.

Research and innovation

The fifth priority area concerns obstacles and necessary actions for *research and innovation*. It is pointed out that Europe needs to invest in “ICT research and development”, otherwise the manufacturing and service sectors in Europe will be threatened [digitalisation as a market in its own; issues concern lacks of investments in research on digitalisation]. Due to global challenges cities are facing, we can expect urban planning and development and smart cities to be interesting contexts for both innovation and research, and EU policy-makers emphasise that Europe should continue its advancements in key areas such as eInfrastructures and cloud-computing; referring

to an infrastructure consisting of technical, organisation, and social components to enable collaboration in a decentralised research environment [digitalisation as a communication infrastructure (consisting of technical, organisational, and social components)]. In this context it is also acknowledged that “ICT drives value creation” as well as economic growth and according to the Commission this means “that industry is increasingly in need of open and interoperable solutions to exploit ICT across all sectors” (DAE, p. 23) [issues concern interoperability]. This also calls for further research on Future Internet and Internet of Things. We have already seen that smart city developments tend to focus on future internet (internet of things) which should make digitalisation a relevant issue in general in urban planning and development.

Digital literacy and inclusion

The sixth priority area concerns obstacles and necessary actions for *enhancement of digital literacy, skills and inclusion*. This area is on the one hand more peripheral to urban planning and development, and, on the other hand, lack of such competence in the planning process will most likely have effects on how digitalisation is spoken of; what role digitalisation is attributed in urban developments. In DAE European policy-makers portray the “digital era” to ultimately be about empowerment and emancipation, and as a European citizen, no matter background or skills, you should have the possibility to exploit the opportunities that digitalisation brings about. Further it is pointed out that digitalisation is vital for working smarter which also demands a digital literacy and skilled users [digitalisation as a precondition for productivity]. This also calls for further training and education in the area [issues concern digital competence and education].

Societal benefits

The seventh priority area concerns obstacles and necessary actions for *ICT-enabled benefits for EU society*. In this area European policy-makers see digitalisation – that is “smart use of technology and exploitation of information” – as important in helping us “to address the challenges facing society like climate change and the ageing population” (DAE, p. 27) [digitalisation as a means to address societal challenges]. It is pointed out that

ICT is becoming a critical element for delivering policy objectives like supporting an ageing society, climate change, reducing energy consumption, improving transportation efficiency and mobility, empowering patients and ensuring the inclusion of persons with disabilities. (DAE, p. 27)

Delivering policy objectives are of course relevant on all levels (from EU level to local). Given the global challenges and the new role appointed to local governments concerning many of these challenges, we could expect that digitalisation also is reflected in the discussions in practice in urban planning. The first area brought up by the Commission

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where digitalisation can make a contribution to society concerns *the environment*. Digitalisation is in this context pointed out to have a key role when it comes to cutting greenhouse gas emissions and improving energy efficiency [digitalisation as a means to decrease emissions and improve energy efficiency (e.g. energy savings in buildings, less resource-intensive products and services, intelligent transport systems, smart grids)]. For example, it is argued that digitalisation potentially can lead to

structural shift to less resource-intensive products and services, for energy savings in buildings and electricity networks, as well as for more efficient and less energy consuming intelligent transport systems (DAE, p. 27).

This is of course interesting to the context of urban planning and development as it touches upon many of the context relevant issues, e.g. building, energy provision, transportation. In order to achieve results in the area, *information* is pointed out as essential as it will help people make better choices. In the quote below, digitalisation in its literal meaning, that is to make data digital in order for a computer to process it, is thought to be important.

The ICT sector should deliver modelling, analysis, monitoring and visualisation tools to evaluate the energy performance and emissions of buildings, vehicles, companies, cities and regions" (DAE, p. 28).
[digitalisation as a means for modelling, analysing, monitoring and visualising energy data]

Further, in this context, it is said that smart grids are essential to control of transmission and distribution of electricity, however, for this advanced digital infrastructure to function properly an open interface of transmission and distribution is necessary [digitalisation as an information and communication infrastructure]. It is pointed out by the Commission that a "wide-scale role out" of digital solutions like this calls for cooperation between the ICT industry and other sectors (public and private).

Another area pointed out by the Commission which deserves a bit more attention is *government* and the development of eGovernment. This area could be seen to be relevant to urban planning and development in general, as it concerns many of the public services/functions that cities are obliged to provide. In this context EU policy-makers point out that eGovernment services "offer a cost-effective route to better service for every citizen and business and participatory open and transparent government" (DAE, p. 31) [digitalisation as a means to make government transparent and open]. At the same time, it is also referred to as something that can "reduce costs and save time for public administrations, citizens and businesses" (ibid.) [digitalisation as a means to render administration more effective]. In urban planning this could for example concern administrative processes and information sharing within and outside the administration, or to involve citizens in planning processes. Hence, all types of activities that can improve quality in decisions and at the same time make them transparent. Healthcare

and culture are also promoted as two areas where digitalisation can make a difference. In healthcare for example the use of digital resources is thought to “improve the quality of care, reduce medical costs and foster independent living, including in remote places” (DAE, p. 29) [Digitalisation as means to render processes and services more effective]. At the same time, it is acknowledged that personal health information must be safely stored and that there are organisational and legal barriers that need to be removed [issues concern privacy and integrity; issues concern interoperability (organisational, legal)]. Digitalisation in relation to culture is mainly discussed in term of using new media to distribute cultural and creative content [digitalisation as a means to distribute cultural contents], and that this calls for investments in digitalisation as such [issues concern investments in digitalisation and accessibility].

Summary and reflections

In the Table below (6:3), I have summarised elements of discourses on digitalisation in DAE. Not surprisingly, we can note that digitalisation also in this policy document is attributed different roles (e.g. means, precondition). What is more interesting however, is that when focus is on the phenomenon as such, and where we can assume that the policy-makers behind it have competence in the area, digitalisation is more frequently seen as *means to be used in a variety of contexts*, e.g. in governance, in transportation, in energy management, in healthcare – and not only as a means to reinforce economy and fuel sustainability (like in the overall strategy EU2020). Purposes of using digital resources are different depending on context, but generally digitalisation is seen as a means to rationalise and make processes more efficient. In line with the overall strategy (Europe 2020), when objectified, digitalisation is mainly *seen as a market in its own* and something that could spur economy. Development of digital infrastructure could be seen as one market, other markets are new products and services that include digital solutions. Consequently, digital competences and skills are essential in driving this development.

In the summary below, we can also note that policy-makers in this area have a more nuanced view of what digitalisation is, and the issues involved. Digitalisation is seen as a *communication infrastructure consisting of different components*. One essential part in this infrastructure is the development of both fixed and wireless solutions (e.g. broadband, fibre, telecommunication), which could be seen as a technical component. We can also note that policy-makers in this context also acknowledge other components, i.e. organisational and social components, where they mean that these components are as essential as the technical components.

When it comes to different issues and sought actions, the different issues could be categorised in three categories, i.e. issues concerning interoperability, issues concerning investments, and issues concerning trust and security. However, in contrast to the overall strategy, the different issues connected to digitalisation are more elaborated in DAE. Issues related to interoperability, for example, are not only classified

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into technical and legal matters but also into organisational and social matters. Technical interoperability is on the one hand seen as an issue of standard setting, and on the other hand, as a capacity issue (how to secure usage). Also legal matters are more elaborated in relation to different contexts of use, e.g. legal hindrances for integrating/sharing systems or data, legal hindrances for digital commerce. Issues and sought actions concerning investment mainly concern three types of investments, i.e. investments in digital infrastructure, investments in research, and investments in competence. The third category of issues concern issues of trust and security, and in this context questions regarding privacy and integrity are brought up, as well as malwares and cybercrime, both of which can affect people's trust in provided solutions. Altogether, we can note that policy-makers with knowledge on digitalisation both see more opportunities with digitalisation and at the same time see more challenges/issues connected to it (i.e. a more nuanced view).

Table 6:3. Summary of elements of discourses on digitalisation in Digital Agenda for Europe

Dimension in the text		Elements of discourses
Digital market		Digitalisation as a market in its own
		Digitalisation as a precondition for online contents and services
		Issues concern making public data available for commercialisation
		Issues concern interoperability (technical standards, legislation of digital commerce)
		Issues concern trust in digital solutions (services)
Interoperability and standards		Issues concern technical interoperability and standard setting
		Issues concern legislation and regulations
Trust and security		Issues concern how to create trust and security in provided solutions
		Issues concern cybercrime and malwares
		Issues concern privacy and integrity
Fast internet access		Digitalisation as an information and communication infrastructure
		Digitalisation as a precondition for economic growth
		Digitalisation as a communication infrastructure consisting of both fixed and wireless solutions
		Issues concern prevention of congestions in the communication infrastructure
		Issues concern investments in communication infrastructure
Research and innovation		Digitalisation as a market in its own
		Digitalisation as a communication infrastructure (technical, organisational, social components)
		Issues concern lacks of investments in research on Digitalisation
		Issues concern interoperability
Digital literacy and inclusion		Digitalisation as a precondition for productivity
		Issues concern digital competence and education
Societal benefits		Digitalisation as a means to address societal challenges (climate changes, ageing population)
	Environment	savings in buildings, less resource-intensive products and services, intelligent transport systems, smart grids)
		Digitalisation as a means for modelling, analysings, monitoring and visualising energy data
		Digitalisation as an information and communication infrastructure
	Transport	Digitalisation as a dimension of a smart (intelligent) transport system
		Digitalisation as a means to make government transparent and open
	Government	Digitalisation as a means to render administration more effective
		Digitalisation as a means to distribute cultural contents
	Culture	Issues concern investments in digitalisation and accessibility
		Digitalisation as means to render processes and services more effective
		Issues concern privacy and integrity
		Issues concern interoperability (organisational, legal)
	Healthcare	

Above we have seen how digitalisation is spoken of as an initiative in its own. Below we will see how the phenomenon is spoken of in yet another context. The next initiative to be analysed is A Resource Efficient Europe.

Resource efficient Europe

The initiative called A Resource Efficient Europe (hereafter referred to as REE) was not launched until January 2011, almost a year after EU's growth strategy Europe 2020 and the digital agenda, DAE. This flagship initiative is one out of two initiatives launched by the Commission to fuel *sustainable* growth (see Table 6:1 above). In comparison with the overall strategy and the digital agenda this initiative is not as elaborated as the other two. It is early in the initiative established that current patterns of use of the "world's resources put pressure on our planet and threatens the security of supply. [Consequently, c]ontinuing our current patterns of resource use is not an option" (REE, p. 2). At the same time, it is established that initiatives to accomplish resource efficiency require actions in a broad range of areas, e.g. climate, energy, transport, water, agriculture, all of which are relevant to urban planning and development. Actions in these areas are also seen as "key[s] to securing growth and jobs for Europe" (ibid.). Actions to accomplish resource efficiency mainly appear to revolve around three things:

- 1) to create new more resource efficient products and services,
- 2) to find new ways to manage resources efficiently,
- 3) to create incentives to change consumer behaviours.

Technological improvements together with improvements "in energy, industrial, agricultural and transport systems" (REE, p.3) are specifically mentioned as important to achieve resource efficiency. Almost all of these systems are central to urban planning and development and could thus be expected to be discussed also in practice. REE is by the Commission seen as a "framework for policies to support a shift towards a resource-efficient and low-carbon economy" (REE, p. 3). European policy-makers point out that this shift requires actions in several areas, which makes it a complex thing to accomplish. Noteworthy is that in these discussions transitions to smart grids or intelligent traffic management systems are not mentioned at all [lack of discourse on deployment of smart/intelligent infrastructures].

Digitalisation and resource efficiency

It is established in REE that resources are "inefficiently" used due to lack of knowledge about true costs to society. In this context inefficiently rather means that resources are wastefully used by consumers. It is argued that this wasteful use is a consequence of a lack of knowledge of what the effects are to the environment and to our health, and lack of incentives to change our behaviours. Knowledge about true costs is thus put forward by European policy-makers as an incentive that would impact consumer behaviours in

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a positive way. In this particular context the use of digital resources is particularly pointed out to have an important role as the use of digital resources can help making true prices transparent to consumers. For example, it is said that “information and communication technologies [like smart metering] can play a decisive role” in this work (REE, p. 7) [digitalisation as a means to calculate resource costs; digitalisation as an information and communication means]. In addition to initiatives taken by EU and national governments in these areas, the Commission also points out “coordinated public support for R&D and innovation” as strategic areas to “increase the availability and performance of the necessary technologies” (ibid.).

Summary and reflections

In the Table below (6:4), I have summarised elements of discourses on digitalisation in REE. Based on the summary we can see that digitalisation does not appear to have such a prominent role in this particular document. In this document, European policy-makers mainly refer to digitalisation as a means in achieving resource efficiency, where it either can be used to calculate costs or to influence consumer behaviours. What is particularly interesting is that new infrastructures, like smart grids, energy home management systems, or intelligent transport systems, are not mentioned by policy-makers in this document at all. Hence, we can note that there are gaps in how digitalisation is discussed in REE both in comparison to the overall strategy Europe 2020 and in comparison to DAE. This is probably a result of different policy-makers and interest groups being behind the different documents, where policy-makers in the area of resource efficiency at the time had a quite narrow view of the role of digitalisation. This could indicate a silo thinking within different policy areas within EU and the European Commission, and that policy-makers with knowledge on digitalisation have a hard time to reach out to policy-makers in other areas (where digitalisation could be applied and thus make a difference). An apparent risk with silo thinking and a too narrow focus on a specific policy area is that it could result in sub optimisation. Yet, at the same time, specific knowledge within an area could be seen as an advantage and an asset as such. In this context it is also pointed out that resource-efficiency initiatives are closely linked to other initiatives taken by the EU. However, it is not clear where and how this should be done.

6:4. Summary of elements of discourses in Resource Efficient Europe

Dimension in the text	Elements of discourses
Digitalisation and resource efficiency	Lack of discourse on deployment of smart/intelligent infrastructures
	Digitalisation as a means to calculate resource costs
	Digitalisation as an information and communication means

At this point I have covered how digitalisation is viewed by different policy-makers at an EU level in three different policy documents. Below, I will proceed to discuss the found elements of discourses in relation to urban development and city services.

Chapter summary – EU policy discourse

In this section I summarise how digitalisation has been spoken of by different policy-makers at an EU level and discuss how these elements of discourses are relevant to the context of urban planning and development. I have earlier identified that urban planning and development touches upon many service areas that cities are to provide; areas that are more or less central to urban planning and development. At this stage of the analysis I have chosen to categorise previously found elements of discourses in relation to the different services/functions that cities are to provide (also services/functions that smart city developments target, cf. Chapter 4, smart city as a policy arena). These categories are: governance, environment, communications, education, culture, welfare, and economy. These categories are relatively broad and inclusive in character. By categorising the elements in relation to these services/function it becomes clear in what contexts digitalisation is spoken of, where it is more prominent and where it is less prominent (see Table 6:5 below).

In the table we can note that digitalisation in most service contexts is spoken of as a *means*, and as such it is seen as a tool to do/achieve other things, e.g. make services, processes, administration more effective, calculate/model/analyse data, distribute. Even though digitalisation is seen as a means in almost all services areas, it is clear that it is more prominent in two areas, i.e. governance and environment (energy). In these policy documents, European policy-makers focus less on digitalisation in services related education, culture and welfare. This could be a consequence of the different foci of the documents, where Europe 2020 has an overall economic focus, meanwhile REE focuses on resource efficiency. DAE on the other hand focuses on digitalisation in general, and is also the only document that also mentions digitalisation in these contexts.

When objectified digitalisation is by European policy-makers primarily seen as two things: either a *communication infrastructure* or a *market*. When seen as a communication infrastructure, we can note that policy-makers with knowledge in digitalisation mean that the infrastructure consists of both hard and soft components. Meanwhile policy-makers with less knowledge/focus on digitalisation appear to mainly see it as consisting of hard components. The hard infrastructure is seen to consist of both fixed and wireless networks, and the soft infrastructure refers to social aspects of communication (e.g. organisational and social components). Digitalisation is also in this policy practice seen as a market and driver of economic growth. When referred to as a market digitalisation is either seen as an industry in its own or as a means to drive other markets (business innovation and business development, service development). However, it is not so much spoken of as means, but rather seen as precondition; a precondition for productivity, for services.

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Interoperability, investments in infrastructure, and trust and security are three areas, which European policy-makers target as important to work with on both EU level and national levels.

6:5. Summary of elements of discourses on digitalisation from an EU perspective

Dimension of urban development	Elements of discourses
Governance *administration *participation/engagement	Digitalisation as a means to address societal challenges (climate changes, ageing population) (DAE)
	Digitalisation as a precondition for online contents and services (DAE)
	Digitalisation as a means to render administration more effective (DAE)
	Digitalisation as a means to make government transparent and open (DAE)
	Issues concern making public data available for commercialisation (DAE)
Environment *housing *energy *water *safety	Digitalisation as a means to achieve resource efficiency (EU2020)
	Digitalisation as a means to calculate resource costs (REE)
	Digitalisation as a means to decrease emissions and improve energy efficiency (DAE/2)
	Digitalisation as a communication infrastructure (smart grid) (EU2020; DAE)
	Digitalisation as a means for modelling, analysings, monitoring and visualising energy data (DAE)
Communications *transport *ICT	Digitalisation as a means to decrease emissions and improve energy efficiency (DAE)
	Digitalisation as a dimension of a smart (intelligent) transport system (DAE)
	Digitalisation as an information and communication means (EU2020/2; REE)
	Digitalisation as a communication infrastructure (EU2020/2) consisting of both fixed and wireless solutions (DAE)
	Digitalisation as a communication infrastructure (consisting of technical, organisational, and social components) (DAE)
	Digitalisation as an information and communication infrastructure (DAE)
	Digitalisation as a means to interconnect infrastructures (EU2020)
	Digitalisation as a dimension of smart (EU2020/3)
	Issues concern interoperability (technical standards, legislation of digital commerce) (EU2020/2; DAE/4)
	Issues concern trust and security in digital solutions (services) (DAE/2)
	Issues concern robustness in the communication infrastructure (DAE)
Education *school *workforce	Issues concern digital competence and education (DAE)
Culture *recreation *tourism	Digitalisation as a means to distribute cultural contents (DAE)
	Issues concern investments in digitalisation and accessibility (DAE)
Welfare *health *social	Digitalisation as means to render processes and services more effective (DAE)
	Issues concern privacy and integrity (DAE)
	Issues concern interoperability (organisational, legal) (DAE)
Economy *business *commerce	Digitalisation as a precondition and driver of economic growth (EU2020/2; DAE/1)
	Digitalisation as a market in its own (EU2020/4; DAE/2)
	Digitalisation as a precondition for business innovation (EU2020)
	Digitalisation as a precondition for productivity (DAE)
	Digitalisation as a precondition for online contents and services (DAE)
	Issues concern investments in communication infrastructure (EU2020/1; DAE/1)
	Issues concern lacks of investments in research on Digitalisation (DAE)

Chapter 7: National policy perspective on digitalisation and urban development

In previous chapter a European perspective on policy discourses on digitalisation and urban development was presented, and in this chapter I introduce a national perspective on the same. The presentation of this perspective is based on a discourse analysis of two different Swedish policy documents. The first document is a national strategy for Sweden (Vision for Sweden 2025) with focus on physical and social planning. This strategy could be seen as a national version of Europe2020, yet with a minor scope. The second document is a national strategy on digitalisation (Digital Agenda for Sweden).

Both of these policy documents have been selected as they give insight to how policy-makers on a national level (in this case the Swedish government and a particular agency) view digitalisation, current challenges and future needs, and what actions are sought on national level in urban planning and development (see Chapter 2 for more details concerning methodological issues). In Figure 7:1 below, I present the chronical order of the publication of chosen documents at both EU level and national level. Given the order of publication, we can expect to find traces from discourses on EU level on a national level, especially concerning the digital agenda. Even though *Vision for Sweden 2025* was written and decided on after the *Digital Agenda for Sweden* I have chosen to start with the former as I mean that this Vision (as did Europe 2020) gives a broad understanding of current issues in urban planning and development, and thus, also gives clues to how digitalisation is viewed in this broader context of urban development. This particular view on urban development and digitalisation will eventually be compared to how digitalisation is spoken of in the national agenda on digitalisation.

Figure 7:1. Timeline showing the chronological order of the policy documents at EU and national level

Vision for Sweden 2025

Vision for Sweden 2025⁹ (hereafter referred to as VfS2025) was produced in 2012 by the National Board of Housing, Building and Planning on behalf of the Swedish government (assignment in the letter of regulation concerning the year of 2011)¹⁰. VfS2015 is a strategic document presenting goals on where Sweden should be in the year of 2025 in areas relating to physical and social planning. Physical planning has to do with the design of the immediate environment, however, it is acknowledged that the development of physical surrounding also affects the social environment. Consequently, this vision takes a rather broad approach to urban planning and development (like the one I have described in Chapter 2, cf. research focus). Twelve areas are put forward by the National Board of Housing as prioritized, and these areas are thought to “offer inspiration for measures promoting sustainable social development at all levels from national to local” (Boverket, 2014.). The prioritized areas are: city management, environment, regional development, building, higher education, planning, tourism, rail infrastructures, transport, energy, water, and land preservation. These areas are more or less central to urban planning and development and can thus give us an idea of how digitalisation comes into play both in urban development as such as well as in the planning process.

The Swedish National Board of Housing chooses to take a wide perspective when framing the national vision and they do this by reflecting on the four mega trends – globalisation, urbanisation, climate change and digitalisation – and their possible consequences in a Swedish context. For example, it is pointed out that climate changes might affect ice covering periods and precipitation (VfS2025, p. 5), urbanisation will probably result in dense city centres and/or in cities with several city cores (ibid.). The fourth trend, digitalisation, is put forward as an opportunity and by 2025 it is said that

*Sweden will be a clear frontrunner in exploiting the opportunities opened up by digitalisation. Access to first-class Internet links is taken for granted and online communications are a precondition of retaining and developing living standards, both in rural districts and digital communications as we are on electricity and running water. (VfS2025, p. 5) [digitalisation as a precondition for maintaining and developing living standards]*¹¹

In this context, the Swedish Board of Housing also acknowledges that one of the issues in the future concerns management of these growing metropolitan areas, where focus is

⁹ The vision is based on a review of hundred existing goals and an analysis of “where Sweden ought to be in the year 2025 in order to attain the goals set for a sustainable society by the year 2050” (Boverket, 2014).

¹⁰ A condensed English version of the same document was produced in 2014, which is the one that has been used and quoted in this thesis.

¹¹ As reminder, [brackets] are in the empirical material used to indicate my coding of elements of discourses.

on how to create sustainable environments in and around cities. City management is also the first area prioritised by the National Board of Housing in VfS2025.

City management

In VfS2025 *management of growing metropolitan areas* is put forward as a key area to work with, especially if the motive is sustainable development. The National Board of Housing's interpretation of management in this context is related to physical planning, where they mean that cities need to grow in a structured and holistic way without compromising the environment. According to the Board of Housing this calls for collaboration already in the planning process; collaboration in and between municipalities "with the region, with various stakeholders and with the citizens" (VfS2025, p. 9) [issues concern collaboration between different stakeholders in the planning process]. As a consequence, we can expect changes in management of urban planning and development processes in the future. However, digitalisation is not explicitly discussed as a means (or in any other role) in this context [lack of discourse on digitalisation in relation to city management].

Sustainable environment

The second area to be prioritised is *creation of sustainable environments*. Sustainable environment is in VfS2025 associated with preservation of a biological diversity as well as public health (both ecological and social aspects). Greenhouse gas emissions, climate changes and a neglected housing and urban development are put forward by the agency's policy-makers as threats to the environment. Consequently, the Board of Housing anticipates a development where fewer cars are used in cities, where green areas are preserved, where resource-saving life-styles are promoted and where housing stocks are upgraded. In this context Internet is put forward as an opportunity, especially for those who live in the country side and have the possibility to work from home, as it facilitates distance work [digitalisation as a means in distance work]. To achieve such a development, the Board of Housing calls for a physical planning that "takes place through interaction between different stakeholders, areas of competence and with the citizens concerned" (VfS2025, p. 14) [issues concern engagement of different stakeholders in the planning process].

Regional development

The third area put forward in VfS2025 is a *sustainable development of small localities and sparsely populated areas*. Migration to cities also means that other (regional) areas becomes depopulated, and the Board of Housing means that these two movements need to be balanced against each other to attain a sustainable development at all levels. A key to success is according to VfS2025, "extensive co-operation" between the public and private sector to stimulate business and increase attractiveness in the region. In this context, the possibility of working or studying from a remote location is something that

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is put forward as an enabler of regional development [digitalisation as a means in distance work/distance education]. “Access to robust and rapid Internet connection” in combination with physical communications are even spoken of as preconditions for “increasing the attractiveness of sparsely populated districts” (VfS2025, p. 17) [digitalisation as a communication infrastructure]. The digital infrastructure is portrayed as essential to business development and to access services. The development of digital public services means, according to the policy-makers at the Board of Housing, “that the resources are utilised more efficiently and that the quality of services has become more diversified and frequently also better” (VfS2025, p. 17-18) [digitalisation a precondition for business development; digitalisation as a precondition for public services]. According to the agency’s policy-makers this calls not only for collaboration concerning the physical planning, but also for a broader collaboration where competencies and services are shared between villages, country districts and municipalities and this with the help of digital resources [issues concern collaboration in planning processes; issues concern sharing of resources and services].

Building

The forth area brought up in VfS2025 is building. This area is of course central to urban planning and development. In the vision it is said that *building sustainably* is about a construction that takes “people’s needs for quality of life [and] good health” into account at the same time as it economises with resources (VfS2025, p. 21). In the future, there is a “uniform quality thanks to the development of computerised project design in combination with better co-ordination and logistics within the construction” (VfS2025, p. 21). Hence, today there is a lack of a uniform use of digital resources to manage urban and planning projects [digitalisation as a means to manage urban planning and development projects]. It is also pointed out by the policy-makers that buildings in the future are eco-sensitive and adaptable. In this context the intelligent home is put forward as a future development [digitalisation as means to manage the intelligent home; digitalisation as a dimension of smart/intelligent].

The intelligent home is generally established and creates security in the home (intruder detection, etc.) as well as regulating comfort in an energy-efficient way. Technology development is focused on userfriendliness which simplifies living while creating a secure living environment.

(VfS2025, p. 22)

We can note that digitalisation of homes is spoken of in both technical and social terms. To realise these ideas, the policy-makers at the National Board of Housing see a need for a dialogue “between public authorities and the construction and real estate sectors” to reach consensus concerning coordination issues, waste issues, hazardous material issues, and design issues (VfS2025, p. 23) [issues concern dialogue and coordination between different sectors on particular topics].

Higher education

The fifth area in VfS2025 concerns *higher education as an engine of regional growth*. Not all urban development projects deal with higher education, yet attracting people with right competencies is something that all cities strive for, which also makes it an important area to urban development in general. In the VfS2025 higher education localities are presented as infrastructural hubs and important engines for regional growth and employment (VfS2015, p. 25). Thus, localities of higher education could be seen as an asset to the city in several ways. In this particular context, the agency's policy-makers see digitalisation as "super-fast IT communications [that] cover the entire country, [and] which makes it possible to work and study at home to an increasing extent." (VfS2025, p. 26). Further, it is pointed out that "[d]istance learning programmes increase in scope and complement stationary courses. In this way, many people are given the option of participating in higher education, regardless of where they happen to live." (VfS2025, p. 26) [digitalisation as a means in distance work and distance education].

Transport

The sixth area brought up by the National Board of Housing in VfS2025 is *development of public transport*. Communication infrastructures are of course central aspects of urban planning and development. In this particular context, policy-makers at the National Board of Housing emphasise that also regional development requires an expansion of public transport, and in the future they mean that "[l]ower ticket prices, better punctuality, higher service frequency, enhanced comfort and easy Internet connections have also meant that many more people choose to travel by public transport" (VfS2025, p. 37) [digitalisation as an important dimension in commuting]. It is further pointed out that in rural areas transport by car has declined in the future and this partly due to improved online access and "systems with mobile service functions being gradually developed" (VfS2025, p. 38) [digitalisation as a communication infrastructure].

Energy

The seventh area concerns *securing future electricity supply*; an area which is essential to urban planning and development. Policy-makers at the national Board of Housing interpret energy efficiency to be about "an active development and expansion of solar, wind, wave and bioenergy sources [and] an expansion of smart electricity grids" (VfS2025, p. 41) [digitalisation as a communication infrastructure (smart grids)]. In VfS2025 it is said that

Sweden now has a robust electrical power supply and occupies a leading position in the expansion of Europe's smart grid. Large and small plants for renewable electricity production complement one another and are linked together with smart grids. [digitalisation as a means to interconnect infrastructures] (VfS2025, p. 42)

In line with this development it is also pointed out in VfS2025 that in the future local production of electricity (produced by households) is a fact, and that any “surplus in local electricity production is transferred over to the smart grid” (ibid.) [digitalisation as a means to decentralise energy production; digitalisation as means to achieve energy efficiency]. Of course this calls for investments in grid infrastructure, but also a change in mind-set when it comes to electricity production [issues concern investments in infrastructure; issues concern changes in business models connected to electricity production].

Planning for temporary operation (TO)

The eighth area in VfS2025 concerns *long-term planning for temporary operations* and this area mainly appears to concern extraction of raw materials (natural resources), like hydropower, forestry and mining. This area has perhaps limited impact on local urban planning and development as it concerns national interests. However, development of these types of industries also entails an “expanded infrastructure for electricity, IT and transportation” (VfS2025, p. 28), something which in the long run can affect local planning positively [issues concern expansion of infrastructures].

Tourism, rail infrastructures and land preservation

The last three areas – bolstering the visitor and hospitality sector, creating international rail connections for freight and passenger travel, and preserving nature, shorelines, and agricultural land close to built-up areas – are perhaps questionable areas to the context of this thesis. However, all three of them concern the creation of attractive environments either for people and businesses or for the sake of the environment itself. From an overall perspective I find these areas to be important dimensions of local urban planning and development; however, in this context digitalisation is not mentioned at all [lack of discourse on digitalisation in relation to tourism, rail infrastructures, and land preservation].

Summary and reflections

In the Table below (7:1), I have summarised elements of discourses on digitalisation in VfS2015. We can note that many of the issues brought up in VfS2025 concern national and regional interests in urban planning and development. However, these interests also have local consequences. For example, it is emphasised in the vision that physical planning calls for collaboration at all levels (locally and regionally), in and between municipalities, in interaction with stakeholders, and with citizens. We have already in previous chapters seen that urban planning and development (smart city developments) concern governance issues and participation and involvement in decision-making processes in order to create transparent and open processes. Also in this policy document it appears as participation and involvement in urban planning and development is prioritised. Thus, we can expect a similar movement in practice in urban development projects. Concerning, the role attributed to digitalisation we can note that it is also in

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this national context either spoken of as *means* or as a *precondition*. When spoken of as a means there are three areas that are prominent, distance work/education, energy distribution, and in development processes. Concerning the latter digitalisation is either seen as a means to align and manage planning processes, or as a means to manage different home systems (e.g. for security, for regulating comfort). When spoken of as a means in the process, this also indicates that today these processes are not coordinated and designed in a uniform way.

When national policy-makers see digitalisation as a precondition they tend to put this in relation to regional/rural development, e.g. for business development, for accessing public services, for maintaining living standards in rural areas. In a Swedish context it is perhaps not so surprising that brought up issues also concern investments in infrastructure in these more rural areas. What differs this national vision and national policy-makers from the European ones, is their focus on organisational interoperability. The challenges and actions national policy-makers call for often concern collaborations, coordination of resources, engagement in processes. Further, similar to EU policy-makers, digitalisation is seen as a communication infrastructure mainly in the context of energy use and energy production (smart grids).

Table 7:1. Summary of elements of discourses on digitalisation in Vision for Sweden 2025

Dimension in the text	Elements of discourses
	Digitalisation as a precondition for maintaining and developing living standards
City Management	Lack of discourse on digitalisation in relation to city management
	Issues concern collaboration between different stakeholders in the planning process
Sustainable environment	Digitalisation as a means in distance work
	Issues concern engagement of different stakeholders in the planning process
Regional development	Digitalisation as a means in distance work/distance education
	Digitalisation as a communication infrastructure
	Digitalisation a precondition for business development
	Digitalisation a precondition for public services
	Issues concern collaboration in planning processes;
	Issues concern sharing of resources and services
Building	Digitalisation as a means to manage urban planning and development projects
	Digitalisation as means to manage the intelligent home
	Digitalisation as a dimension of smart/intelligent
	Issues concern dialogue and coordination between different sectors on particular topics
Higher education	Digitalisation a means in distance work and distance education
Transport	Digitalisation as an important dimension in commuting
	Digitalisation as a communication infrastructure
Energy	Digitalisation as a communication infrastructure (smart grids)
	Digitalisation as a means to interconnect infrastructures
	Digitalisation as a means to decentralise energy production
	Digitalisation as a means to achieve energy efficiency
	Issues concern investments in infrastructure
	Issues concern changes in business models connected to electricity production
Planning of TO	Issues concern expansion of infrastructures
Tourism, Rail infrastructure, Land preservation	Lack of discourse on digitalisation in relation to tourism, rail infrastructures, and land preservation

Above I have presented how a national agency which is in charge of many of the policy areas that concerns urban planning and development view digitalisation. Below I will continue to how the phenomenon is spoken of more explicitly in the national agenda on digitalisation.

Digital Agenda for Sweden

The Digital Agenda for Sweden¹² (hereafter referred to as DAfS) was decided by Swedish government in the year of 2011 – hence not very long after the EU equivalent. The Swedish government sees the agenda as an instrument to coordinate efforts and measurements concerning digitalisation. It is early established that Sweden is a nation at the front when it comes to implementation of digital infrastructures and usage of digital resources. However, the

Government's aspiration is for Sweden to lead the way in use of ICT in order to attain policy goals for growth in all parts of the country, social welfare, democracy and climate improvement (DAfS, p. 5).

Hence the aim of the agenda is to create a coherent national strategy for exploiting opportunities of digitalisation. Four different contexts are pointed out by the Swedish government where digitalisation is thought to make a difference: in education, in healthcare, in the service sector, and to democracy. Even though Sweden has been an early adopter of digitalisation (e.g. internet, mobile phones, GSM-net) and user of digital resources and digital infrastructures, it is pointed out in DAfS that the challenge today is to become even better. The goal is to “boost Swedish competitiveness, growth and innovation, while respecting human rights and ensuring sustainable development” (DAfS, p. 13).

Similar to the Vision for Sweden 2025, digitalisation is brought up as means to meet societal challenges – worldwide challenges like climate change, economic crises, and globalisation, as well as national ones like aging population which will put strains on welfare systems, and social exclusion, maintaining and strengthening competitiveness of Swedish businesses. For example, it is pointed out that digitalisation can contribute to

creating new ways of designing solutions for an ageing society (e-health, digital aids), digital solutions for the environment (smart grids, intelligent transport systems), promoting cultural diversity (digital distribution of cultural content), democracy (transparent administration, systems for dialogue with decision-makers), improved competitiveness for businesses (digital skills, new products, services and business models) (DAfS, p. 13)

¹² For the analysis I have used the English version of the Digital Agenda.

In this quote we can note that the government envisions many application areas of digitalisation and many of these also concern urban planning and development [digitalisation as a means to address societal challenges (welfare, environment, democracy, economy)]. Further, opportunities that digitalisation brings about when it comes to gathering and storing large amounts of data are also emphasised as important by national policy-makers. Focus in DAfS is on the opportunities, however challenges or downsides to the development are also mentioned. Examples of what the national policy-makers see as downsides are risks of non-permitted controls and surveillance of individuals, criminal activities and frauds (phishing). Given the background it is stated that the IT-political goal is that “Sweden will be the best in the world at exploiting the opportunities afforded by digitisation” (DAfS, p. 15). In order to attain the goal, the government has pointed out four strategic areas to work with: easy and safe to use, services that create benefit, the need for infrastructure, and the role of ICT in societal development. In the next section I will present how digitalisation is spoken of in these specific areas and how this relates to urban planning and development.

Easy and safe to use

In the first area in DAfS focuses on the role of *information* where national policy-makers see information as one of the most important societal resources to be digitised as it can be exploited by each and every one and eventually contribute to society [digitalisation as a means to exploit information (weather, traffic, maps, vehicles)]. However, in this work it is according to DAfS necessary to differentiate and scale different types of information according to how sensitive it is (integrity /privacy issues). It is proposed that accessibility to non-sensitive information should be high, e.g. “weather, traffic, roads, maps, streets and vehicles” (DAfS, p. 20). National policy-makers have prioritised four subareas to work with in order to increase usage of digital resources, i.e. digital inclusion, e-services, digital competence, and everyday use security.

The first subarea *digital inclusion* concerns necessary actions to make sure that each and every one (who wants) can make use of digitalisation. In this context issues related to accessibility and usability are brought up. It is pointed out by national policy-makers that design and development of digital solutions must have the user in mind [issues concern accessibility and usability]. The second subarea *e-services and information as basis for innovative services* concerns how to make administration smarter and more open [digitalisation as enabler of smart and open government], and at the same time support innovation and participation [digitalisation as a means for innovative services; digitalisation as a means for participation]. In this context issues concerning usage revolve around making information available for other actors (than the government), and lack of standardised information structures [issues concern information availability; issues concern interoperability (semantic)]. The third subarea, *digital skills*, concerns people's digital competence. Having digital skills is portrayed as vital to being

employable in the future [issues concern digital competence, knowledge and skills]. The fourth subarea *everyday security* focus on issues related to security and trust; how users must be well informed and aware of security issues in order to also put demands on the same [issues concern how to create trust and security; issues concern users' digital competence on security].

In sum, we can note that usage is a prioritised dimension of digitalisation in DAfS. Digitalisation as such can be excluding, and, thus, affect society negatively. Making use of digital resources for making administration smarter, or using information as a resource for innovative services could be of interest in the context of urban planning and development.

Services that create benefit

In the second area national policy-makers focus on the emerging service society. In DAfS policy-makers foresee an increasing demand on a variety of digital services. Focus is on creating a range of services, channels that take different situations in life into consideration, and that are easy to use. All of this is thought to transform sectors and stimulate economic growth (innovative ideas, new businesses and business models). The public administration plays according the agenda an important role, both as a supplier of services but also as a buyer of the very same. It is pointed out that “the time has come to radically improve the efficiency of administration” (DAfS, p. 26). It is about giving the right service to the right price and at the same time increase accessibility. National policy-makers have prioritised six subareas in which digitalisation is thought to make a difference, i.e. public administration, entrepreneurship and business development, healthcare and social services, school and teaching, democracy, and culture. All of these areas map into urban development in the general sense and are therefore of interest.

The first subarea *public administration* focus on how digitalisation can make everyday life simpler for both citizens and businesses, and at the same time make public administration more efficient [digitalisation as a means to deliver services; digitalisation as a means to render administration more effective]. As urban planning and development is an integrated part in the public administration this area could be of special interest. Also in this context national policy-makers emphasise the sharing and re-using of information. Issues concern how to make processes, rules and technical solutions to work together [issues concern interoperability (organisational, legal, and technical)]. The second subarea *entrepreneurship and business development* concerns how digitalisation can be used to boost business [digitalisation as a driver of business and economic growth]. Digitalisation is portrayed as an important means in the work with simplifications for businesses, where digital solutions are said to be “an important tool” (DAfS, p. 28). The transit to electronic procurement is promoted as something that will increase efficiency for both businesses and public administration, especially in cross-

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border commerce [digitalisation as a means to render commerce more effective]. Further, access to internet and high-speed broadband is portrayed as precondition for establishment of small and medium enterprises in the countryside. Consequently, issues concern developing interoperable digital solutions (e.g. e-signatures) for electronic commerce, and harmonisation of regulations across the EU [issues concern interoperability (technical and legal)]. Digitalisation connected to the forth subarea, *health care and social services*, is in DAfS referred to as e-health. Focus is on how digitalisation can be used to improve processes and services from three distinct perspectives, i.e. the individual, personnel and decision-makers [digitalisation as means to render processes and services more effective]. Implementation of digital solutions and services is described to “have great potential to contribute to efficiency and quality improvements” (DAfS, p. 31). Issues brought up by national policy-makers in this area revolve around the complexity in these services, the need for a unified organisational structure, the need for inter-organisational collaborations, information security and technical standards [issues concern interoperability (organisational, technical, legal)]. In the fourth subarea *school and teaching*, digitalisation concern on the one hand access to digital resources, and on the other hand development of digital competence. National policy-makers see access to digital resources as an asset to both teaching and learning processes, as well as in administrative processes [digitalisation as a means for teaching, learning and administrating]. Digital skills are portrayed as vital and digital skills and competence are in DAfS pointed out as important issues [issues concern digital competence and education].

The fifth subarea in DAfS is *democracy*. This area focuses on how digitalisation can be used to improve citizens' possibilities to get involved in and to influence decisions at all levels (national to local). In this context national policy-makers see digitalisation as important means to stimulate citizen dialogues and improve community knowledge, thus, portrayed as an important means in democratic development [digitalisation as an information and communication means; digitalisation as a means to make government transparent and open]. Policy-makers see development of strategies for digitalisation as important to democratic development [issues concern development of information and communication infrastructures for citizen dialogues]. The final subarea, in relation to area denoted services that create benefit, is *access to culture*. Focus in this subarea is on how digitalisation can be used to both preserve and distribute cultural heritage [digitalisation as preserver and distributor of culture]. Issues brought up by policy-makers in this context concern technical advancements to support this development [issues concern supporting digital development for preservation, production and distribution of culture]. This area is perhaps less central to urban planning and development, yet, culture is one function/service cities are to support, and also an area

that national policy-makers point out as an area where digitalisation can make a difference.

Need for infrastructure

It is pointed out in DAfS that in order to both use and provide digital services there are some conditions that need to be fulfilled; conditions such as good access to communication infrastructure (telephony and broadband) – an infrastructure that is both robust and reliable and where information can travel securely. It is also pointed out by national policy-makers that it is actors on the private market that have the main responsibility for the communication network and investments in it. This is particularly interesting in an urban planning and development context as these actors could be expected to be involved at an early stage. However, it is at the same time pointed out in DAfS that other actors also are important for a prosperous development of such an infrastructure. Examples of other actors are the municipalities, the county councils, the county administrative boards. The role of the government is according to the policy-makers to “make sure that the market works efficiently”, and to provide the conditions for businesses to operate (DAfS, p. 38). Together with the private market the government also has a responsibility to make sure that communication services and the communication infrastructure are reliable and robust. The government has prioritised six subareas to work with to improve the communication infrastructure and they are internet, information security, soft infrastructure, geographic information, robust electronic communication, broadband.

The first subarea focuses on *internet* as a vital communication infrastructure to society [digitalisation as a communication infrastructure]. Issues on a national level brought up in DAfS concern how to ensure that this global infrastructure is “open, robust, stable and accessible” (DAfS, p. 38), especially as technical developments are rapid [issues concern interoperability (technical)]. In the second subarea *information security* policy-makers stress that “[p]rivate and public information systems must be secured with the aim of safeguarding assets in society” (DAfS, p. 40) [issues concern information security from a societal perspective (democratic, economic, political, and individual)]. We can expect information security to be an important issue in discussions where digital solutions are in focus in urban planning and development, and especially in smart city developments where real-time data on city activities are seen as a future solution. The third subarea, i.e. development of *soft infrastructure*, is in DAfS seen as a precondition for realising the potential of digitalisation. In this area national policy-makers distinguish between hard and soft infrastructures, where the latter is seen as “resources in the form of information made available, basic services and functions” (DAfS, p. 42) [digitalisation as soft (information, services) and hard infrastructures (communication network)]. Further, it is pointed out that

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[t]he soft infrastructure represents a foundation on which to achieve interoperability, i.e. to make systems, organisations or operational processes work together and capable of communicating with one another by following agreed rules (DAfS, p. 42)

Hence, the soft infrastructure is by these policy-makers seen as a precondition for interoperability. In this context standards are discussed and defined as “voluntary common solutions devised by consensus for problems that often occur” (DAfS, p. 42). National policy-makers see the work with standardisation as a horizontal instrument to 1) promote collaboration between private and public sector, and 2) to promote competitiveness. The work with digital standardisations is portrayed as essential and complex [issues concern interoperability and the work with standardisations]. The forth subarea focus on usage of *geographical information*. Geographical information is in DAfS defined as information that “describes phenomena that can be shown on a map using coordinates or some other indication of location”, and seen as information that is “becoming increasingly significant in central and local government as a means of making planning, decisions and follow-up more efficient (DAfS, p. 44). Policy-makers also see the use of geodata as vital 1) to business development, e.g. in the transport sector, and 2) to task management, e.g. emergency response systems. Hence, the use of geodata could be an important issue in urban planning and development.

Infrastructure for geographical information can be described as coherent whole if information together with different conditions required to make the information accessible and usable, for example rules, services for searching for, finding and using the information and systems for collaboration between different actors. (DAfS, p. 44) [digitalisation as soft and hard infrastructures; digitalisation a precondition for usage of geodata; issues concern interoperability]

The fifth subarea in DAfS focuses on *robust electronic communication*. Robust is in this context interpreted as communications that are “constructed in a reliable manner” (DAfS, p. 45) [digitalisation as (tele)communication infrastructure], and focus in the work within this area is on how to diminish disruptions in the communication network [issues concern disruptions in the operation of the communication network]. *Broadband*, which is the sixth subarea in relation to the need for infrastructure, is portrayed as the most vital communication infrastructure for both households and businesses [digitalisation as a vital communication infrastructure to society; digitalisation as a precondition and driver of economic growth]. National policy-makers point out that broadband coverage differ between urban and rural areas, where there in the former case often exist a selection of broadband operators to choose from, meanwhile in the latter sometimes is “impossible to obtain functioning broadband” (DAfS, p. 47) [issues concern investments in communication infrastructure (broadband)].

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In sum, we can note that development of a digital communication infrastructure is by policy-makers seen as essential to society, i.e. to citizens, to business, to administration. This communication infrastructure is seen to consist of both a soft infrastructure, i.e. resources in the form of information/data, services/functions, and a hard infrastructure, i.e. telecommunication network, broadband.

The role of ICT in societal development

It is established in DAfS that digitalisation permeates every level of society and thus also affects it in fundamental ways. In DAfS policy-makers point out both processes and areas where they see that digitalisation can be of importance for societal development, and these are: research and innovation, ICT for the environment, gender equality, freedom on the internet, copyright, global development. Concerning *innovation and research* it is pointed out that “digital information and digital tools must be used to a greater extent in research activity and innovation processes” (DAfS, p. 49) [digitalisation as an important means in research and innovation]. Innovation is in DAfS defined as “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations” (DAfS, p. 50). Sweden is by the policy-makers portrayed as having a strong position when it comes to research and development of ICT. In this context, the public sector is pointed out as a potential driver of digitalisation as it is “a large purchaser of and user of various forms of ICT-related goods and services” (DAfS, p. 50) [digitalisation as a market in its own]. In effect, innovations in relation to digitalisation are seen as vital to economic and societal development [digitalisation as a driver of economic growth and societal development]. Health care and care of elderly are contexts which policy-makers particularly point out where the use of so called test beds for innovation can be important. Test bed is in this context defined as “a common environment or structure to develop and demonstrate new concepts” (DAfS, p. 50). Test beds are thought to facilitate for innovators to “develop, test, and demonstrate the potential of innovative solutions through close cooperation with users” (ibid.).

Concerning the second area, *ICT for environment*, it is pointed out that “ICT must contribute to an environmentally sound society” (DAfS, p. 50). In this context challenges connected to climate and environmental changes are discussed, and policy-makers point out that

ICT is estimated to have potential to reduce carbon dioxide emissions in certain areas, principally the areas of construction, housing, energy and transport, by 15 per cent. ICT is consequently an important tool in achieving our common climate and environmental targets (DAfS, p. 51).

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This area is perhaps of particular interest to urban planning and development, as many of the areas are of direct concern to it. Further, it is in DAfS pointed out how digital solutions can contribute in specific areas, for example, in transport digital solutions are seen as important means to 1) replace transport and travel [digitalisation as a means to replace transport and travel], 2) to improve logistics and traffic management [digitalisation as a dimension of smart/intelligent transport systems]. In environmental management digitalisation is seen as a means to monitor and influence energy consumption [digitalisation as a means to achieve resource efficiency]. Concerning the latter area, national policy-makers particularly point out smart grids as an interesting solution [digitalisation as a communication infrastructure (smart grids)]. In this context it is said that

ICT will make smart production, distribution and use of energy possible.

The use of ICT is of particular interest in construction and housing in energy efficiency properties. Control systems can help control energy flows and lighting in an environmentally efficient way (DAfS, p. 51) [digitalisation as means for energy management and control]

In industry, digital solutions are portrayed as important means to control and monitor industrial processes, and thus also contribute to energy efficiency. Policy-makers also acknowledge the reverse impact digitalisation might have on the environment.

Concerning *gender equality*, it is pointed out in DAfS that there still is a “skewed gender distribution among professionals in the ICT sector” (DAfS, p. 52) and in ICT education [issues concern gender equality in ICT sector and education]. Other challenges brought up are connected to *freedom on the net* such as respecting human rights, *copyright* and how to improve and safeguard copyrights. These areas are perhaps of minor interest to urban planning and development, and thus not covered in detail in this study.

Summary and reflections

In the Table below (7:2), I have summarised elements of discourses on digitalisation in DAfS. Similar to EU policy-makers, national policy-makers with knowledge on digitalisation tend to have a more differentiated view of it. In this national context, digitalisation is attributed several roles, e.g. *means*, *precondition*, *driver*, *enabler*, but also *preserver* and *distributor*. However, to view digitalisation as a means for something still appears as the most common denominator. Like in the European version of the digital agenda, digitalisation is seen as *a means in a variety of contexts*, e.g. in administration, in education, in healthcare, in research. When spoken of as a means it is seen as a tool to achieve or do different things, e.g. more efficient processes, better management, openness and transparency, participation, better and more efficient service-delivery. In the summary below, we can also note similarities between how European policy-makers and Swedish policy-makers understands digitalisation, where they see it as a *communication infrastructure*. National policy-makers also explicitly

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(unlike EU) differentiates between soft and hard infrastructures. Example of components in the soft infrastructure are information (data) and services; meanwhile, the hard infrastructure is the (tele)communication network.

When it comes to different issues and sought actions, these could be categorised into three categories, i.e. issues concerning *interoperability*, issues concerning *competence*, issues concerning *security and trust*. Interestingly, compared to the EU, issues related to investments in infrastructure are not very prominent. A probable reason could be that this is a minor issue in the Swedish context (due to high internet penetration). Interoperability, on the other hand, is the most prominent issue brought up by national policy-makers. In the agenda several aspects of interoperability are covered and discussed, e.g. semantic interoperability (data standardisation/shared meanings), technical interoperability (integration of systems), organisational interoperability (management/ governance), legal interoperability (laws/regulations). Issues of interoperability are brought up in relation to all contexts of use. Another aspect of interoperability is connected to robustness in the communication infrastructure.

Table 7:2. Summary of element of discourses on digitalisation in Digital Agenda for Sweden

Dimension in the text		Elements of discourses
Usage	Digital inclusion E-services	Digitalisation as a means to address societal challenges (welfare, environment, democracy, economy)
		Digitalisation as a means to exploit information (weather, traffic, maps, vehicles)
		Issues concern accessibility and usability
		Digitalisation as enabler of smart and open government
		Digitalisation as a means for innovative services
		Digitalisation as a means for participation
	Competence Security	Issues concern information availability
		Issues concern interoperability (semantic)
		Issues concern digital competence, knowledge and skills
		Issues concern how to create trust and security
		Issues concern users' digital competence on security
Services	Public administration	Digitalisation as a means to deliver services
		Digitalisation as a means to render administration more effective
		Issues concern interoperability (organisational, legal, and technical)
	Entrepreneurship and business development	Digitalisation as a driver of business and economic growth
		Digitalisation as a means to render commerce more effective
		Issues concern interoperability (technical and legal)
	Healthcare	Digitalisation as means to render processes and services more effective
		Issues concern interoperability (organisational, technical, legal)
	Education	Digitalisation as a means for teaching, learning and administrating
		Issues concern digital competence and education
	Democracy	Digitalisation as an information and communication means
		Digitalisation as a means to make government transparent and open
		Issues concern development of information and communication infrastructures for citizen dialogues
	Culture	Digitalisation as preserver and distributor of culture
		Issues concern supporting digital development for preservation, production and distribution of culture

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Dimension in the text	Elements of discourses
Infrastructure	Internet
	Digitalisation as a communication infrastructure
	Issues concern interoperability (technical)
	Information security
	Issues concern information security from a societal perspective (democratic, economic, political, and individual)
	Soft infrastructure
	Digitalisation as soft (information, services) and hard infrastructures (communication network)
	Issues concern interoperability and the work with standardisations
	Geographical information
	Digitalisation as soft and hard infrastructures
	Digitalisation a precondition for usage of geodata
	Issues concern interoperability
	Robust communication
	Digitalisation as (tele)communication infrastructure
	Issues concern disruptions in the operation of the communication network
Societal benefits	Broadband
	Digitalisation as a vital communication infrastructure to society
	Digitalisation as a precondition and driver of economic growth
	Issues concern investments in communication infrastructure (broadband)
	Research and innovation
	Digitalisation as an important means in research and to innovation (healthcare)
	Digitalisation as a driver of economic growth and societal development
	Digitalisation as a market in its own
	ICT for the environment
	Digitalisation as a means to achieve resource efficiency
	Digitalisation as a communication infrastructure (smart grids)
	Digitalisation as means for energy management and control
	Digitalisation as a means to replace transport and travel
	Digitalisation as dimension of smart/intelligent transport systems
	Gender equality
	Issues concern gender equality in ICT sector and education

At this stage, I have covered how digitalisation is viewed by different policy-makers at a national level in two different policy documents – Vision for Sweden 2025 and A Digital Agenda for Sweden. Below, in the Chapter summary, I will proceed to discuss the found elements of discourses in relation to urban development and city services.

Chapter summary – national policy discourse

In this section I summarise how digitalisation has been spoken of by different policy-makers at a national level and discuss how these elements of discourses are relevant to the context of urban planning and development. I have used the same logic as in the previous chapter and clustered and summarised the results from the two analysis above in Table 7:3 below.

In the summary below we can note similarities between what roles EU policy-makers and national policy-makers attribute to digitalisation in different contexts of urban development (city services/functions). In almost all service areas, digitalisation is *seen as a tool to do/achieve other things*, e.g. to deliver services, to manage and control things (processes/home systems), to work, to learn. We can also note a similar pattern on a national level (compared to an EU level), that discourses on digitalisation are more prominent in relation to governance, environment, and business. In governance it is seen as a tool to deliver services, tool for participation, or tool to make government

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transparent and open. In environment focus is on energy, where digitalisation is seen as a means to decentralise energy production and to achieve resource efficiency. Policy-makers also acknowledge digitalisation as a means in and for business, either as a tool to make production/management more efficient or as a means to deliver service/commerce. *Other roles attributed to digitalisation are precondition, driver, enabler.* National policy-makers focus less on digitalisation in services related to education, culture and welfare. Like in the prior discussion concerning EU policy discourse, this might be a consequence of the chosen documents and the stakeholders behind them. Visions for Sweden 2025 is a policy document developed by the national board of housing and the DAfS is developed by the Ministry of Enterprise, Energy and Communications. In both cases, even though said to have a holistic approach to urban development, we could anticipate that they have their special interests. Similar to the EU policy discourse, national policy-makers see digitalisation as both a *communication infrastructure* and a *market*. Policy-makers make a difference between hard and soft infrastructure where the former is connected to (tele)communication networks, and the latter concerns information and services. Information and data are portrayed as valuable resources to be exploited. When spoken of as market it is both seen as an industry in its own, as well as driver of other businesses.

Interoperability (and different kinds of interoperability, e.g. semantic, technical, organisational, legal) is brought up in both policy contexts covered in this analysis and seen as an important area to work with on local, regional and national levels.

Table 7:3. Summary of element of discourses on digitalisation from a national perspective

Dimension of urban development	Elements of discourses
Governance	Digitalisation as a vital communication infrastructure and a driver of societal development (DAfS)
*administration	Digitalisation as a means to address societal challenges (welfare, environment, democracy, economy) (DAfS/2)
*participation/engagement	Digitalisation as a precondition for maintaining and developing living standards (VfS2025)
	Digitalisation a precondition for public services (VfS2025)
	Digitalisation as an information and communication means (democracy) (DAfS)
	Digitalisation as a means to deliver services (DAfS)
	Digitalisation as a means to render administration more effective (DAfS)
	Digitalisation as an enabler and means to make government transparent and open (DAfS)
	Digitalisation as a means for participation (DAfS)
	Issues concern information security from a societal perspective (democratic, economic, political, and individual) (DAfS)
	Issues concern collaboration between different stakeholders in the planning process (VfS2025/2)
	Issues concern sharing of resources and services (VfS2025)
	Issues concern information availability
	Issues concern accessibility and usability

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Dimension of urban development	Elements of discourses
Environment	Digitalisation a precondition for usage of geodata (DAfS)
*housing	Digitalisation as a means to manage urban planning and development projects (VfS2025)
*energy	Digitalisation as means to manage the intelligent home (VfS2025)
*water	Digitalisation as a communication infrastructure (smart grids) (VfS2025; DAfS)
*safety	Digitalisation as a means to decentralise energy production (VfS2025)
	Digitalisation as a means to achieve energy efficiency (VfS2025; DAfS)
	Digitalisation as a means for energy management and control (DAfS)
	Issues concern engagement of different stakeholders in the planning process (VfS2025)
	Issues concern dialogue and coordination between different sectors on particular topics (VfS2025)
	Issues concern investments in infrastructure (VfS2025)
	Issues concern changes in business models connected to electricity production (VfS2025)
Communications	Digitalisation as an important dimension in commuting (VfS2025)
*transport	Digitalisation as a means to replace transport and travel (DAfS)
*ICT	Digitalisation as dimension of smart/intelligent transport systems (DAfS)
	Digitalisation as a dimension of smart/intelligent (VfS2025)
	Digitalisation as a means to interconnect infrastructures (VfS2025)
	Digitalisation as a means to exploit information (weather, traffic, maps, vehicles) (DAfS)
	Digitalisation as a communication infrastructure (VfS2025/2; DAfS/) (tele)communication infrastructure (DAfS)
	Digitalisation as soft (information, services) and hard infrastructures (communication network) (DAfS/2)
	Issues concern expansion of infrastructures (VfS2025)
	Issues concern interoperability (semantic, organisational, technical, legal) (DAfS/6)
	Issues concern how to create trust and security (DAfS)
	Issues concern development of information and communication infrastructures and digital solutions (DAfS)
	Issues concern robustness in the communication infrastructure (DAfS)
Education	Digitalisation as a means in distance education (VfS2025/2)
*school	Digitalisation as a means for teaching, learning and administrating (DAfS)
*workforce	Issues concern gender equality in ICT sector and education (DAfS)
	Issues concern digital competence, knowledge and skills (DAfS/3)
Culture	Digitalisation as preserver and distributor of culture (DAfS)
*recreation	
*tourism	
Welfare	Digitalisation as means to render processes and services more effective (DAfS)
*health	
*social	
Economy	Digitalisation as a precondition and a driver of business and economic growth (DAfS/3)
*business	Digitalisation as an important means in research and to innovation (DAfS)
*commerce	Digitalisation as a market in its own (DAfS)
	Digitalisation as a means in distance work (VfS2025/3)
	Digitalisation a precondition for business development (VfS2025)
	Digitalisation as a meansto deliver (innovative) services (DAfS)
	Digitalisation as a means to render commerce more effective (DAfS)
	Issues concern investments in communication infrastructure (DAfS)

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Chapter 8: Local policy perspective on digitalisation and urban development

In this chapter a local policy discourse on digitalisation and urban development is presented. The presentation is based on a discourse analysis of three different policy documents. The first document is municipal strategy on digitalisation (Digital Agenda for Linköping). The second one is a municipal strategy concerning a specific development project (Visions for Vallastaden 2017) – this could be seen as an internal strategy. The last policy document could be seen as a complementing strategy to the prior one – however, with an external focus (Vallastaden Competition Program).

In Figure 8:1 below, I present an overview of the chronical order of the different policy documents at the different levels. Based on this, one interesting aspect is to see whether we can find traces of discourses on digitalisation from EU level and national level, also on a local municipal level. In this context we expect to find traces of reoccurring discourses on digitalisation especially concerning the digital agenda.

Figure 8:1. Timeline showing the chronological order of the policy documents at EU, national and local level

In this chapter, I have chosen to start out with the Digital Agenda for Linköping. This might appear as the reverse order from previous chapters (6 and 7), where I have started out in the larger strategic context (EU2020, Vision for Sweden 2025). Concerning this larger strategic context, I have not found an equivalent policy document on local municipal level. Instead, the municipality has developed an overarching political vision saying that the municipality should be characterised following three aspects:

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- A city in growth – a bigger region but also more of an international character
- An open city – respecting integrity and the individual's choice
- A free, enterprising, safer and greener city (Linköping.se, 2015¹³)

These aspects are interesting as they indicate directions that local policy-makers want urban development to take. A more concrete understanding of these visions is, however, represented in the municipal strategy *Visions for Vallastaden 2017*¹⁴, which concerns a development project of a new district called Vallastaden. The reason for starting out in the digital agenda however, is that I find this document to be superior to the project vision, and consequently, we can expect to find traces of the local digital agenda in the latter.

Digital Agenda for Linköping

The Digital Agenda for Linköping (hereafter referred to as DAfL) is by local policy-makers presented as a document describing prioritised local actions within the area of “IT and communications” and covers the years of 2012-2015. Six areas are pointed out as prioritised by local policy-makers at the municipality. It is also said that the agenda is to be a guide and support in the municipalities “work with prioritising, planning and implementing IT and communication-oriented development initiatives that can be useful to municipality operations and in the service offered to the municipality” (DAfL, p. 5). Initiatives taken in these areas are thought to strengthen Linköping as a brand. In the beginning the municipality also chooses to give short versions of the EU, national and regional variants of digital agendas.

Three major goals are pointed out to guide municipal work with “electronic government development as a contributor to e-society” and they are: “easier every-day for the individual and for businesses; smarter and more open governance to support innovation and participation; higher quality and efficiency in operations” (DAfL, p. 7). In relation to these goals four challenges have been identified; challenges that single municipalities cannot solve on their own. These challenges are very much related to interoperability issues connected to electronic government development, i.e. management and control issues, laws and regulation issues, semantic issues (information infrastructures), technical infrastructures and security issues [issues concern interoperability]. However, these issues are not commented in the agenda.

Six areas to work with digitalisation

The first area local policy-makers present concerns *increasing digital participation and competences*. In the larger context this area concerns issues related to social

¹³ <http://www.linkoping.se/Demokrati-politik/Politiska-majoritet/Allians-for-Linkoping-Politisk-vision/>

¹⁴ Original title Idéprogram LinköpingsBo2016, document in Swedish.

inclusion/exclusion and the importance of creating a sense of community through participation, an area where digitalisation is pointed out to make a difference [digitalisation as a means for participation and social inclusion]. In this context three main actions are sought “[1] enhancing citizens’ digital participation and digital competences”, [2] promote an organisation and culture that contributes to continuous development of the administration’s digital competence, [and 3] secure access to necessary IT infrastructure and IT resources” (DAfL, p. 8) [issues concern how to enhance citizens' digital participation and competence; how to secure access to digital resources and infrastructure]. We can note that these areas for action are close to and in line with the national goals. In line with this the municipal work focuses on identifying different target groups’ needs. Sought solutions might appear to be in the periphery of physical planning and at the same time, I would argue, they are important to urban development as such. Many times it appears to be a question of using digital resources for communication in different contexts (e.g. education, healthcare, business life, administration) [digitalisation as an information and communications means]. The use of digital resources is pointed out as essential for attaining efficiency and quality and at the same time increase participation and insight into different operations in the municipality. However, this calls not only for digital solutions that are easy to use, that facilitate communication and information exchange between different users, but also for investments in digital resources and necessary digital infrastructures (hardware and software) in concerned operations [issues concern investments in digital resources and digital infrastructure].

The second area prioritised by policy-makers at the municipality concerns the environment and climate, and is denoted as *decreasing the ecological footprint*. In this area local policy-makers set an ambition to be on the top of the line in this work and be CO₂ neutral already in 2025. In this context the use of digital resources is pointed out as essential to “[1] achieve energy efficiency and sustainable solutions in the city and in the municipality, [2] manage energy efficient operations within the municipality and the municipally-owned companies” (DAfL, p. 10). Propositions to attain the goals in this area are, for example, increased use of digital resources for meetings of all sorts, use of digital resources to simulate and calculate environmental effects. An example of the latter is to simulate “how roads and districts could be built to achieve an optimal traffic flow and better ecological conditions” (ibid.) [digitalisation as means to calculate environmental effects]. In this context it is pointed out by local policy-makers that it is important that the municipality “applies IT and communication technology as a natural part in the continuous development” of the city and the countryside (DAfL, p. 11). [digitalisation as a dimension of urban planning and development]. Further, decreasing the ecological footprint is a question of making the people aware, and in this context “IT

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and communication technologies” are put forward as an important means [digitalisation as a means to increase ecological awareness].

The third area in DAfL concerns *research, innovation and entrepreneurship*. Trustworthy and efficient services are described as something that injects trust and credibility among entrepreneurs and local business. Linköping university is also presented as an asset and something that is a “strong part of Linköping’s identity and everyday life” (DAfL, p. 11). In order to promote and improve research, innovation and entrepreneurship, the local policy-makers want to support networks and activities within the area of information and communication technology. This can be done by involving the university and the local business life in development projects in the municipality. It is also said that the municipality “can act as a testbed when researchers, students or entrepreneurs need help to test different types of solutions or products in an authentic environment” (ibid.). [digitalisation as a means for innovation; digitalisation as a market in its own]. In this context it is also pointed out in the agenda that the municipality needs to be active and aware of what is going on regarding these issues at regional, national and international level, this to avoid developing and implementing their own solutions [issues concern interoperability].

In DAfL the forth area concerns how to *integrate IT in education*. Education is pointed out as “one of the most important factors for both the individual and urban development in general” (DAfL, p. 11). In this context the municipality intends to continue their work with “integrating digital learning resources in teaching”, “developing digital communication” (ibid.). [digitalisation as a means in teaching and in administration; digitalisation as a communication means]. The fifth area increased *quality in healthcare* is perhaps also in the periphery of urban planning and development. Yet similar to education we can expect that some of the solutions in the area could also concern physical planning as such, e.g. development of digital infrastructure (broadband, fibre), planning and building nursing homes, care centres with the latest technologies. To increase quality in healthcare local policy-makers at the municipality want to make use of information and communication technologies for various purposes, for example to improve follow ups, to make information exchange easier, to visualise quality in the operations. [digitalisation as a means to increase quality and make healthcare more efficient; digitalisation as an information and communication means].

The final area the municipality has chosen to prioritise as a strategic area regarding digitalisation is how it can contribute to *an open and more accessible municipality*. To be able to influence local decisions as a citizen is pointed out as important in DAfL. Digital resources and digital solutions are by local policy-makers promoted as means for dialogue and services in the municipality [digitalisation as a means for participation and citizen involvement; digitalisation as a means to deliver services]. Further it is said

that the municipality offers services that fit people's needs and at the same time are efficient. In this context, a "well-developed IT infrastructure, in all parts of the municipality, is central in order to create a spread in attractive living environments" (DAfL, p. 14). In line with these ambitions, the municipality intends to increase the accessibility and offered services by "advancing digital communication channels and making municipal information available" (cf. open data), "creating new arenas and communication approaches to engage more people in developing the municipality" (ibid.) [digitalisation as an information and communication means; issues concern how to make data available].

Summary and reflections

In the table below (8:1), I have summarised elements of discourses on digitalisation in DAfL. In sum, we can note that the local policy concerning digitalisation is not deviating much from the ones on national and EU level. Yet, there are differences. First, we can note that in this local context digitalisation is exclusively spoken of as a *means to do/achieve something*. Second, local policy-makers appear to have different priorities when it comes to contexts of use compared to EU and national policy-makers. In DAfL digitalisation is spoken of in relation to four service areas: governance, environment, education and healthcare. In *governance* digitalisation is seen as a means to either deliver public services or as a means for participation, i.e. taking part in local decision-making. In *environment* it is seen as a means to calculate environmental effects and increase ecological awareness. These two areas do not deviate much from EU and national views. However, education and healthcare have not been emphasised in prior documents. In *education* local policy-makers see digitalisation as a means both in teaching and in administration, and in *healthcare* it is seen as a means to make processes more efficient. Further, in this local context digitalisation is not so much spoken of as a communication infrastructure as it is in the national and EU equivalent. However, it is still seen as an *information and communication means*, which presupposes some kind of infrastructure. Yet, issues foreseen by local policy-makers concern investments in infrastructure and digital resources, but also open data and interoperability. Hence, following the same pattern as EU and national policies on digitalisation.

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Table 8:1. Summary of elements of discourses in Digital Agenda for Linköping

Dimension in the text	Elements of discourses
Increasing digital participation and competences	Digitalisation as a means for participation and social inclusion
	Digitalisation as an information and communications means
	Issues concern how to enhance citizens' digital participation and competence
	Issues concern how to secure access to digital resources and infrastructure
	Issues concern investments in digital resources and digital infrastructure
Decreasing the ecological footprint	Digitalisation as means to calculate environmental effects
	Digitalisation as a means to increase ecological awareness
	Digitalisation as a dimension of urban planning and development
Research, innovation and entrepreneurship	Digitalisation as a means for innovation
	Digitalisation as a market in its own
	Issues concern interoperability
IT in education	Digitalisation as a means in teaching and in administration
	Digitalisation as a communication means
Quality in healthcare	Digitalisation as a means to increase quality and make healthcare more efficient
	Digitalisation as an information and communications means
Openness and accessibility	Digitalisation as a means for participation and citizen involvement
	Digitalisation as a means to deliver services
	Digitalisation as an information and communication means
	Issues concern how to make data available

Above we have seen how digitalisation and the use of digital resources are spoken of in a local municipal context. In the next section, I will proceed to how the phenomenon is spoken of in a specific setting of urban planning and development.

Vision for Vallastaden 2017

Above I have presented general strategies concerning digitalisation and the use of digital resources in the municipality. Hence, in this section, I will cover how local policy-makers view digitalisation in the context of the studied urban development project Vallastaden 2017¹⁵. The document I have chosen to depart from is a policy/program document, i.e. *Vision for Vallastaden 2017* (hereafter referred to as VS2017). This document is a policy document guiding both the project and the planning and development of the new district in Linköping¹⁶. The team behind the vision mainly consists of civil servants with different roles in the municipality (e.g. projects manager, plan architects, city planners). In the work with the planning pillars (see below) civil servants with particular competences have also been involved, e.g. facility planners, city developers, IT coordinators.

¹⁵ After local elections and change of power (also in the project management) the project changed name to Vallastaden 2017. Initially it was called LinköpingsBo2016 and the location was named Vallastaden.

¹⁶ Linköping is the fifth largest municipality in Sweden, with approximately 152 000 inhabitants. See <http://www.linkoping.se/Global/Om%20kommunen/Fakta%20om%20Link%C3%B6ping/FaktaOmLinkoping.pdf?epslanguage=sv>

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“People construct the city” is the motto permeating the vision for Vallastaden 2017. In VS2017 three concepts – *knowledge*, *social sustainability*, and *creativity* – are put forward to guide and form the contents of the project, and, by departing from these concepts in the formation and implementation of the project, this development is supposed to lead to “an attractive and interesting urban milieu that generates exciting meetings and innovations” (VS2017, p. 5). Further in VS2017, it is pointed out that the project as such is to constitute an example of future urban planning and development, both as an end product and as a process. Concerning the latter, it is stressed by local policy-makers that the “process of planning and implementing Linköpingsbo2016¹⁷ shall be characterised by broad *dialogue* and development of new knowledge” (VS2017, p. 5). The project is thought to consist of three parts: 1) an urban development project, 2) a planning process with dialogue, 3) an urban development expo.

The location to be exploited is an area in-between one of the university campuses in the city (Campus Valla) and the city centre. The university location is in VS2017 described as the city’s largest job site. Next to the location there is also a recreation area and a Science Park. Hence, the area surrounding the unexploited location is characterised by being knowledge intensive and vibrant during day time, but not after office hours. Therefore, the aim is to build a vivacious district where there are activities at all hours. This calls, according to local policy-makers, for building of new “dwellings of different kinds, pre-schools, schools, offices, service and business, culture” (VS2017, p. 7). The name LinköpingsBo2016 (later changed to Vallastaden 2017) was at the time mainly connected to the third part in the project which was the urban development expo. It is further pointed out by the policy-makers behind the vision, that one important dimension in this development is the collaboration with the university.

Another dimension put forward in VS2017 is *diversity*. It is pointed out that diversity is to characterise the new district. The way to achieve this is, according to the policy-makers, to assign modest land allotments, and to open up the market for “untraditional” developers, like architects and small developers. The expo area is said to be characterised by playfulness, i.e. an area where “people grow and develop, where people meet” (VS2017, p. 11). There are several values connected to the new district, such as preservation of environmental values (car free zone), social values (areas for spontaneous meetings), and values of plurality (mix of different forms of housing, different social backgrounds).

Twelve areas to guide the project and the development

Twelve areas are put forward in VS2017 as fundamental to what local policy-makers see as a future-oriented and sustainable planning of an urban development project. These

¹⁷ LinköpingsBo2016 was the original name of the project.

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areas concern the location, education, culture and leisure, welfare, utilities, transport, physical planning, environment, social sustainability, IT, commercial and industrial life, and participation. We can note that many of these areas are central to city management in general (basic functions) and to urban planning and development in particular. In the presentation below, I have chosen to cluster some of the areas.

The first area brought up by the local policy-makers behind the Vision for Vallastaden 2017 is linked to the *location and Campus Valla*. According to the vision the ambition is to open the university campus area Campus Valla toward the surrounding society and make it a clear and integrated part of the city and the region. One way of opening the location to the surrounding environment is, according to VS2017, by developing inspiring activities that attract people to the campus area. A precondition for opening the campus area to the surrounding environment is according to local policy-makers a well-developed infrastructure, here mainly referring to traditional communications infrastructure (transport).

The second area pointed out in VS2017 is *education*. In this context local policy-makers stress that they want to create future learning environments; environments that are characterised by “creativity, security, new thinking, and quality” (VS2017, p. 13). This is also to be done in collaboration with the university. Promoted values in this context are openness and learning.

When it comes to the third area – *culture and leisure* – it is mainly associated with the urban design, and it is pointed out that “aesthetic design and new architecture are important success factors” to the coming urban development expo (VS2017, p. 14). At the same time the location and its surroundings are associated with recreation and athletics, and, in line with this, the new district is according to the local policy-makers to be guided by these values and norms as well. It is pointed out in VS2017 that “green areas for venues are becoming even more important when cities are densified” (VS2017, p. 17). These areas are pointed out as important for recreation and physical meetings.

It is further pointed out in VS2017 that a precondition for “social networks surrounded by a *positive atmosphere* to appear is that the total need of human beings is taken into consideration” when developing a new district (VS2017, p. 14). Local policy-makers associate ‘total need’ with both different generations’ needs (life cycle) and special needs such as different types of disabilities. The fourth area concerns *welfare* and how a new district can be developed with wellbeing in focus.

Another aim with the project is to be on the top of the line when it comes to realising “latest *innovations* in energy, environmental technology and sustainable urban development” (VS2017, p. 15). Hence, the fifth area concerns *energy and environment*. Local policy-makers point out that the new district is to be developed with a resource

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efficient thinking in mind. Examples of this is according to them energy “efficient housing, locally produced electricity, sustainable building materials” (ibid.). An area also associated with the environment is *communications and infrastructure*. In this context communications and infrastructure is said to be a question about reducing the negative impact transports have on the environment and the climate. Accordingly, the aim of the project is to “show attractive solutions for public transport, pedestrians and cyclists” (VS2017, p. 15) and, in line with this thinking, the new district is to be developed as a car free zone.

The seventh area called *physical planning and architecture* touches upon things that also are described in the areas of welfare and culture. In this area, it is stressed by local policy-makers that the new district is to glow with “security, communion and a beautiful every-day” (VS2017, p. 17), and that the planning is to be done from different perspectives, i.e. “the family, the adult without children, the student, the adolescent, the retired” (VS2017, p. 17). The aim is to create possibilities for physical meetings. Plurality and new design are values connected to architecture. To achieve this local policy-makers call for different types of developers (groups, traditional developers, architects) and workshop arrangements during the planning process.

It is stressed in the vision that the *social dimension of sustainability* “is to be given increased space in sustainable urban development” (VS2017, p. 17). Local policy-makers also give examples of social sustainability: “democracy and health, economic and social security, identity and equality, plurality and integration, participation and influence and cultural heritage” (ibid.). Many of these dimensions are integrated in other areas, like for example letting people participate in the planning process (thus influencing it). *Participation* is, however, an area in its own in VS2017. It is pointed out that “large space is to be given to participation and dialogue” (VS2017, p. 18). It is further pointed out by the policy-makers that there are many forms and channels to create and implement this. However, social media is emphasised as “a particular important channel in the process” with the aim to “create unexpected meetings and new knowledge exchanges” (ibid.). [digitalisation as a means for participation and dialogue (social media); digitalisation as a communication means].

In VS2017 *information and communication technology* (ICT) is pointed out as a prioritised area in its own. In this context it is said that ICT “shall with the aid of different innovative and smart solutions create conditions for reduced consumption of natural resources, increased availability, service and social presence” (VS2017, p. 18). [digitalisation as a precondition for resource efficiency; digitalisation as a means to deliver services; digitalisation as a means for social inclusion]. Examples put forward by local policy-makers regarding implementation and use of ICT (in their words) are:

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implementation of measurement systems for electricity and hot and cold water to influence energy consumption [digitalisation as a means to manage energy systems], safety alarms and entrance systems, [digitalisation as a means to manage home systems (security/safety)], social media use in the community to solve community problems [digitalisation as a means to create online local communities and social sustainability].

Vallastaden 2017 is said to be a project that opens up for knowledge exchange and sharing of ideas, and there is an idea that a mix of residents, services, education and work “increases the attractiveness of the district” (VS2017, p. 18). This is also something that is thought to attract *businesses* to the area and to the city. This together with possibilities to collaborate with researchers are thought to give another dimension to the development and the district.

Summary and reflections

In the table below (8:2), I have summarised elements of discourses on digitalisation in VS2017. In sum, we can note that the project team has chosen to single out digitalisation (ICT) as an area in its own. And in comparison with the other areas, digitalisation has a minor role. Instead, focus in the visionary program is on different dimensions of urban development (e.g. education, welfare, energy and environment). By separating digitalisation issues already in this context might indicate a silo thinking within the municipality, and that issues regarding digitalisation are not integrated in their context of use. However, at the same time, we can note that many of the applications brought up by local policy-makers still concern other areas, such as environment, energy, administration. In this visionary document of Vallastaden, digitalisation (like in the case of the local digital agenda) is seen as a *means to do/achieve different things*, i.e. to deliver services, to manage energy, home systems. Hence, a rather traditional view of the IT artefact as a tool. Another context of use is social inclusion (which other policies have not focused as much) and using digitisation as a means to create local communities to achieve social sustainability. This focus is perhaps not so surprising in this context as the project of Vallastaden targets social sustainability.

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Table 8:2. Summary of elements of discourses in *Vision for Vallastaden 2017*

Dimension in the text	Elements of discourses
Location	Lack of discourse on digitalisation
Education	Lack of discourse on digitalisation
Culture and leisure	Lack of discourse on digitalisation
Welfare	Lack of discourse on digitalisation
Environment and energy	Lack of explicit discourse on digitalisation (yet mentioned as a an area in discussions on ICT)
Communications and infrastructure	Lack of discourse on digitalisation
Physical planning and architecture	Lack of explicit discourse on digitalisation (yet mentioned as a an area in discussions on ICT)
Green areas	Lack of discourse on digitalisation
Social sustainability	Lack of explicit discourse on digitalisation (yet mentioned as a an area in discussions on ICT)
ICT	Digitalisation as a precondition for resource efficiency
	Digitalisation as a means to deliver services
	Digitalisation as a means for social inclusion
	Digitalisation as a means to manage energy systems
	Digitalisation as a means to manage home systems (security/safety)
	Digitalisation as a means to create online local communities and social sustainability
Businesses and commerce	Lack of discourse on digitalisation
Participation	Digitalisation as a means for participation and dialogue (social media)
	Digitalisation as a communication means

Above, I have presented how digitalisation is viewed by local policy-makers in the context of a local urban development project. In the next section, I will proceed to how local policy-makers present digitalisation to a specific target group in urban planning, i.e. to architects, and this is represented by a competition program for architects; a program aimed to guide the architects in their design process.

Vallastaden Competition Program

Many of the civil servants that were involved in the work with *Vision for Vallastaden 2017* (the idea program) were also involved in the work the competition program aimed at the architects, i.e. Vallastaden Competition Program (hereafter referred to as VCP). However, this program is not solely a product of the municipality but also other stakeholders, like the university, the real-estate concern that develops and manages the university's facilities, the local energy company. The competition program has also been approved by the Swedish Association of Architects. In VCP the aim of the competition is described as “to generate good ideas on how a new district in Linköping can be designed and to find new cooperation partners in the continued planning of the district” (VCP, p. 5). The future urban development expo – LinköpingsBo2016 – is also said to constitute a concrete “example and a possible testbed for future urban planning and development” (ibid.).

Knowledge, social sustainability and creativity

In line with the *Vision for Vallastaden 2017* it is emphasised that the new district is to be characterised by *knowledge*, *social sustainability* and *creativity*. These guiding concepts as well as the location as such are also elaborated in the program. The first

concept – knowledge – is associated with learning and is presented as “the driving force of urban development” (VCP, p. 8). Interactions are seen as important for generating knowledge and learning. Arranging for human encounters are therefore promoted as an important dimension not only in the urban design as such but also in implementation of that design. Concerning the location, it is in VCP pointed out that the new district Vallastaden seeks to connect the university with other districts. The proximity to a Science Park, Mjärdevi Science, Park, is also seen as something that could lead to interesting collaborations and innovations in the area. The second concept social sustainability is put in its larger context as one of three dimensions of sustainability (in addition to ecologic and economic sustainability). In the development of Vallastaden “special focus is to be given to social sustainability” and according to the program social sustainability is about “building an inclusive society where basic human needs are fulfilled” (VCP, p. 9). The third concept – creativity – is associated with new ways and perspectives of doing things and also a source for innovation.

Four visions of the new district

Four visions of the new district are described in VCP, these visions are meant to inspire and guide the architects in their work. The first vision – *Vallastaden a multi-coloured district* – concerns the design of the district as such and the housing. It is said that the public space in the district should be designed for flexible usages, and that the housing should “be varied on a small-scale level. A mix of apartment blocks, compact small houses, office buildings and other businesses should be present in the district” (VCP, p. 10). In the second vision – *Vallastaden a district for human encounters and participation* – it is stressed that the design should be planned in a way that it “strengthens the social bonds between the residents as well as between residents, workers and students” (VCP, p. 11). An important dimension in achieving this is user influence in public spaces, user driven ideas and shared premises. In this vision digitalisation is also mentioned, where it is said that

Mobile technology for communications gives many people the opportunity to work at home, at cafés and other places in the public environment.

Vallastaden shall through adjusted residences, flexible buildings and public spaces make room for a smoother transition between work, spare time and social life. (VCP, p. 11) [digitalisation as a communication means; digitalisation as means for flexible work].

The third vision is labelled *Vallastaden a climate smart district*. In this vision of the new district resource-efficiency and climate issues are addressed, and it is emphasised in VCP that in order to be CO₂ neutral in the near future cross-sectoral collaborations are necessary. Necessary actions are investments in efficient systems as well as user behavioural changes. The latter is said to dependent on a design that “makes it easy for the user to make right choices from an environmental perspective”, which calls for

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solutions and structures that are designed and developed from a user perspective (VCP, p. 12). Digitalisation is mentioned in the work with reducing the negative impact of transport on the environment. In addition to creating car free zones, the program calls for active work with “information, IT solutions, car pools, etc.” (ibid.). Further, it is pointed out that electricity distribution is to be characterised “by a dynamic electricity network that uses new technology for so called ‘smart grids’” and are designed for small scale electricity production (VCP, p. 24) [digitalisation as a communication infrastructure (smart grids); digitalisation as a means for working with CO₂ reduction; digitalisation as a means for small scale energy production;]. The last vision brought up in the competition program is *Vallastaden a district in development*. In this vision a picture of an environment that is dynamic and at the same time robust is conveyed. Robust in the sense that it will last over time, and dynamic in the sense that it can be changed and/or adjusted to future needs. In this context temporary uses of land or temporary services are envisioned.

Summary and reflections

In the table below (8:3), I have summarised elements of discourses on digitalisation in VCP. What we can note in this context is that digitalisation has a reduced role when comparing to the other two policy documents on local level. Digitalisation is still seen as *a means to do/achieve* something. However, in comparison with Visions for Vallastaden 2017, we can note that focus in application area has shifted. In this competition program, aimed at architects, digitalisation is on the one hand portrayed as a means for communication and work, and on the other hand portrayed as communication infrastructure for electricity and energy distribution (use of smart grids). We can note traces between the local digital agenda and this document concerning issues related to the environment, where digitisation is seen as a means to work with CO₂ reduction.

Table 8:3. Summary of elements of discourses in Vallastaden Competition Program

Dimension in the text	Elements of disources
Knowledge, social sustainability and creativity	Lack of discourse on digitalisation
Vallastaden a multi-coloured district	Lack of discourse on digitalisation
Vallastaden a district for human encounters and participation	Digitalisation as a communication means
	Digitalisation as a means for flexible work
Vallastaden a climate smart district	Digitalisation as a communication infrastructure (smart grids)
	Digitalisation as a means for small scale energy production
	Digitalisation as a means for working with CO ₂ reduction
Vallastaden a district in development	Lack of discourse on digitalisation
Services and conditions	Lack of discourse on digitalisation

Above I have presented how digitalisation is viewed by local policy-makers and other stakeholders in the project and how it is presented to architects, who are central in the

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design of the district. Below I will proceed to discuss the found elements of discourses in relation to urban development and city services.

Chapter summary - local policy discourse

In this section I summarise how digitalisation has been spoken of by different policy-makers at a local level and discuss how these elements of discourses are relevant to the context of urban planning and development. I have used the same logic as in previous two chapters and clustered and summarised the results from the three analysis above in Table 8:4 below.

In the table we can note that digitalisation is *almost exclusive spoken of as means* in relation to the different service areas. In this local context discourses on digitalisation are more prominent in two areas, environment and governance. Concerning the environment, local policy-makers see digitalisation as a means to achieve, manage and monitor energy distribution, using smart grids. Focus in governance is to use digitalisation as a means to deliver services, for participation and citizen involvement. Perhaps it is not so surprising that digitalisation not so much is discussed in the context of education, culture, and welfare as these services are more peripheral to urban planning. However, the results in the table below does not necessarily mean that digitalisation is not important in these areas, but rather a result of the chosen focus and chosen documents for this study. At the same time, it also reinforces that the areas of education, culture and welfare are not so prominent to urban planning.

Table 8:4. Summary of elements of discourses on digitalisation from a local perspective

Dimension of urban development	Elements of discourses
Governance	Digitalisation as a means for participation, citizen involvement and social inclusion (DAfL; VS2017)
*administration	Digitalisation as a means for participation and dialogue (social media)(VS2017)
*participation/engagement	Digitalisation as a means to deliver services (DAfL/VS2017)
	Issues concern how to make data available (DAfL)
Environment	Digitalisation as a means to calculate environmental effects (DAfL)
*housing	Digitalisation as a means to increase ecological awareness (DAfL)
*energy	Digitalisation as a dimension of urban planning and development (DAfL)
*water	Digitalisation as a precondition for resource efficiency (VS2017)
*safety	Digitalisation as a means to manage energy systems (VS2017)
	Digitalisation as a communication infrastructure (smart grids) (VCP)
	Digitalisation as a means for small scale energy production (VCP)
	Digitalisation as a means for working with CO2 reduction (VCP)
	(VS2017)
	Digitalisation as a means to manage home systems (security/safety) (VS2017)
Communications	Digitalisation as an information and communications means (DAfL/3)
*transport	Digitalisation as a communication means (DAfL; VS2017; VCP)
*ICT	Issues concern how to secure access to digital resources and infrastructure (DAfL)
	Issues concern interoperability (DAfL)

Table to be continued on the next page.

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Dimension of urban development	Elements of discourses
Education	Digitalisation as a means in teaching and in administration (DAfL)
*school	Issues concern how to enhance citizens' digital participation and competence (DAfL)
*workforce	
Culture	
*recreation	
*tourism	
Welfare	Digitalisation as a means to increase quality and make healthcare more efficient (DAfL)
*health	
*social	
Economy	Digitalisation as a means for innovation (DAfL)
*business	Digitalisation as a market in its own (DAfL)
*commerce	Digitalisation as a means for flexible work (VCP)
	Issues concern investments in digital resources and digital infrastructure (DAfL)

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Chapter 9: The story of Vallastaden 2017

In previous chapters I have presented three policy perspectives on urban planning and development, and how digitalisation has been spoken of in these contexts. In this chapter I shift focus to how digitalisation has come to be expressed in an ongoing urban development project – Vallastaden 2017. This chapter constitutes a narrative account of the project and the development of the new district Vallastaden. Altogether, this will give us a picture of how digitalisation is produced and consumed in practice in a local context.

An urban development project with high standards and ambitions¹⁸

Ever since the establishment of Linköping university (in 1975), it has been discussions on connecting the city of Linköping with the campus area; an area which originally was in the outskirts of the city. In the fall of 2011 these discussions were finally turned into actions. A strategic work began within the municipality which resulted in *Vision for Vallastaden 2017*¹⁹ – an idea program guiding both the project and the development as such (presented in Chapter 8). This project was spoken of by local politicians and involved civil servants as a development that would become one of the city's most prominent ones. It was also a project that was sanctioned and supported politically by all parties – both by those in power (right wing parties) and the opposition (left wing parties). Vallastaden 2017 was characterised by high ambitions and goals – a sort of 'prestige project' where the city of Linköping was to be placed on the map. On the one hand, high ambitions concerned the end-product as such (Vallastaden); a product that would be open for viewing in an exhibition (showing future design, future homes, latest building techniques). On the other hand, the high ambitions concerned the process and the project as such, where the project team had the ambitions to implement a new approach to urban planning and development (later referred to as the Vallastaden model). This new approach was also something that would be part of the exhibition. Hence, Vallastaden 2017 was by local politicians and civil servants pointed out as a project that would statute an example of future urban planning and development in Sweden.

In line with these ambitions, marketing became an important dimension in communicating Vallastaden 2017 (a marketing and communicator was also recruited to

¹⁸ In this chapter I have instead of [] used figures to present elements of discourses

¹⁹ At the time the project went under the name LinköpingsBo2016

the project team). According to the communication strategy²⁰ marketing was to focus on two parts – a new model for urban planning (process), and the development as such – Vallastaden (the result/the product). From a marketing perspective three messages were identified as important to convey, i.e. 1) Vallastaden as a unique development, 2) Vallastaden as an interesting and innovative development, and 3) Vallastaden as a development that builds upon a new level of participation and cooperation (Communication strategy LinköpingsBo2016). A stakeholder analysis was done, and the identified stakeholders were categorised into two categories: internal and external stakeholders (to the municipality). Examples of internal stakeholders were co-workers within the project and within the administration, local politicians, and publicly-owned companies. Examples of external stakeholders were citizens, developers, architects, researchers, entrepreneurs, media. Developers, *architects* and *politicians* were pointed out as important as “their power to influence the project [was] high” (Communication strategy, p. 13). Consequently, these stakeholders were to receive information about the project quickly. In the communication strategy these stakeholders were also pointed out as key groups to success in the execution of the project.

In the marketing context, different channels for marketing and communication of the project were pointed out and prioritised channels were “the web” and “social media”. A project web site was established www.linköpingsbo2016.se (later changed to www.vallastaden2017.se). Also the municipality’s own web site was seen as an important channel. Concerning social media, Facebook and Twitter were seen as the primary channels. A Facebook account was also created early in the process. *Participation, storytelling, sharing and visualisation*

were identified as keywords in the marketing strategy, and in this context social media was seen as an important means in sharing and spreading information about the project. Concerning visualisations, the use of digital resources was presented as powerful means to create attractive contents and to evoke feelings and engagement in the project. Examples of contents to be visualised were maps and city plans.

Visualisations based on augmented reality solutions or in the form of games, e.g. build your dream city, were pointed out as examples of digital solutions. The work with social media was focused around five principles: visual focus, dialogue, sharing (disseminating), use and reuse.

High ambitions and standards also meant a tight schedule. The exhibition was set to the summer of 2016, which meant that the new district (or at least the exhibition area) was

²⁰ Kommunikationsstrategi LinköpingsBo2016

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to be designed, planned, and built within 4 years. 4 years is a very short time in this context as the plan process together with exploitation and procurement processes, and development processes tend to take time. From the part of the project team setting a short time frame was at the time seen as a way to stretch and challenge the system and thus achieve changes. Hence, Vallastaden could be seen as a development that puts pressure on several important processes, i.e. planning processes, exploitation and procurement, and development processes. Below, I will proceed to present how the project of Vallastaden have been organised. This will give us insight of the different actors in the project.

The organisation of Vallastaden 2017

Much of the work with planning and developing Vallastaden has been done by the municipality. First of all, as the city council and the executive board (see Figure 9:1 below) are in charge of policy-making and all the formal decisions, they are the ones that initiated the project from the beginning. They are also the ones that took all the formal decisions, e.g. deciding on different programs and plans, e.g. the idea program, the quality program, local plan. However, these programs and plans are also results of civil servants' work. Civil servants working at the Environment and urban planning department has for example been involved in and in charge of preparations of the different programs and plans. They are also in charge of follow ups on different things. However, in Vallastaden due to the new approach to planning (see below) some of the work with follow ups, e.g. examination/evaluation of fulfilment of the quality program was appointed to the project company (Linköpingsexpo AB). Follow up on planning applications and issuing building approvals were still part of the work carried out by civil servants at building permit office.

Figure 9:1. The organisation of Vallastaden 2017

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In addition to the formal organisation tied to planning of Vallastaden (the work done within the administration), the municipality also decided to form a project company, i.e. Linköpingsexpo AB (Expo company in Figure 9:1). Like other publicly-owned companies, the supervision of Linköpingsexpo's operations were placed under the city council (executive board in the municipality in the Figure above). This also means that the company has to continually report about events and plans to either the council or to the executive board. At the time, the mission assigned to Linköpingsexpo AB was to:

- *Realise the project "LinköpingsBo2016"²¹ according to the approved idea program*
- *Plan, market, and realise housing and society expo in Vallastaden summer of 2016*
- *Work to establish Vallastaden as a national role model for ecologic and social sustainability*
- *Cooperate with developers and other stakeholders in the conversion of the area surrounding Vallastaden*
- *Work for participation from citizens, business, organisations, publicly-owned companies and the local administration in the project LinköpingBo2016²² (Owner directives)*

In the articles of association concerning Linköpingsexpo AB²³ board members of the supervisory board were to be appointed by the city council. Appointed board members were politicians (commissioners), representatives from a national real-estate owner, the university and the industrial life. In the beginning Linköpingsexpo AB consisted of two people, a project manager and a marketing and communication manager. Pending recruitments, two civil servants substituted the two positions (two people who also had been involved in the work the idea program covering LinköpingsBo2016, in this study referred to as Vision for Vallastaden 2017). Hence, Linköpingsexpo AB became the project organisation that would realise Vallastaden 2017.

In addition to the municipality and the expo company, much work has also been carried out in other publicly-owned companies, e.g. the local energy company, real estate companies. The publicly-owned companies have been involved in the planning and development of Vallastaden. Also the university being a partner in the project set up an internal coordination group, where meetings were held on regular basis, and where different issues connected to the development were discussed and processed, e.g. how different researcher could get involved and contribute to the project. An example of an activity conducted by the university in the planning phase, was the arrangement of workshop cafés (see below). The internal working group started out with a small group of people, e.g. a coordinator, the two university representatives in the supervisory board of Vallastaden, the university architect, and an administrator. I will return to the work

²¹ Former name of the project

²² Ägardirektiv för Linköpingsexpo AB, 2012-02-14

²³ Bolagsordning för Linköpingsexpo AB org nr 556887-4332

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below while describing the process. In sum we can note that the organisation in and around the project of Vallastaden has both a formal structure and an informal structure. Below, I will shortly describe the new approach to urban planning and development launched by the project team behind Vallastaden. This presentation serves as a background to the coming process description.

The Vallastaden model

In short the Vallastaden model could be characterised as followed:

- Detail planning before land allotment (exploitation and procurement)
- Small land allotments, promotion of small scale building, variation, and new actors
- Quality as condition for land allotment (not price):
- Focus on social and ecological sustainability

The municipality has in this case made use of all available methods to form a new model for urban planning and development. For example, they have used the local plan (site plan) as an instrument to regulate land use, street hierarchies and placement of buildings. They have used property division as an instrument to regulate sizes of properties (small allotments). They have used quality program in combination with land allotments as instruments to control quality and monitor toward small-scale building, variation in buildings and to open up for new actors to enter the market. An architect (also contracted in Vallastaden) notes that

Normally municipalities auction off land allotments to developers with the highest bid. However, Linköping has flipped the coin. In this development traditional developers, architects and developing communities compete with quality as a basis for forming a judgement. The price on the land is already set. The development of Vallastaden takes place in cooperation with Linköping municipality and the university where the goal is to create a creative and social and environmental sustainable city (Architect Omniplan, in Byggnyheter, 2014-10-21 [branch media])

The local plan, the detail plan that sets the frames for building, was in Vallastaden decided upon before exploitation and procurement. In the local plan the municipality monitors toward small allotments (based on the notion of patches – see the winning design proposal below) and through quality criteria promotes small-scale production and variation in housing, Variation in housing referring to a variation between rental apartments, cooperative apartments, apartments with full ownership as well as small houses. Hence, the aim was to create a district characterised by variation in housing (as opposed to homogeneous districts, e.g. housing neighbourhood, apartment area). This

was also seen as a way of avoiding segregation (something which also has been critiqued as it will be costly a living) and promoting social sustainability.

In addition to the local plan, the municipality has developed a quality program connected to Vallastaden. In this program *basic conditions* for coordination and design of the external environment and buildings are described. However, in addition to these basic conditions the municipality also has developed *additional conditions for land allotments*. These additional conditions are expressed in the form of 18 evaluation criteria (to be found in the land allotment program). Instead of pricing as a condition for land allotment, the municipality chose to use these quality criteria as the basis for land allotments. Hence, different credits were tied to each criterion and the developer with the highest fulfilment of criteria would qualify for land allotment agreements. Examples of criteria are: use of several architect offices, use of several developers/entrepreneurs within allocated areas, fast development of housing, building for businesses, variation in apartment sizes, building of passive houses and taking special energy demands into account, participation of presumptive residents in the development. Architects and smaller developer appear to embrace the new model; meanwhile traditional developers tend to see the model as too detailed, which both aggravates and makes developments costly. I will return to this below, when presenting a process perspective on the development.

A process perspective on the development of Vallastaden

Figure 9:2 below represents a schematic view of the process and different activities in the planning and development of Vallastaden²⁴. The process described below covers the years of 2012-2015, however, focus in the narrative lies on the years of 2012 and 2013, when most of the planning work was carried out.

²⁴ This is schematic view is based on my understanding of the project and on the purpose of this study, evidently there are additional project activities that complement this picture.

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Figure 9:2. Process perspective on Vallastaden 2017

A project that seeks broad participation and anchoring (2012-2013)

One interpretation of performing a future example of urban planning and development was according to the project team to seek broad participation in the planning of the new area, named Vallastaden after a name competition early in 2012. Several actions were carried out in line with this ambition, e.g. interdepartmental discussions, arranging dialogue meetings, developing a web-based system to gather ideas or get input from the general public (Annual report 2012).

As a first step to open up for dialogue, the project team (which at that point consisted of two internally recruited civil servants) held, in parallel with the architect competition (see Vallastaden Competition Program in Chapter 8), so called *citizen dialogues*. These dialogues were three in total and focused on different things: the identity of the city of Linköping, public environments that inspire to meetings, and how to unite the city. In the first meeting, it was established that Linköping is characterised by its institutions and buildings, e.g. the university, the aircraft industry, its Science Park, its energy company, its cathedral. These are referred to as the hard values of Linköping. Soft values associated with the city were academic, intellectual, scientific, grown-up and innovative, warm, funny and ambitious. During the meeting sought actions and values were also discussed, e.g. environmental courageous and front-runner technologically, open, friendly and proud (Citizen Dialogue on Linköping identity, April 2012). In the second citizen dialogue focus were on urban environments and how to stimulate interaction, and central themes in the dialogue were public squares and parks as meeting places. These places were to be characterised by openness, flexibility, dynamic, greenness and water. We can note that there was little focus on digitalisation in the discussions, and apart from being a front-runner technologically, there was only one idea that involved digitalisation and that was a proposal concerning a video wall; a public wall that would make it possible to contact other cities and cultures, or for showing films (Citizen Dialogue on urban environments, April 2012). The third citizen dialogue focused on how to unite the city and create a social and environmental sustainable city. All three of these dialogues were summed up in booklets and provided as a complementary documentation to architects taking part in the architect competition. From citizen perspective, digitalisation appears to be downplayed, instead, other values are emphasised, e.g. openness, greenness.

Digitalisation as a
communication means
(public video wall)

Citizens

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In addition to citizen dialogues and in parallel with the public exhibition of the design proposals, *partner dialogues* (in the project called *dialogue meetings*) were arranged by a consultant firm (procured by the municipal council) together with the project team. Partners were in this context the university and the different publicly-owned companies, e.g. the local energy company, real estate companies. These meetings were 4 in total

and focused on the four characterising themes connected to the project: 1) Vallastaden as a learning area, 2) Vallastaden as a creative area, 3) Vallastaden as a social sustainable area, and 4) Vallastaden as a resource-efficient area. The aim of these meetings was to come up

with innovative ideas and the methodology used to achieve this was through creating advertisements. These meetings mainly draw interest from the different municipal departments (linked to each theme), the publicly-owned companies, and a few representatives from the university. Digitalisation was not explicitly in focus in these meetings, however, some of the ideas implicitly or explicitly built on the implementation and use of digital element. For example, when discussing social sustainability ideas of health-related and energy-related services (mobile applications) were discussed; when discussing the second theme creativity visualisations were brought up; and when discussing resource-efficiency (fourth theme) ideas of consumption visualisations and development of an application indicating resource-efficient behaviour was explicitly discussed. For example, the individual “should be able to influence its own resource consumption by making simple choices and see the results of such choices”, in this context an app was discussed as medium to “visually present, on for example, a house wall how much the neighbourhood’s own energy production is and how much is imported. A resource efficiency indicator” (Idea brochure, 2012, p. 25). Another idea generated in the same session and that involved digitalisations was an idea of a “visualisation square”, where you could instead of “testing and feeling, experience the products” virtually (ibid.).

Already at an early stage (see Figure 9:2) the project team launched a web-based platform to gather ideas and get input from the general public and other stakeholders. This platform later went under name the *Idea Ball*; a platform that was introduced already in November 2011. This platform was also integrated with Facebook. The platform functioned as “an idea forum” where published ideas could be commented and liked (Annual report, 2012, project report). Generally, the ideas revolved around different things that citizens desired, e.g. health arena, retirement homes as show off homes, cheap housing, promote the use of electric cars, active speed bumps, car free streets, mix commerce with housing, urban

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farming. Ideas that explicitly involve digitalisation were very few and when mentioned digitalisation was seen as a means for something, e.g. use geodata, visualise information, costs, quality in different areas. (Idea brochure, 2012)

In the summer of 2012 the architect competition went in to a second stage where all the incoming design proposals were exposed in an exhibition. The exhibition was inaugurated by local politicians. In total there were 27 proposals. At this time a jury work also started, a jury that would decide on who was to win the competition. Given the tight time plan in the project a lot of ground work also had to be done. Much work revolved around risk reduction, this in order to avoid delays in the local plan decision. There are certain things that can prolong the development process substantially, e.g. archaeological discoveries, discoveries of certain biotopes, but also the opinion of people and businesses that might be affected by the development. In this case work had to be done in two areas. The first area concerned a neighbouring activity, i.e. a riding school that was worried that the new development would affect their activities. In this case the project management had to arrange a meeting with the members of the riding school, where they reassured them that the development would not affect them negatively. The second area had to do with the water running through the planned district, where newts were found.

A design proposal that challenges the market (fall 2012)

In the early fall of 2012, the winning design proposal was announced by the jury. Out of the 27 proposals, the winning proposal was Tegar (Patches, see Figure 9:3). In the proposal the architect office had embraced the project team's ideas of social sustainability and small-scale building by drawing their design on the old concept of patches. The architect motivates the concept as follows

The concept of Patches was originally a social assurance against crop failures, and a way to share the best farm land. At the same time, it provided conditions for meetings in everyday life. With the proposal Valla patches we take note of the social capacity of property division in patches and create the spatial and social qualities that characterised the undivided village. (Tegar, p. 2)

The winning design also lay the ground for the detail planning and the coming local plan (eventually adopted by the city council) and also an important part of Vallastaden model.

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Figure 9:3. Interpretation and visualisation of Vallastaden (illustration by Okidoki architects)

In the proposal the architects had also taken into account the desire of variation in housing, where they propose that

One patch can be built with different types of buildings in various scales and tenures, certain patches are reserved for community building. The small-scale property division gives different social levels and defined courtyards and gardens, that can substantiate a notion of belonging and accessibility for residents (Tegar, p. 2)

Little is mentioned on digitalisation in the design proposal. The only thing that is mentioned is that Vallastaden is to be built with “so called smart grids, that makes it possible to both consume and supply electricity. This calls for local energy production through for example solar panels or small wind power stations” (Tegar, p. 4). This could also be seen as the architect way of interpreting resource efficiency and (ecological) sustainability. The small-scale ambition in the design challenges traditional ways of housing production, which often are characterised by large-scale productions.

Digitalisation as a communication infrastructure (smart grids)

Architects

In parallel with the municipal planning process and after the announcement of the winning design proposal, the university in its role as project partner initiated a workshop series, called *workshop cafés*. These workshops gathered first and foremost researchers but also practitioners. The idea was to generate and process ideas in the form of workshops. These workshops focused six different themes; 1) energy and buildings, 2) transports and mobility, 3) special session of buildings aimed at construction firms, 4) creativity, innovation and entrepreneurship, 5) education and learning, and 6) collaboration and daily life. The ideas were recorded in a web-based content management system during the sessions and thereafter processed by specially set up expert groups. These expert groups consisted of researchers and representatives from public and private companies with a special interest in the

Digitisation used as a means to process ideas

Workshop café coordinators

particular theme. Focus in this work was to prioritise ideas, identify project owners, and propose projects in the area, but also to support developers in their work. Digitalisation was not an explicit theme during these workshop cafés, however, it was established by the organising group that digitalisation in one way or another imbued all other themes. For example, some of the ideas generated in the discussions concerned digital services, often spoken of in terms of different “Apps”, e.g. a carpooling app, a kitchen-utensil pool app, and a hardware pool app. In the context of education and learning ideas supporting development of different apps for learning purposes were put forward. Further, in the context of energy and smart grids new services (apps) or visualisations of for example consumer behaviours/patterns were discussed. Other topics that were brought up were the use of metering systems and sensor technology to manage and control energy in homes and businesses. Also different automation systems were discussed, e.g. systems supporting different household machines to automatically start according to set parameters. It also became apparent in the discussions and in the proposals that the future residents (in the role of consumer and user) should be involved and engaged in the development process and that the development should be demand-driven.

The recruitment of a CEO to the expo company (spring 2013)

A major turn in the project came with the recruitment of a CEO to the formed expo company Linköpingsexpo AB. The recruitment of a CEO also meant changing of project manager. It was already from the beginning known that a CEO would to be employed in the expo company, and while waiting for this position to be recruited, the internal project manager (a civil servant) was substituting on the position. In addition to a CEO, a position as a marketing and communication director of the project was also sought; a position that initially also was substituted by a civil servant with a background in communications. Both of these substitutes had more or less been involved in the project from the beginning. The timing of the recruitment of a CEO could be seen to be less fortunate as the project was in a sensitive stage, where exploitation and procurement of land/land allotments were to be initiated. At this moment many of the planning activities (citizen dialogues, partner dialogues and workshop cafés) had been carried out, and the project was in a stage where dialogues and negotiations with developers on land allotments were to begin. In March 2013 an *idea and inspiration seminar* was held aimed at developers, firms and other interested stakeholders. At the seminar many of the local and regional property developers, together with small and medium-sized building companies, and architect offices, attended. This “sales pitch” was one of the last things that the substituting project manager held. More than a year into the project, in April 2013, a CEO was recruited. This CEO came from the airplane industry, and was recruited based on his competence in flight logistics. Logistics were at this point seen as

something crucial as the new area was to be built in such a short time and this together with the design in patches where there is little space for on site construction logistics, put pressure on logistics management. The change of project manager (and later also marketing and communication manager) meant that the project team lost the historical background to the project, i.e. knowledge and work that had been done in the planning and anchoring of the project. It also meant that the informal link between the municipality (the administrative departments) and the expo company more or less was broken. The new CEO later witnessed that he had a hard time to “reach in” to the municipality.

Planning for a hackathon that never was (spring and fall 2013)

In parallel with the recruitment process of a CEO, it became apparent to the coordinator of the workshop cafés at the university that digitalisation had emerged as a theme more or less permeating all the workshop cafés. As a consequence, he initiated discussions with people with competences in digitalisation, and people with connections in the IT industry (working in the Science Park close to the location of Vallastaden). In these discussions the idea of a hackathon²⁵ emerged. This idea was also absorbed by the local energy company, as this was an idea that fitted into their internal discussions and work on developing new communication and interaction models with their customers. A small group of people (with different backgrounds) was gathered by the energy company to discuss and plan a hackathon. People represented in this group came from the local energy company, the university, the local Science Park, and the Expo company. These meetings were initiated in the spring of 2013 and the hackathon was planned to take place in the fall. Meetings in this constellation were held three times.

The initial meeting focused on presenting previous work done in different contexts, i.e. an internal workshop at the energy company, the workshop cafés arranged by the university, and work done by the project team. It was pointed out by the energy company (the basic energy provider in the city and in charge of the energy infrastructure) that their purpose for taking part in a similar event was to develop new models for communication with the end user, and the idea of some sort of “killer app” was initially introduced by them. They saw this development as a new strategic field in which they could develop new business models. The continuing discussions and meetings

²⁵ A hackathon (i.e. hacking marathon) is an event to innovate and develop prototypes, often very limited in time (Raatikainen et al., 2013)

concerned different themes of what could be realised during a hackathon, like for example prototypes of energy management and control systems, prototypes of services/applications for error report or for giving feedback on consumption patterns, prototype of an application for making sustainable decisions, etc. In this context it was discussed that the end user should be involved, and that a need analysis should serve as an input to what should be the focus for the “hacking event”. Other issues raised in the meetings concerned what is necessary for arranging a hackathon; e.g. what kind of data that was needed, in what format this data should be available, ownership of data, and more practical questions concerning what kind of Internet connections, cables, etc. that are necessary in order to carry out a hackathon. In parallel with these discussions, the local energy provider also arranged other meetings and events, e.g. an innovation camp. The innovation camp was a competition arranged for high school students; a competition that was characterised by the “locking-in” of competitors in a studio for 24 hours with the aim to come up with innovative ideas. In November 2013 such an event took place. Sustainability was in focus and the aim was to create a digital service that would focus on resource efficiency. In conjunction with the event, representatives from the telecom company Ericsson gave inspirations talks about augmented reality solutions and how this could be used in mobiles. The concrete instruction to the competitors was to create an app that would make people reflect on their energy use and the winning idea was an app

*where you could monitor all kinds of things in your home from your mobile.
Specially, shower and heat. The shower for example, you can decide that
you could only use maximum 100 litre, then the shower communicates with
the mobile, and it gives a signal when you have used 50 litres for example.
(High school student from the winning team, in Östgöta Correspondenten
2013-11-15)*

Several ideas were at the time discussed as having the potential to be realised in Vallastaden. This and similar events with students at the university resulted in some concrete ideas that the local energy provider chose to continue to work and, consequently the planned hackathon was cancelled as it was seen as redundant.

‘Disillusionment’ in the project (spring 2013)

In the spring of 2013 after the inspiration seminar, land agreement programs were launched and developers were invited to take part in exploitation and procurement. The outcome of the first run was an expressed interest from the part of 19 developers. At the time, project management chose to release the number of tenders as there were rumours that it was a low interest in taking part in the development of Vallastaden. “This exceeds our expectations. I had hoped for ... or I shouldn’t say hope, but I hadn’t thought that we would get so many as 19 tenders” said the responsible commissioner at the time (in Östgöta Correspondenten, 2013-04-22). However, in practice this meant vacancies in

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land allotments. Not long after this political debates on the project started to appear. Local plan decision was soon to be decided on and political discussions concerned budget issues and the time frame of the project. However, at the end of the spring the first eight developers had entered so called land allotment agreements with the municipality. At the same time, an extra land agreement program was launched in the beginning of the summer. A new person was also recruited to the expo company, a development manager whose mission was to coordinate the municipality with the developers, the architects and the construction site.

The political battle of Vallastaden begins (fall 2013)

Almost a year before national elections a political debate on Vallastaden started to take form. In conjunction with the upcoming decision on the local plan, the present political opposition started to write debate articles in the local media, where they urged project management not to rush the exhibition. The opposition argued that there are too many questions marks concerning the time plan, overriding costs, and lowering of ambitions. The opposition wanted to postpone the decision on the local plan. The chairman of the executive board meant that one must not confuse the local plan with the expo. However, when the local plan was discussed in city council the opposition postponed the decision on the plan. One month later, in September 2013 the city council decided on the local plan. As a consequence, the commissioner also a political opponent and member of the supervisory of Linköpingsexpo AB, decides to opt out. Reasons for opting out were: the time frame, economy, and quality. The commissioner points out that the expo company need additional money, meanwhile the CEO has a different opinion, where he says it is a misunderstanding. At the same time, it was announced from the management that the expo now was saved, enough developers had bought land allotments in order for the expo to take form.

Glory and fame and progress in the project

In parallel with the political discussions, project management had the opportunity to present Vallastaden to the Royal Family who visited Linköping and short after their visit Vallastaden project was appointed as the winner of Green Building Awards, with the motivation “

A collaboration process with a clear overall perspective, high ambition level and with the pursuit of diversity and innovation. With land allotment as an instrument conditions for new thinking in relation to design, execution and management are created (source Facebook)

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Figure 9:4. Project postings in Facebook

The pictures above (Figure 9:4) could also be seen as two examples of how the project team consciously has worked with social media in marketing and communicating the project. And in practice, the project home site together with the Facebook account appear as the primary channels for communication. Facebook has mainly been used to give updates on project activities in combination with uploaded pictures (as was intended in the communication strategy) and has thus served as a sort of documentation of the process. However, there is little evidence on dialogue and sharing in this medium (so far).

In October 2013, the Commissioner (also the president of the supervisory board of the expo company), together with the University Director and the Vice President of the local energy company, cut the first sod in Vallastaden. This was in social media presented as an historical moment (see picture below). Cutting the first sod also meant that the work with the basic infrastructure started to take form, i.e. development of roads and utilities. In Vallastaden a 1100-meter long culvert was planned for; a culvert that would contain and gather pipes and cables for electricity, sewage, water and communication.

According to the vice president of the local energy company this new technique (the culvert) “gives us possibilities to meet future technical developments. When cables are worn out they can easily be replaced”. (Östgöta Correspondenten, 2013-10-25)

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Figure 9.5. Example of Facebook posting

In the picture above (Figure 9.5), there is yet another example of a Facebook posting, this is also a posting that has rendered some dialogue.

However, in November the same year, local and regional developers react in a debate article in the local media. Their reaction concerns the municipality's way of working with plan processes and land allotment process, where they mean the municipality does not understand development conditions. They argue that demands expressed in the local plan and in land allotment regulations (quality program) are both aggravating and costly. What they want is a coordination of municipal demands to create predictability in the production. At the moment they mean that these demands differ from project to project, which became apparent to them during the land allocation of Vallastaden.

As developers we had participated with enthusiasm in a large number of meetings about Vallastaden, and given several concrete proposals on the design and type of houses. The proposals that came up during this process were unfortunately not taken into account, and thereof the weak interest. (Skanska, Riksbyggen, Lindstén Fastigheter AB, Botrygg, HSB, Östgöta Correspondenten 2013-11-12)

The political battle of Vallastaden intensifies (spring and autumn 2014)

In the wake of the decision on the local plan, political opponents openly debate Vallastaden in the local media, where they want to put an end to the expo and in the beginning of 2014 contracted developers are invited to the city hall to discuss the time frame of the project. The expo company says that they have perceived an interest among developer to push the expo in time. However, not all developers are positive to a postponement of the expo. At the time, the political opponents also demanded that the expo was to be liquidated)

That the social democrats today propose that no more money is to be contributed and that the expo company will be liquidated, means, [...], that the social democrats if they should win the elections have to look at the issues again and take a new decision. (Östgöta Correspondenten 2014-03-

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It was also an intense debate in the city council when decisions on more financial resources to the expo company and postponement of the expo were decided. The expo was postponed to 2017. In conjunction with this, yet another land allotment process was initiated by the municipality and in the beginning of the fall the first building permit was issued. National elections were held in September, which meant a change in power in the municipality. The ruling alliance was changed and the prior opposition came into power after the elections.

The revival of the project (fall 2014 and spring 2015)

In October an important piece in the expo was solved. One of the large construction firms decided to take part in the development of Vallastaden. This developer had been active in the planning process of Vallastaden, but had refrained from engagement due to the municipality's complicated process. "At the time the message was that each developer would maximum get two allotments, but with such small developments the company couldn't get any economy" (Östgöta Correspondenten 2014-10-15). To meet the demands of the developer the project team had to revise the original plan.

In February 2015 the new local government decided to go through with the expo and they presented their plan on the coming expo. "We have earlier been worried over a tight time frame, however, after having scrutinised the project we are ascertained that we can pull off a good exhibition", says the new chairman of the executive board in the municipality. As a consequence, board members of the supervisory board of Linköpingsexpo AB are changed. In a press realise, the new coalition points out that "an increased support to the expo company, and more frequent information to all stakeholders, more frequent owner dialogues and a clearer management of the expo company are required" (Press release, 2015-02-10). Not long thereafter the minister of housing also visits Vallastaden. Later in the early summer of 2015, the CEO of the expo

company was changed. A new CEO was recruited. In September 2015 the project changed name to Vallastaden 2017 and a new logotype was launched (cf. Figure 9:6).

Figure 9:6. The changing of logotypes (Vallastaden homepage)

Vallastaden gradually taking shape

In the beginning of 2015 the basic infrastructure for many of the services were in place in Vallastaden. This basic infrastructure consisted of a unique culvert system covering 1800 meters. An innovative culvert system had been designed in Vallastaden; a system that consisted of cables and pipes along the walls of a culvert. Infrastructure for heating, water, sewage, electricity, communication, and waste were gathered in the culvert.

When the municipality decided on a housing expo, the bar was set very high. This is a district that is to be worth to show off. For [us] this means to solve the basic infrastructure in a new, better, and more sustainable way. We had workshops and eventually this idea emerged.
(project manager local energy company, Östgöta Correspondenten 2015-01-28)

According to the vice president in the local energy company, the uniqueness of the design was that it liberates ground for building tighter, and that digging up of streets will not be necessary in the future. This allows a densely built urban area, with narrow streets. The new design was said to be more expensive than the traditional ways of working with basic infrastructure, but the vice president meant that

In Vallastaden it is probably an equivalent cost as the soil conditions in combination with the narrow design are difficult. In this case conventional techniques had been difficult. (Vice president, local energy company, Östgöta Correspondenten 2015-01-28)

Later in 2015, it was also announced that Vallastaden would get a “plus energy house”, which is a passive house (type of low-energy building) in combination with solar panels. This combination would create a surplus of energy and this surplus would be distributed back on the electricity grid. At the time, the involved developers meant that so far it has been unusual that this kind of technology is used in tenement buildings. This development was a cooperation between a large building cooperation and one of the publicly-owned real estate companies.

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The same year it was decided that if you move to Vallastaden you have to be a part of the car pool (an idea that was discussed in the planning phase). “It is clear in the ambition of the project of Vallastaden that we are to be more sustainable, both socially and economically. The car pool is an expression of that”, says the chairman of environment and urban planning, also member of the supervisory board of the expo company (in Östgöta Correspondenten, 2015-11-30)

Chapter summary – planning and building discourse

In this chapter, I have presented a project perspective on planning and development of a new district called Vallastaden, and how digitalisation have been spoken of and used by different actors in this context. In the following section I summarise the found elements of discourses on digitalisation and discuss how these elements are relevant to the broader context of urban planning and development.

In the table below, we can note that in practice in an urban development project, digitalisation is both *used and spoken of as means in the process and in the development* as such. There are two contexts of use, i.e. *in project management* as a tool to inform and market the project and to gather ideas/information, and in *energy management* as a tool to communicate with customers (to influence customer behaviour) and as implementation of hard infrastructure (fibre cables). In practice in planning, digitalisation is not explicitly discussed but rather an issues that underpins other discussions, e.g. development of different applications and services that draw upon digitalisation.

Table 9:1. Summary of elements of discourses on digitalisation in Vallastaden 2017

Dimension of urban development	Elements of discourses
Governance	Digitalisation seen as a means to market the project (policy-makers)
*administration	Digitalisation used as a means to market the project (project management)
*participation/engagement	Digitalisation seen as a means to create attractive contents and stimulate engagement (policy-makers)
	Digitalisation seen as a means to deliver services (civil servants, project management, researchers)
	Digitalisation used as a means to gather ideas, web-based platform (project management)
	Digitalisation used as a means to process ideas (partner coordinators)
Environment	Digitalisation seen as a means to deliver energy services (civil servants, project management, researchers, local energy company)
*housing	Digitalisation seen as a means to achieve resource efficiency (civil servants, project management, researchers, local energy company)
*energy	Digitalisation seen as communication infrastructure - smart grids (architects)
*water	Digitalisation seen as a strategic area and a means to work with customer communication (local energy company)
*safety	Digitalisation seen as a means to influence consumer behaviour (local energy company)
	Digitalisation as implementation of communication infrastructure, e.g. cables, fibre (local energy company)
	Digitalisation seen as the implementation of smart grids (developer/entrepreneur)
Communications	Digitalisation seen as a communication means, e.g. public video wall (citizens)
*transport	
*ICT	

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Table continued from previous page.

Dimension of urban development	Elements of discourses
Education *school *workforce	
Culture *recreation *tourism	
Welfare *health *social	Digitalisation as a means to deliver health services (civil servants, project management, researchers)
Economy *business *commerce	Digitalisation seen as a strategic area for business development (local energy company)

This summary ends the part covering the empirical foundations of this study. In the next part I will proceed to analysis and discussion of the results and to end with conclusions and suggestions for future research.

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PART IV

DISCUSSION AND CONCLUSIONS

Introduction to discussion and conclusions

The aim of this part is to analyse and discuss the results of this study. I use analysis and discussion interchangeably in this context, as I see them as intertwined. Focus is on analysing and discussing identified repertoires of discourses on digitalisation, who the stakeholders are and their salience as well as what their stakes are in digitalisation, and discuss what kinds of institutional patterns and elements that characterise urban planning and development as a process in a wider social and organisational context. Hence, in this part I have made use of my analytical framework – the DiSSIPE framework – that I constructed in Chapter 5 (I have enclosed the framework below as a reminder to the reader). The DiSSIPE framework focuses on 1) identification of discourses, 2) identification of stakeholders, their salience and stake, and 3) identification of institutional patterns and elements in the wider social and organisational context. I argue that by applying this framework and by doing this type of analysis we can gain insights on how digitalisation is constructed (and construed) in different practices covering urban planning and development. Hence, in the analysis and discussion, I address my research questions with the help of my framework. My research questions are:

- What repertoires of discourses on digitalisation are there in policy and planning of urban developments?
- What relations are there between different discourses on digitalisation and smart, and how can these relations be understood?
- How can gaps in understanding of digitalisation and smart be handled in the future?

Figure IV:1. DiSSIPE framework

This part is organised as follows:

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Chapter 10: Analysis and discussion

Chapter 11: Conclusions

Chapter 10: Analysis and discussion

This chapter aims to discuss the findings from the four previous chapters (Chapter 6-9). The discussion is outlined around the three research questions posed in the introduction to this thesis. First, I will discuss the identified repertoires of discourses on digitalisation in policy and planning of urban development. This is followed by a discussion on stakeholders' salience and stake in urban development and in digitalisation, and implication of institutional patterns and elements. I close this chapter by discussing how gaps and variances in discourses on digitalisation can be handled.

In this study we have identified that urban planning and development involves actors from different sectors, actors representing public as well as private organisations. These actors also have different roles in urban development, e.g. policy-makers, project leaders, designers, developers (e.g. in Chapter 6-8 policy-makers behind different policy documents, in Chapter 9 in the project architects as designers). We have also seen that issues related to urban development and digitalisation are discussed and acted upon in different contexts, i.e. in different practices. These practices are characterised by different actors, structures, routines norms, cultures (Scott, 2014; cf. community of practice, Lave and Wenger, 1991; Fairclough, 2001). Policy practices, for example, involve many institutions (well-established organisations with a societal purpose) at different levels, e.g. European Commission, national government and agencies, local government, i.e. municipality (which we have seen examples of in Chapter 6-9). These institutions have central roles in forming *normative discourses* on both urban planning and digitalisation, i.e. what is considered right and wrong, what is desirable and how this should be done or not be done (Ahrne and Brunsson, 2006; March and Olsen, 2008). They are also in some cases in charge of *regulative discourses*, i.e. rules and laws (DiMaggio and Powell, 1991, Scott, 2014), e.g. plan and building acts. Both normative and regulative discourses eventually have impact on *cultural-cognitive* ones, i.e. setting frames for shared conceptions of urban planning and development and on digitalisation. Hence, many of the above mentioned institutions have particular interests in urban planning and development and in digitalisation (cf. stakeholders' salience and stake Mitchell et al., 1997; Freeman, 1984). However, their legitimacy and power to influence how digitalisation is put into practice in different practices of urban development are in general low, e.g. developments IT infrastructure and services are in practice dependent of the private industry. Consequently, policy-makers at different levels express

normative claims on digitalisation in policy documents (which we have seen in Chapter 6-8).

Further, in planning practices of urban developments, we have also seen that, in addition to institutions, these types of development processes also involve other actors, often a mix of public and private organisations. In this case, we have seen organisations like architect firms, construction firms, real estate owners (both private and publicly-owned companies) to be involved in the development of a new district (see Chapter 9). These organisations are also characterised by their own practices, values and norms, which also means that they have different stakes in urban planning and development as well as in digitalisation (see Chapter summary in Chapter 9). I will return to all of these insights below and discuss them more in detail. I will start out with the identified repertoires of discourses on digitalisation and discuss implications of these findings in relation to urban planning and development and smart city developments.

Discourses on digitalisation

As we have come to know it in this study, discourses are how we talk about and understand the world around us, a sort of sense-making process where we use language to both construct and construe the social reality and things around us at the same time (Potter and Wetherell, 1987; Gee, 1999, Jørgensen and Philips, 2002; cf. social constructionism Burr, 1995; Berger and Luckmann, 1966). Throughout the empirical part in this study, we have in the summaries seen different meanings, understandings, representations and statements attributed to digitalisation and these different meanings and understanding both construct and construe what digitalisation is in these contexts. Based on the identified elements of discourses (cf. summaries in table format in Chapter 6-9) and my analysis of how they are connected to different dimensions of urban development (cf. Chapter summaries – governance, environment, communications, education, culture, welfare, economy), I have identified different repertoires of discourses on digitalisation, i.e. a stock of discourses on digitalisation in policy and planning of urban development. In Figure 10:1 below, I have summarised the identified repertoires in the policy practice. The results are divided into four categories. These categories are characterised by a distinction along two dimensions, i.e. type of policy and focus area. Concerning the type, I have distinguished between two types of policies, i.e. policies targeting urban development, referred to as *urban development policies*, and policies targeting digitalisation, referred to as *digitalisation policies*. This categorisation has been made based on the assumption that policy-makers behind these different documents 1) have different knowledge and competences on digitalisation, and 2) have different stakes in both digitalisation and urban development. Concerning focus areas, I have distinguished between *urban foci* and *digitalisation foci*. Hence, the analysis of the repertoires is a sort intertextual analysis (cf. in line with CDA traditions, Jørgensen and

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Philips, 2002). By doing this we gain insights on the range of repertoires of discourses on digitalisation in different policy practices of urban planning and development.

Discourses in policy practices

When analysing the results at we find the main differences between the two types of policies. In urban development policies there is one repertoire that is more dominant, and that is to see digitalisation as a *means* in services related to the *environment*, meanwhile policies on digitalisation there is a more diverse approach to application areas, e.g. *governance*, *environment*, *economy* (see Figure 10:1). We find similar patterns when it comes to meanings and understandings attributed to digitalisation. In urban development policies there are two repertoires on digitalisation as such, where one repertoire concerns *digitalisation as a means*, and the other repertoire concern *digitalisation as a communication infrastructure*. In digitalisation policies there is yet another prevailing repertoire and that is to see *digitalisation as a market*. I will return to these patterns more in detail below.

	Urban foci	Digitalisation foci
Urban development policies	<p>Environment Energy management / resource efficiency /urban planning</p> <p>Economy market / business innovation / R&D</p>	<p>Means to achieve/do something (e.g. . calculate costs, streamline processes, manage home and energy systems, manage planning processes)</p> <p>Communication infrastructure (e.g. smart grid)</p> <p>Issues concern interoperability and investments</p>
Digitalisation policies	<p>Governance services / administration / transparency / participation</p> <p>Environment energy management / energy efficiency / communication infrastructure (smart grid)</p> <p>Communications ICT / communication infrastructure / information / transport</p> <p>Economy market / business / services / commerce / R&D</p>	<p>Market (e.g. products, services, open data)</p> <p>Means to achieve/do something (e.g. deliver services, streamline, decrease emissions, transparency)</p> <p>Communication infrastructure Hard components, e.g. fibre network, soft components, e.g. data/services</p> <p>Issues concern interoperability, investments, trust and security</p>

Figure 10:1. Summary of repertoires discourses on digitalisation in different policy practices

Urban development policies on urban foci

In urban development policies, one repertoire concerns how digitalisation can be used as a means in services and functions related to the *environment* (see Figure 10:1). Focus in this context is on energy and how to economise with resources. When digitalisation is spoken of in this context it is primarily seen as a means to achieve resource efficiency. Urban policies could be seen to reinforce global discussions on sustainability (cf. in conferences like Habitat II(I), UNCED). Sustainability is also an important dimension in smart city literature (e.g. social and environmental sustainability as strategic components of smart cities, Caragliu et al., 2011). However, in these policy contexts when discussing the environment, there is little focus on the environment as an important dimension in creating livable and socially sustainable cities (Chourabi et al., 2012) and as a dimension in creating socially inclusive communities (cf. social sustainability, Patridge, 2005). Instead, in urban development policies focus is on production and energy and electricity management, e.g. decentralised electricity production and small-scale energy production. Thus, in this context we see an example of distinct discourse pertaining to a specific practice, i.e. a dominant repertoire. Another repertoire in urban development policies concerns how digitalisation can contribute to *economy*. This repertoire is more prominent on EU level. This is perhaps not surprising as the European strategy, Europe 2020 (including the flagship initiatives), has a strong focus on economic growth. However, what is interesting is that digitalisation on the one hand is seen as market in its own, and on the other hand as a means for achieving productivity and business innovations in other markets (e.g. new products and services in energy market for example). Focus on economy in urban development policies is not a surprising result as cities often are seen as economic centres (da Silva et al., 2012). In the literature on the smart city I have also identified a discourse where the smart city is seen as an arena for economic development, and as such it comprises many aspects, e.g. competitiveness, productivity, labour market, entrepreneurship, innovations (cf. Giffinger et al., 2007). Chourabi et al. (2012) even mean that creating environments for business development is essential for smart city progress, and the development policies in this case also reinforce this picture, where IT industry is pinpointed as an area for both job creation and business creation.

Urban development policies on digital foci

In urban development policies we find two repertoires on digitalisation as such (see Figure 10:1). The first repertoire concerns digitalisation as a *means* to achieve/do different things in an environmental context, e.g. calculate environmental costs, manage energy processes, streamline processes. The other repertoire concerns digitalisation as a *communication infrastructure*. When spoken of as an infrastructure this is done in relation to energy, and in this context the infrastructure is referred to in terms of a smart grid. The smart grid is seen as a precondition for decentralised electricity production.

Hence, on the one hand, policy-makers with focus on urban development appear to see urban development as a matter of laying down cables (cf. the wired city, Hollands, 2008), and, on the other hand, equipping cities (premises) with necessary means to work with resource efficiency. Hence, technology is in this context seen as a computational tool (Orlikowski and Iacono, 2001), a tool that can gather, communicate, and act on real-time data (Kitchin, 2014), in this case electricity data. This with the aim to be more efficient and create a sustainable electricity provision for the future (Naus, Spaargaren, van Vliet, van der Horst, 2014). Hence, in this type of policy context both urban development and digitalisation are seen as areas that can be engineered and environmental issues are thus treated as technical problems that can be solved. Interoperability issues in development policies either revolve around regulative matters, i.e. creating regulative frameworks (cf. judicial interoperability, Goldkuhl, 2008) or organisational matters, e.g. how to create viable structures for cooperation between different stakeholders. Other issues concern investments in infrastructure, e.g. broadband development, fibre.

Digitalisation policies on urban foci

In comparison to urban development policies, there are additional repertoires where digitalisation is thought to make a contribution in digitalisation policies (see Figure 10:1). The most prominent repertoire concerns how digitalisation can be used as means in services and functions related to *governance*. In this context digitalisation is seen as a means to both deliver public services, as well as a means to render internal administrative processes more efficient. This is in line with ideas on e-government and smart government (Nam and Pardo, 2011a, b; Gil-Garcia, Nam, Pardo, 2015; Meijer et al., 2015). In this policy context, the aim is to create an open and transparent administration and digitalisation is seen as a means for participation. Citizen participation in decision-making is seen as an important dimension in creating an open and transparent government (cf. smart governance, Nam and Pardo, 2011a, Alawadhi et al., 2012; Gil-Garcia et al., 2016). Interestingly, prior knowledge in this area shows that access to governance processes is something that often have been ignored (Chourabi et al., 2012). However, we can note that this repertoire is not prominent in urban development policies, which can indicate that this repertoire is a weak and context bound repertoire. The two repertoires concerning how digitalisation can be used as means in services and functions related to *environment* and to *economy* do not deviate much from the ones in urban development policies. However, policy-makers in this context appear to have a more nuanced way of discussing these matters. In relation to the environment, for example, it is not only energy that is targeted but also construction, housing and transport, where digitalisation is seen as means to reduce emissions and as an important tool in achieving climate and environmental goals. Something, which we have seen, that also is an important dimension in smart city developments (Caragliu et

al., 2011). In the context of economy, digitalisation is seen as a means to drive developments of both new innovative services and to drive business innovation.

Digitalisation policies on digital foci

In digitalisation policies, I have identified three repertoires on digitalisation. In addition to repertoires on digitalisation as a *means* and as a *communication infrastructure*, digitalisation is in this context also seen as a *market* in its own. In contrast to urban development policies, in this context the market is seen as a “digital matter” rather than a development area within urban development. This could be seen as a natural consequence of the type of policy document, i.e. being digitalisation policies. When spoken of as a market it is seen as an arena where buyers and providers of IT products, IT services, open data interact with each other. This arena is characterised by an IT infrastructure for commerce and business (e.g. eID, eProcurement). The repertoire concerning digitalisation as a *communication infrastructure* is also more nuanced in this policy context, where the infrastructure is seen to consist of both hard infrastructures as well as soft infrastructures. Hard infrastructures concern development of both fixed and wireless networks for communication. Hence, in a city context the hard infrastructure is a question of “laying down” cables (cf. wired city, Hollands, 2008). However, focus is not only on the hard infrastructure, but also on its purpose, i.e. communication. Thus in line with conceptions of the digital city where focus is on using the infrastructure for communication and information purposes (cf. digital city, Yovanof and Hazapis, 2009). This focus is also closer to the soft infrastructure, which concerns information/data availability, services. The repertoire concerning digitalisation as a *means* to achieve/do things is also more diversified, where several contexts of use are reflected upon, e.g. public services related to administration, environment, healthcare, education, culture. Hence, digitalisation policies appear to be closer to a sociotechnical view of technology, where technologies are seen as embedded in a context of use (cf. embedded systems, Orlikowski and Iacono, 2001). Yet, the prevailing repertoire of primarily seeing it as means that easily can be designed, transferred to and used in different contexts at the same time indicate a narrow interpretation of digitalisation (cf. tool view, Orlikowski and Iacono, 2001). In digitalisation policies issues revolve around three things: investments in infrastructure, interoperability, and security and trust. Investments in infrastructure is mainly seen as a mission for the private sector, i.e. development of fixed and wireless networks, broadband, telecom networks, thus an engineering matter. Issues related to interoperability are, in comparison to urban development policies, more substantiated. On the one hand, interoperability issues revolve around standard setting and alignment of rules and legal frameworks (cf. technical and judicial interoperability, Gil-Garcia, 2012; Goldkuhl, 2008). On the other hand, it also revolves around organisational matters, e.g. how to create viable structures for collaborations between different stakeholders, and information and data, i.e. alignment of concepts and

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terminology (cf. organisational and semantic interoperability, Goldkuhl, 2008). Issues of security and trust also indicate that policy-makers in this context acknowledge downsides with digitalisation, i.e. ethical implications linked to privacy and integrity.

In sum, a prevailing repertoire in policy is to see digitalisation as an information and communication *means and infrastructure to enhance productivity in different services/functions related to urban planning and development*. These results are not controversial to an IS community, on the contrary, these results reinforce what IS researcher already know. Orlikowski and Iacono (2001) would refer to this as the *tool view* of technology. These results also reinforce the picture that policy-makers tend to have a technocratic view of both urban development (cf. Kitchin, 2014; Hollands, 2015) and of technology, where both are seen as artefacts that can be engineered and designed for different purposes. A technocratic view of the IT artefact is also critiqued within the IS community, where technology design and development is seen as something that cannot be separated from its context of use (Baskerville, 2013; Paul, 2007; Bernroider et al., 2013; Iivari and Hirschheim, 1996). Implications of these results is that such dominant and institutionalised repertoires, where digitalisation primarily is seen as a means or an infrastructure, also makes them hard to change. This also means that other discourses are either obstructed or at least have a hard time to penetrate in practice. In this study smart city discourses have been non-existing in planning practices for example). Thus, repertoires of these kinds are powerful (cf. Fairclough, 2001) as they are taken-for-granted, and, as such not reflected upon.

Above, I have discussed different repertoires on digitation in policy practice of urban planning and development, and these repertoires can be summarised as follows:

- Digitalisation as means in environment, economy, governance
- Digitalisation as a communication infrastructure (hard and soft)
- Digitalisation as a market (either as an arena or as products/services)
- Issues connected to digitalisation concern interoperability, security and trust, and investments

In figure 10:2 below I have summarised identified repertoires in policy practices and contrasted these findings with identified repertoires on digitalisation in planning (and building) practices, in this case represented by Vallastaden 2017. Hence, the results are once again categorised in four categories, but this time based on a distinction between different practices, i.e. policy and planning and different foci, i.e. urban development foci and digitalisation foci. This could also be seen to mirror a policy implementation perspective.

Planning practices on urban development and digitalisation

In this study we have seen that planning practices involve many different actors, local politicians, civil servants (in different roles and functions), architects, citizens, researchers, to mention a few. These actors also change in prominence over time, depending on phases/processes in the project (I will return to this in the next part when discussing stakeholder' salience and stake). Not surprisingly, these actors also have different interests in the planning process as well as in urban development. Hence, in this case, urban development foci have come to revolve around issues related to *governance*, *urban design*, *utilities*, *construction*, and *innovations* (see summary in Figure 10:2 below). Focus on *governance* has in this case meant several things. First, *social sustainability* has been a priority in the project, both as an aspect characterising the process and as an aspect characterising the end product (the new district Vallastaden). Different stakeholders have been engaged in the process as a way of targeting social sustainability public services. Social sustainability is also an important dimension in the smart city. Caragliu et al. (2011) for example argue that one of the aims a smart city is to achieve social inclusion of various urban residents. An interesting observation in the studies case is that in relation to the end product (the district of Vallastaden), social sustainability has meant building a district with a variety in housing, and creating environments that focus on quality of life and social inclusion (cf. social inclusion, Patridge, 2005). Hence, in this case we have seen an example of a development project that acts upon policy goals of participation and social inclusion also in practice. This case could be seen as a deviating example from normal practices in urban planning which tend to refrain from engaging citizens and other stakeholders in the process (Chourabi et al., 2012). At the same time, this study also shows how local policy-makers by focusing on *urban design* (small land allotments) both target and reinforce notions that the urban community tends to get lost in strategic planning, zoning and landscaping. Not truly understanding what urban design is, something which Clos, former Mayor of Barcelona and executive director of UN-habitat, also cautions against (cf. statement in the Guardian, 2016). However, by combining design with participation in the process, this project could be an interesting example to learn from in the future.

Interestingly, in this context of social sustainability and participation, digitalisation has both been pointed out and used as an important means in the process. For example, social media was at an early stage pointed out as an important channel to work with. However, we can also note that these undertakings are more complex in practice than in theory. In contrast to expectations where social media was seen as a channel that would stimulate dialogue, in practice, these channels appear to render little activity/actual discussions. Instead, channels like social media have become important means to document the project process, and as such, they are powerful means in constructing and construing the story of Vallastaden (cf. narrative, Czarniawska, 2004; social construction, Burr, 1995; Berger and Luckmann, 1966). Thus, in this case, the IT artefact is a carrier of a normative discourse (for an example see picture of Facebook posting in

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Chapter 9 when presenting a process perspective on Vallastaden). Consequently, the artefact also come to have a symbolic value in the process where it creates the frames for meanings and shared conceptions of Vallastaden, thus a type of institutional carrier of discourses (Scott, 2014).

	Urban development foci	Digitalisation foci
Policy practice	<p>Economy Market / business innovation / R&D / services / commerce</p> <p>Environment Energy management / resource efficiency / urban planning / smart grid</p> <p>Governance Services / administration / transparency / participation</p> <p>Communications ICT / communication infrastructure / information / transport</p>	<p>Means to achieve/do something</p> <ul style="list-style-type: none"> • service delivery, • management • communication and information <p>Communication infrastructure</p> <ul style="list-style-type: none"> • hard infrastructure (grids, broadband, fibre, telecom) • soft infrastructure (services, information, open data) <p>Market</p> <ul style="list-style-type: none"> • new products, services, • open data
Planning (building) practice	<p>Innovations New services, functions</p> <p>Construction Variation in housing (apartments to small houses)</p> <p>Utilities Energy provision, sewage, water, fibre, resource efficiency</p> <p>Urban design Small land allotments, social sustainability</p> <p>Governance Social sustainability, participation, resource efficiency, small-scale production, new actors</p>	<p>Means to do achieve/do something</p> <ul style="list-style-type: none"> • deliver services • communicate information • market the project • gather ideas • innovate business structures <p>Communication infrastructure</p> <ul style="list-style-type: none"> • implementation of fibre, • smart grid

Figure 10:2. Summary of repertoires discourses on digitalisation in policy and planning practices

In Figure 10:2 we can also note that repertoires on resource efficiency are prevailing. In planning practices, *utilities* are approached from two perspectives, an infrastructural perspective and a business perspective. Interestingly, concerning infrastructure, the energy supplier does not in this case focus on smart grids (at least not explicitly). Instead, their interpretation of infrastructure (and their interest in this project) was a new building technology for providing basic services, i.e. a culvert system for energy provision, sewage, fibre, water (cf. providing basic condition for the wired city, Hollands, 2008). Smart grids are in this case only spoken of by policy-makers and architects, where architects' use of the concept could be seen as a response to policy-makers request. The other perspective concern business development. In this context digitalisation was spoken of and discussed as a *means* to deliver a new type of service to customers; a service where customers can interact with the provider (in the discussions referred to as

the “killer app”). However, the motive was to develop new business areas; areas which not earlier had been explored. Even though many activities were carried out to realise these ideas in practice, ideas remain unrealised. Two reflections can be done in this context; one is that digitalisation could be seen as a carrier of change (cf. Agarwal and Lucas, 2005) and as such it has positive connotations, another is that it is an example of how policy goals related to digitalisation as a means for business development also are targeted in practice.

In this case, as ambitions have been high in the project (concerning both the process and the end product Vallastaden), focus in the planning process has also been on *innovations* (see Figure 10:2 above). The above mentioned idea of a killer app could be seen as an example of an outcome of an innovation process. All different planning sessions, like partner dialogues, workshop cafés, have focused on new services/products to be implemented in the new district. Digitalisation was never an explicit focus in these settings, however, it appeared as an important dimension in many of the ideas (e.g. a means in service delivery, cf. a project that seeks broad participation, Chapter 9). This result could, according to me, be seen to pinpoint one of the problems with smart cities and what role digitalisation is to have in these contexts. By black-boxing the IT artefact in discussions, I mean that it is not clear. In the literature on smart cities, we find, on the one hand, a strand that focuses on smart cities as a holistic approach to city developments by identifying different core components/dimensions (Caragliu et al., 2011; Alawadhi et al., 2012; Gil-Garica, Pardo, Nam, 2015), and in this context digitalisation one component/dimension among others (e.g. social and environmental sustainability, economic development). On the other hand, we find a strand within the literature that (solely) focuses on technology development, mainly driven by the IT industry (e.g. instrumentation, intelligence, Harrison et al., 2010; Naphade et al., 2011; Schaffers et al., 2012). Hence, there is also in the literature a tension in how the IT artefact is approached and viewed. Returning to the planning sessions in practice, an interesting observation to be made is that in these settings end-users were not involved (future residents) and discussions on needs were based on assumptions (cf. Axelsson and Melin, 2007). Focus in these discussions were on social sustainability and resource efficiency, the latter discourse on resource efficiency appears to be an institutionalised discourse and in this case competing with the discourse on social sustainability. In policy we can see both a digital imperative and a sustainability imperative.

Above, I have discussed different repertoires on digitation in planning practices of urban development, and these repertoires can be summarised as follows:

- Digitalisation as means in governance and in environment
- Digitalisation as a communication infrastructure

In the next section I will proceed to discuss identified stakeholders' salience and stake in both urban development and in digitalisation. This will give insights on an organisational perspective on urban development, who the actors are and what their interest in digitalisation is.

Stakeholders' salience and stakes

Based on the empirical findings in Part III, I have identified several stakeholder groups. These stakeholder groups are presented and analysed in Table 10:1 and Table 10:2 below. Stakeholder typology by Mitchell et al., (1997) have been used as a theoretical point of departure to identify stakeholders. Focus in the analysis is on identified stakeholder group's salience and stake in urban development and in digitalisation. Concerning stakes in urban development, I have divided between stakeholders' salience and stake in urban development in general and in the particular development project as such. In this analysis, stakeholders are those who either can affect or are affected by urban development in general and Vallastaden 2017 in particular (cf. stakeholder, Freeman, 1984). I find it necessary to both discuss stakes in relation to urban development in general, and in relation to the particular development project as such, as many of the global challenges and discussions also are of concern to a local (project) level, (cf. discussions on urbanisation, climate changes, globalisation and the new role of cities, Kievani, 2010; Holden et al., 2008). The studied case is also an example of how a local government by focusing on social sustainability and resource efficiency have targeted global issues on a local level. An illustration of this is the municipality's new model for urban planning, where focus has been on engaging different stakeholders in the process, together with a new approach to land allotments where the municipality monitors developments toward small-scale production. In the stakeholder analysis following stakeholder groups have been identified: policy-makers, local politicians, civil servants, Expo company, architects, developers, energy company, university, and residents. Based on Mitchell et al.'s (1997) stakeholder typology, salience is in this study seen as stakeholders' legitimacy, power and urgency to influence urban development in general and the studied development in particular (the organisational context of urban planning and development). Another assumption in this context is that their salience and stakes in urban development also affect how digitalisation is spoken of and put into practice in these settings. Stakes are conceived as their particular interests in the project and in digitalisation. In the next section I will start out by discussing policy-makers as stakeholders, hence, focusing on the policy practice covered in this study. In this case there are policy-makers both on the outside and on the inside of the project organisation (cf. Gelders et al., 2007) and some of them could be seen as secondary stakeholders, meanwhile others are crucial for the project (primary stakeholders, cf. Kamal et al., 2011), which is typical for public sector projects.

Further in this chapter when discussing repertoires of discourses on digitalisation, we have already seen that different actors (stakeholders) in policy and planning have different interests and foci in urban development and in digitalisation. As these types of projects cross sectorial borders, where both public and private sector organisations are involved, there are also different types of values involved. These values are either part of practices, i.e. ideals and views of what is important in the process and the work, or connected to the end-product, i.e. ideals connected to urban design and construction (norms and cultural-cognitive patterns, cf. Scott, 2014; Zucker, 1991). In prior discussion on different repertoires on digitalisation in this chapter, we have seen values like openness, transparency, participation be promoted in governance processes. Other values like efficiency and productivity have also been promoted in a policy context, these are also values that traditionally are seen as part of economic interests; interests that characterise private sector organisations. In this study, we have seen examples of how these different values also both unites and differentiates different stakeholders' stake in urban planning and development as well as in digitalisation. Hence, this case is an illustrative example of how objectives and values pertaining to different stakeholders compete in practice (Chourabi et al., 2012). I will return to these matters when discussing the identified stakeholder groups below. In Table 10:1 (below) I have summarised policy-makers' salience and stake in urban development and in digitalisation.

Policy practices and policy-makers' salience and stake

Policy-makers as a stakeholder group is multifaceted. Policy-makers are those who set political goals and directions for both urban development and digitalisation (which we have seen examples of in the empirical part in the different policy documents). In policy practices we find policy-makers 1) at different levels (in this study ranging from EU to local level), and 2) within different policy fields (e.g. digitalisation/IT, energy, urban planning). This means that this group of stakeholders is a heterogeneous group. Hence depending on characteristics, different policy-makers have different urgency in claims, as well as different power and legitimacy to influence outcomes in practice (Mitchell et al., 1997). In Table 10:1 this stakeholder group have been divided into three subgroups, EU policy-makers, national policy-makers, and local policy-makers.

When analysing *EU policy-makers'* salience and stake in urban development and in digitalisation, we can note that this subcategory also is multifaceted. First, we have a group of policy-makers whose formal status is high when it comes to setting strategic directions of developments in general in Europe. Second, within this policy practice, we also have policy-makers with special interests and competences, like energy efficiency, digitalisation, governance. We find the same patterns also on national and local level, where we have policy-makers belonging to different ministries, agencies, administrative departments (thus having different roles, competencies, and interests). Policy-makers'

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concerns at this level are connected to global challenges inherited to urbanisation, climate changes, and globalisation, where they focus on a range of areas for actions (e.g. government, environment, communications, industry, education). Hence, on a EU level policy-makers' stake in urban development could be seen to be high, where their claims and urgency to achieve changes could be seen to be high as well. However, their power and legitimacy to influence these matters on national and local levels are often limited. There are a number of studies on smart cities that also acknowledge complexities in governance structures, policy and institutional dimensions (e.g. Chourabi et al., 2012; Alawadhi et al., 2012; Gil-Garcia, Pardo, Nam, 2015). To local project level this stakeholder group could be seen as a demanding (based on categorisation made by Mitchel et al., 1997) and at the same time peripheral stakeholder, where normative claims are put forward in different policy documents. In prior discussion on different repertoires on digitalisation, we have seen that policy-makers' view digitalisation as a means, communication infrastructure and a market. We have also seen that these discourses on digitalisation are institutionalised (taken-for-granted) and thus hard to change (Scott, 2014; Fairclough, 2001). In some policy contexts, discourses on digitalisation are more prominent than in others. In services and functions related the environment, digitalisation is promoted as a means to achieve resource-efficiency, and in governance as a means to deliver public services/render administrative processes more efficient (cf. previous sections above on discourses on digitalisation). Hence, at this level policy-makers appear to have an economic and societal stake in digitalisation. EU policy-makers' power and legitimacy to influence these matters in practice are contingent of other stakeholders, e.g. of the telecom industry to develop communication infrastructure, IT industry to develop technical standards, of governments to set policy frameworks.

When analysing national *policy-makers'* salience and stake in urban development and in digitalisation we find similar patterns to the EU equivalent. On a national level we find policy-makers working within the government (at different ministries) as well as within different agencies (agencies which have different missions, objectives and interests in relation to urban planning). In this study national policy-makers have been represented by one particular ministry (Ministry of Enterprise, Energy and Communications responsible for the Digital Agenda for Sweden, see Chapter 7) and one agency (National Board of Housing, Building and Planning responsible for Visions for Sweden 2025, *ibid.*). At this level policy-makers' focus is of course of national interests', however, many of the actions concern the same areas as on the European level, e.g. government, environment, communications, education. However, due to contextual factors, interests within these areas varies slightly in comparison to European ones. An example of this is investments in infrastructure, where Sweden is one the highest ranked countries when it comes to broadband penetration (cf. OECD broadband statistics). Sweden does not have the same urgency to develop communication infrastructures as other countries in Europe that are lagging behind in infrastructural developments have. In a national

context aims in urban development and in digitalisation are similar to EU one, i.e. to achieve sustainable economic growth. To a local level national policy-makers could be seen as a demanding stakeholder with urgent claims on urban development, but yet limited power and legitimacy to influence local outcomes. National policy-makers have power to influence regulations, e.g. building and planning acts, digitalisation regulations, and normative discourses on desired directions. In this study we have seen two examples of these normative discourses and claims, represented in the two policy documents (Digital Agenda for Sweden and Visions for Sweden 2025). Both normative and regulative discourses have (to some extent) consequences on planning practices and how digitalisation is put into practice in urban planning and development. At the same time, we can note that national policy-makers have no formal power to influence local planning practices (due to autonomy of municipalities). When analysing national policy-makers' stake in digitalisation, we see a similar pattern to the EU equivalent, where their stake in digitalisation appear to be economic and societal.

The third subgroup of policy-makers are *local policy-makers*. When analysing their salience and stake we find more or less reverse patterns from EU level. Local policy-makers are both salient and have high stake in the particular development project. In this case they have also come to have a high stake in urban development in general as they wanted to contribute with a new approach to urban planning and development, spoken of as the Vallastaden model. Hence, their urgency to influence these matters on national level could be seen to be high, however their formal power and legitimacy to do so in practice are still limited. Interestingly in this context, we have seen that social media have become an informal instrument and important means in legitimising the new model and by creating a story around the new model project management also attempts to influence outcomes in the wider context of urban planning and development. The IT artefact have become an important carrier of the discourse on Vallastaden, which could be compared to what Scott (2014) refers to as artefacts as institutional carriers or carriers of messages. The municipality's focus has in this case been on building viable communities and not on digitalisation issues. Focus has been on resource efficiency and social sustainability, in a way targeting many of the policy goals connected to the smart city (Angelidou, 2014; Caragliu et al., 2011). Local policy-makers as a stakeholder group is a definitive stakeholder as they have the power to influence outcomes in practice. Local policy-makers' stake in digitalisation is medium (to high). Their stake in digitalisation concerns creating better services for citizens and to arrange for efficient internal administration. Stakes in digitalisation varies depending on policy-makers interest/focus.

In this section, I have focused on the policy practice and policy-makers' salience and stakes in urban development and in digitalisation. In the next section I will proceed to discuss the project organisation and identified stakeholders in planning practices. Policy-makers are also prominent in this context, which shows that stakeholders' roles are dynamic (Kamal et al., 2007).

Table 10.1. Summary stakeholders' salience and stake in urban development and in digitalisation (policy practice)

Stakeholder group	Stakeholder type	Salience	Stake in urban development	Stake in digitalisation
EU policy-makers	European Commission	Power: Low Legitimacy: Low Urgency: High	EU policy-makers' stake in urban development in general is high, but in the particular project low. They focus on a range of areas for actions (e.g. government, environment, communications, industry, education) with the aim to achieve sustainable economic growth in Europe. This is a <i>demanding stakeholder</i> with claims on urban development but little power to influence local outcomes.	EU policy-makers' stake in digitalisations is medium (to high). They have an economic and societal stake in digitalisation. Stakes in digitalisation vary depending on policy-makers interest/focus.
National policy-makers	Government/agency	Power: Low Legitimacy: Low Urgency: High	National policy-makers' stake in urban development in general is high, but in the particular project low. They focus on a range of areas for actions (e.g. government, environment, communications, education) with the aim to achieve sustainable economic growth in Sweden. This group is a <i>demanding stakeholder</i> with claims on urban development but little power to influence local outcomes.	National policy-makers' stake in digitalisation is medium (to high). They have an economic and societal stake in digitalisation. Stakes in digitalisation vary depending on policy-makers interest/focus.
Local policy-makers	Municipality	Power: High Legitimacy: High Urgency: High	Local policy-makers' stake in urban development and in the particular project is medium to high. They focus on building viable communities which are both resource efficient and socially sustainable. This group is a <i>definitive stakeholder</i> as they have the power to influence outcomes in practice.	Local policy-makers' stake in digitalisation is medium (to high). Their stake in digitalisation is to create better services/administration. Stakes in digitalisation vary depending on policy-makers interest/focus.

Planning practice characterised by a dominant coalition of stakeholders

The project organisation is in this case characterised by a dominant coalition (using Mitchell et al.'s, 1997, terminology). However, stakeholder groups in this coalition have changed over time, which also indicates that these stakeholder groups' saliences have been dynamic (cf. Axelsson, Melin, Lindgren, 2013b; Kamal et al., 2007). In early project phases this coalition consisted of local politicians and civil servants (as parts of the project team behind the project). Much prestige was put in the project from the beginning, where standards were set very high. Hence, to the involved politicians and civil servants the stake in the particular development project could be seen as to be high. When analysing the project team's salience at this stage, it is clear that they possessed all three of the salience attributes (cf. Mitchell et al., 1997), where they had legitimate and urgent claims and the power to influence contents and directions of the project. However, due to national governance models in Sweden they were also dependent of the municipal council to approve idea programs, local plans, quality programs. This means that their power was to some extent limited. A year in to the project a CEO was recruited to the project company (Expo company). This recruitment also meant that project management was changed. This change from a, to the municipal, internal recruited manager to an external recruited one, also meant a change in salience. The new manager could be seen to lack one attribute – legitimacy. Coming 'from the outside' of the municipal family the project manager had no prior relation to the municipal organisation. This also meant that he had a hard time to navigate and to reach in to civil servants in the municipality. This is an example of how salience also is dependent of individual's legitimacy in their roles, and when individuals are changed the role also can change in salience (Kamal et al., 2011).

When analysing *local politicians* as a stakeholder group, this is of course also a complex group. In general, local politicians are those who initiate and decide on large scale development projects (like the studied one). This means that they possess all three of the salience attributes (Mitchell et al. 1997). In this case this stakeholder group was also pointed out by project management itself as powerful group. This study also reinforces this picture. In the beginning this project was sanctioned politically within the municipality, an example of this is that both ruling parties and the opposition had representatives in the supervisory board of the Expo company. However, more than a year into the project, we have seen in the empirical data that the project started to cause a 'political battle' (see the political battle of Vallastaden, Chapter 9). A probable explanation to this conflict could be that the project, being a sort of prestige project, became a political issue in the local elections. However, this conflict influenced the project in the sense that it created uncertainties, uncertainties that the project manager did not have formal power to influence. The results in this case reinforce prior knowledge on the smart city where city management and local government affect

performance significantly (Gil-Garica, Nam and Pardo, 2015; Nam and Pardo, 2011a). Prior research on smart city initiatives also show that political positions impact directions of smart city projects (Alawadhi et al., 2012), which also have been the case in this study. Hence, using Mitchell et al.'s (1997) terminology, politicians as a group could be characterised as a *definitive* stakeholder as they have power to influence not only content and directions of the project, but also its existence. Local politicians' stake in digitalisation is low. However, in their role as policy-makers in the project their stake in digitalisation is marketing and engaging stakeholders in the project.

Civil servants as a stakeholder group is also multifaceted. In urban development projects civil servants have different roles and functions, e.g. as expert roles (city planners, land surveyors), as controllers (working with tender requests and building approvals, cf. Figure 5:2 Typical planning and development processes, in Chapter 5). Consequently, civil servants' stake in urban development vary depending on role and function. And generally civil servants' stake is to do a good job internally within the local administration. In this case in early stages of the project, civil servants work has concerned creation of different plans and programs, e.g. Vallastaden vision, Vallastaden competition program, work with the local plan and the additional quality program (cf. Chapter 8 and 9). Later in the process civil servants have also been involved in work following up on tender and allocation agreements. In the literature we have also seen that policy contexts are identified as vital in smart city developments (Alawadhi et al., 2012; Chourabi et al., 2012; Nam and Pardo, 2011a), however, this is mainly approached from a comprehensive level not focusing on particular functions and roles and how they come to influence outcomes. Results in this study show that civil servants is a group that could be classified as a *dominant* stakeholder group (using Mitchell et al.'s terminology), with power to influence but little urgency to do so. Civil servants' stake in digitalisation vary depending on role and function, to servants that work with digitisation it is obviously high. In relation to the project civil servants' stake in digitalisation is practical as a means to do their job.

When analysing the results, we also in this case find the *Expo company* as a stakeholder group. This company was established by the municipality with the mission to realise the project. Establishing publicly-owned companies to run different projects are not something unique. In effect, the Expo company have also become synonymous with project management in this case. In the beginning project management (like we have seen above) consisted of the policy-makers behind the project, i.e. involved politicians and civil servants. At this stage the Expos company as such did not appear as a salient stakeholder. As the company was managed by civil servants, with an obvious relation to the municipality, organisational borders appeared to be blurred. At this stage project management's salience was high and their stake in the project was obviously high and the company could be seen as the organisational context. However, the change in

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management (recruitment of an external CEO) also had effects on the company, a change that meant that the Expo company became a stakeholder in itself in the project. Studies on smart city initiatives have shown that these types of developments call for interdepartmental cooperation and collaboration (Alawadhi et al., 2012), something which also characterised this project from the beginning. However, in this case a change in roles (cf. project management) also has come to have negative effects on internal municipal collaborations and cooperation (cf. inside and outside stakeholders, Gelders et al., 2007). Consequently, stakeholder salience changed, where the Expo company and project management from the beginning more or less possessed all three attributes (urgency, power, and legitimacy, Mitchell et al., 1997), but through the change in management roles lost legitimacy towards the municipality. Project managements' and the Expo company's stake in the project is of course to deliver an interesting and attractive expo and realise the new approach to urban planning (the Vallastaden model). Hence, their stake in the project is high. At the same time, the analysis show that this group is (have turned into) a *dependent* stakeholder as they are dependent of local politicians for power, their claims are urgent and legitimate. Project management's stake in digitalisation is medium, where their stake in digitalisation is marketing and communicating the project, engaging stakeholders in the process, creating innovative solutions for the expo.

Another salient stakeholder in the project is the local *energy provider* which is also a partner that could be seen as a part of the dominant coalition. This company is also owned by the municipality. However, unlike the Expo company the local energy company is much more self-governed, and in comparison to the project company the energy company is characterised by being a large and profitable corporation in the region. When analysing its salience, in its role as utility provider in the region, this stakeholder's salience is very high. The energy provider decided from an early stage to take active part in the project, and, like local politicians, they set high standards in the project. Subsequently, they took active part in many of the planning activities, e.g. the municipality's dialogue meetings, the university's workshops. They also arranged their own activities, like the hackathon planning or the Innovations Camps (cf. the hackathon that never was, Chapter 9). The purpose of these activities was to develop their own business. Hence, their stake in the project could be seen to be business innovation. A concrete example of their work with innovations is their development of a culvert infrastructure (for electricity, water, sewage, fibre). When comparing this stakeholder with Mitchel et al.'s (1997) salience attributes, this stakeholder possesses all three salience attributes, urgency in claims and legitimacy and power to influence project outcomes (concerning utility infrastructure). This group could be characterised as a *dominant* stakeholder as its influence is assured and their claims lead to actions. This reinforces results Gil-Garcia, Pardo and Nam (2015) have come to in their review on

academic literature and practical tools in the smart city context. One conclusion in their review is that practical tools (indicators/smart city measurements) to a higher extent focus on energy services, meanwhile in academic literature little focus is devoted to the same. In this study, energy services have been salient in the planning practices, as an infrastructure and as a service, where digitalisation has been discussed as an important means for communication with customers. Hence, the local energy providers' stake in digitalisation could be seen as is high, where they mainly see it as a means for business innovation and development.

When analysing *architects'* salience and stake in urban planning and in the particular project, we find some interesting results. First, architects' stake in urban development in general is to deliver viable (and competitive) urban designs. In this case an architect competition was arranged. Arranging competitions in large developments are not uncommon, however, what is more uncommon is the scope given to the winning architects. In this case the winning architects and their design proposal have had a significant role in realising the project. First, the design proposal constitutes the foundation for the municipal work with the local plan. Second, the architect agency has been involved in the exploitation and procurement process when following up/evaluating developers' tenders (as part of the Vallastaden model, cf. Chapter 9). Consequently, the winning architects' stake in the project is high as it promotes their design and their design norm (targeting social sustainability, cf. a design proposal that challenges the market in Chapter 9). This group could be characterised as a *dependent* stakeholder as they in this case were granted legitimacy but yet dependent on local policy-makers for power (decision on the local plan). In later stages in the procurement process their power was reinforced, by also attributing them power and urgency to tender outcomes. Hence, in this case we see another example of how a stakeholder group can change in salience, (cf. Axelsson, Melin, Lindgren, 2013b; Kamal et al., 2007). Another observation to be made in this context is that architects' stake in digitalisation and smart city solution appears to be low or even secondary. The results show that they more or less respond to policy-makers' requests. In this case this has meant that architects reproduce policy-makers' understandings of smart grids. This have been done by reusing descriptions from the competition program in the design proposal (cf. Vallastaden Competition Program, Chapter 8).

Developers as a stakeholder group is also multifaceted. Developers are those who either themselves construct or manage construction processes, this means that they normally have a high stake in urban developments. In general, developers' stake in urban development is to build/deliver/sell viable housing. In the studied case developers together with politicians were identified as very important to the project, and thus prioritised by project management. Information and dialogue with these groups were seen as crucial to project success. Hence, by project management these two groups were

in the beginning attributed all three salience attributes, i.e. power, legitimacy and urgency to influence the project (Mitchell et al., 1997). Consequently, early in the process this group of stakeholders was treated separately by project management and invited to continuous meetings. However, developers as a group is multifaceted, normally consisting of large construction firms or real estate concerns. However, results in this case also show that in this stakeholder category we also find medium-sized real estate companies (both privately- and publicly-owned), architects (small architect agencies to larger agencies), as well as small family-owned real estate businesses. Depending on the type of developer their stake in project varies. In this case the new approach to land allotments showed that the municipality's salience was stronger than the developers' (even though both of them had a stake in it). Developers' stake and salience in the project differ depending on stakeholder type, where private firms' stake is economic and publicly-owned companies' stake is the project. This group is a *dependent* stakeholder as they are dependent of project management and local policy-makers for power to influence, e.g. land allotment processes and agreements. At the same time, it could be seen to be an interdependent relation, where the project also is dependent of the developers to build. In the empirical data, we have for example seen that project management received limited tender offers. In effect, the municipality had to release additional tender requests, resulting in several exploitation and procurement processes (cf. disillusionment in the project, Figure 9:2, Chapter 9). Similar to architects, developers' stake in digitalisation is low to non-existing, where they in this case only appear to respond to policy-makers' requests concerning smart energy production and smart grids. This could also be seen to be a secondary interest from their part, where their primary interest is to build/construct energy efficient housing.

From peripheral to non-stakeholders

In the results we have also seen that there are some stakeholders that are more peripheral or even have become non-stakeholders to the project organisation. The first stakeholder group in this context is the *university*. The university could in the project be seen as a strategic partner as the location of the development was right beside one of the university campuses. Hence, the university's stake in the project was to connect the university with the city. The university was also represented in the supervisory board of the Expo company and took active part in the project from an early stage. For example, the university arranged various workshops to generate ideas that could be fed into the project (see project that seeks broad participation, Chapter 9). To researchers taking part in these arrangements their stake was scientific. However, when analysing the university's salience in the project it could be seen to be medium. Being represented in the supervisory board means that this stakeholder group was granted some power and legitimacy to influence the development. However, the university's urgency in their claims could be seen to be rather low. Using Mitchell et al.'s (1997) terminology this

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stakeholder group could be characterised as *discretionary*. Discretionary in the sense that it has legitimate demands in its role as partner and the knowledge it represents, but no direct power or urgency to influence outcomes. When analysing researchers' stake in digitalisation it could be seen to be medium. In discussions focusing on generating innovative ideas digitalisation appeared as an important dimension (cf. dimension of innovative services, *ibid*, Chapter 9). Researchers' stake in digitalisation is not on the IT artefact, but rather on innovations (cf. prior discussion on discourses in planning practices), hence their stake in digitalisation could be characterised as scientific (focus on knowledge advancements).

Residents' could in this project be seen as a marginalised stakeholder group. Even though this group is an important group, they are 1) hard to engage and 2) it is a heterogeneous group in its own and thus hard to identify. Residents' stake in urban development could be seen to be contingent of interest in moving to the area. If there is an interest in moving to (either building or buying a house, apartment) stakes are higher, but yet very low. Hence, residents' stake in urban development in general could be seen to be low and in this particular project very low. Even though the project had an explicit ambition to involve citizens in the project from the early phases this stakeholder has not been salient in the project, thus this group could be seen as a non-stakeholder in this case. This also implies that residents' stake in digitalisation in this context is low and almost non-existing. A probable explanation to this is ignorance in the area.

To sum up this discussion, we can note that stakes vary depending on stakeholder group, however, stakes in digitalisation are in general very low and a secondary issue, especially in planning practices.

Table 10.2. Summary stakeholders' salience and stake in urban development and in digitalisation – planning (and building) practice (to be continued)

Stakeholder group	Stakeholder type	Salience	Stake in urban development	Stake in digitalisation
Local politicians	Municipality	Power: High Legitimacy: High Urgency: High	Local politicians' stake in urban development in general is medium to high and in the particular project high (a prestige project with high ambitions), where their stake is the project as such. This group is a <i>definitive stakeholder</i> as they have power to influence contents and directions of the project, cf. the political discussions and disputes on the project.	Local politicians' stake in digitalisation is low. However, in their role as policy-makers in the project their stake in digitalisation is marketing and engaging stakeholders in the project.
Civil servants	Municipality	Power: High Legitimacy: High Urgency: Low	Civil servants' stake in urban development in and in the particular project varies depending on role and function. Generally civil servants' stake is to do a good job internally within the administration, e.g. forming different programs (visions to quality), following up on tender and allocation agreements. This group could be seen as a <i>dominant stakeholder</i> with power to influence but little urgency to do so.	Civil servants' stake in digitalisation varies depending on role and function, but is in general low. Servants who are engaged in the project their stake in digitalisation is practical as a means to do their job.
Expo company (project management)	Publicly-owned company	Power: Medium Legitimacy: Medium Urgency: High	Project managements' stake in urban development in general is to deliver an interesting and attractive expo and a new approach to urban planning (Vallastaden model). Their stake in the project is high. This group is a <i>dependent stakeholder</i> as they are dependent of local politicians for power, their claims are urgent and legitimate.	Project management's stake in digitalisation is medium, where their stake in digitalisation is marketing and communicating the project, creating innovative solutions for the expo.
Architects	Private firm	Power: Medium Legitimacy: Medium Urgency: High	Architects' stake in urban planning in general is to deliver viable designs. The winning architects' stake in the project is high as it promotes their design norm. This group is a <i>dependent stakeholder</i> as they are dependent of local policy-makers for power (decision on the local plan), their claims are legitimate in the planning and follow up on land allotments.	Architects' stake in digitalisation is low. Their stake in digitalisation is secondary where they respond to policy-makers' requests.

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Table 10.2. Summary stakeholders' salience and stake in urban development and in digitalisation – planning (and building) practice

Stakeholder group	Stakeholder type	Salience	Stake in urban development	Stake in digitalisation
Developers	Private firms / publicly-owned companies	Power: Medium Legitimacy: High Urgency: Low	Developers' stake in urban development is in general high, where their stake is to build/deliver/sell viable housing. Their stake and salience in the project differs depending on stakeholder type, where private firms stake is economic and publicly-owned companies is to contribute to the project. This group is a <i>dependent stakeholder</i> as they are dependent of project management and local policy-makers for power to influence, e.g. land allotment processes and agreements.	Developers' stake in digitalisation is low. Their stake in digitalisation is secondary where they respond to policy-makers' requests.
Energy provider	Publicly-owned company	Power: Medium Legitimacy: High Urgency: High	The local energy provider's stake in urban development is in general and in this particular project high. Their stake in the project is to come up with innovative and viable utility infrastructures (cf. culvert for electricity, water, sewage, fiber). This group is a <i>dominant stakeholder</i> as its influence is assured and their claims lead to actions.	The local energy providers' stake in digitalisation is high. Their stake in digitalisation is business development.
University	Public organisation	Power: Low Legitimacy: Low Urgency: Medium	The university stake in urban development in general is high and in the particular project medium. Researchers stake is academic meanwhile the university in its role as partner in the project its stake is to connect the university with the city. This group is a <i>discretionary stakeholder</i> who has legitimate demands thanks to its knowledge, but no power and urgency to influence outcomes.	Researchers' stake in digitalisation is medium. Their stake in digitalisation is scientific.
Residents	Citizens	Power: Low Legitimacy: Low Urgency: Low	Residents' stake in urban development and in the particular project is low. Even though the project had an explicit ambition to involve citizens in the project from the early phases this stakeholder has not been salient in the project and thus their stake is not visible. This group is a <i>none stakeholder</i> .	Residents' stake in digitalisation is low in this context.

Implications of institutional patterns and elements

When analysing institutional patterns and elements in urban planning and development and how they affect digitalisation, this study shows that this context is highly institutionalised. The different processes and practices are characterised by all three of Scott's (2014) institutional pillars; regulative, normative and cultural-cognitive. In this institutionalised context digitalisation discourses are subordinate and minor. The results also show how these institutional patterns and elements, i.e. the taken-for-granted like shared rules, actors, activities and relationships (cf. Barley and Tolbert, 1997), come to the "surface" when changes in them are targeted. In the studied case local policy-makers' goal was to change 1) urban planning processes, and 2) urban design patterns. However, changing institutionalised practices and processes is complicated, something which smart city literature also point to (e.g. Nam and Pardo, 2011a; Alawadhi et al., 2012; Chourabi et al., 2012).

First, changes in the planning process have in this study meant formation of a new urban planning approach (called the Vallastaden model). One characterising feature of this model is engagement of citizens and different stakeholders in the planning process. On the one hand, this participatory approach meant a change in governance systems, going from departmental dialogue to interdepartmental dialogue and external dialogue (see previous section on stakeholders' salience and stake). On the other hand, the new approach also meant a change in need focus, where local policy-makers have turned from internal (municipal) needs to citizen and other stakeholder needs. Using institutional terminology, these changes could be described as changes in governance systems as well as in normative systems (Scott, 2014). In this particular context digitalisation was by policy-makers seen as an important means in realising parts of the new governance system (as a means for citizen and stakeholder participation), thus digitalisation was attributed a symbolic value in this context. In practice, however, incentives to engage (through these means) are low (which we have seen in my earlier discussion on residents/citizens as stakeholders). Hence, this is an example of how different practices/contexts are characterised by different values (cf. practices/contexts in which different stakeholders have different stakes) and by launching a new model for urban planning (the Vallastaden model) these institutional elements and patterns also become noticeable. Consequently, changes in the governance system (Scott, 2014) has in this case also meant coordination and collaboration between stakeholders belonging to both the private and public sector (cf. societal sectors, Scott and Meyer, 1991). This could be seen as an example of how policy goals are turned into action (cf. call for dialogue between public and private sector in planning, cf. Vision for Sweden 2025).

Second, the new approach to urban planning also entailed changes in urban design, where local policy-makers targeted social sustainability as design norm (normative

element in its own). When analysing this the results show that (the winning) architects and policy-makers in this case had a shared understanding of what a desirable urban design (cf. normative elements, Scott, 2014; Ahrne and Brunsson, 2006). This design also became an instrument in the new governance system. First, as the design was foundational for the local plan, this meant that land allotments were regulated. This regulation also appeared to be normative where local policy-makers (local politicians together with civil servants) wanted to monitor production from large-scale to small-scale production, and to open up constructions for new actors (cf. Chapter 9 Vallastaden model). In addition to regulating land allotments, project management also launched a new control system to evaluate and follow up on land allotment agreements, a control system which monitored on quality instead of pricing. This change appears to be unique and had several consequences in the project and to the involved stakeholders. Institutionalised practices once again became visible, where changes in practices also meant that several stakeholders opted out and new ones entered. Consequently, in this study medium to large-scale development companies (e.g. large constructions firms, real estate companies) chose (from the beginning) not take part in the development as they did not see any economic value in doing so. Instead, from their point of view they saw this particular project as costly and aggravating. However, for small-scale companies, like architect firms or small property owners, Vallastaden became a window of opportunity to enter a market and expand business. Hence, in this case local policy-makers (local politicians together with civil servants) targeted changes concerned both regulative patterns and elements as well as normative ones (cf. Scott, 2014) and these changes also have come to have consequences on normative systems and cultural/cognitive systems (cf. Scott, 2014; Zucker, 1991).

Finally, if changes are to be achieved and if digitalisation is to become a prominent discourse in practices of urban planning and development, we need to understand and acknowledge both the institutional elements and the different stakeholders that come into play in this context. Like we have seen in research on smart city developments digitalisation is a question of an interplay between policies, institutions, and management (Nam and Pardo, 2011 a-b; Alawadhi et al., 2012). Normative discourses are not to be underestimated as they appear to be emphasised in practice. However, so far discourses on digitalisation appear to be secondary to /or subordinated in comparison with discourses on social sustainability and resource efficiency.

In the sections above I have discussed the range of repertoires of discourses on digitalisation in policy and planning practices of urban development. I have also discussed organisational implications of stakeholders' salience and stake in urban development and in digitalisation, and how the wider institutional context influences the same. In the next section, I will continue to discuss how these issues could be understood and handled in the future.

How to understand digitalisation and urban planning in a smart city context

Given the discussion above, the prevailing discourse on digitalisation in policy and planning of urban development is to see digitalisation as means to achieve different things in different city contexts (services/functions). This study shows that two areas are prioritised in planning practice, i.e. governance (e.g. as a means to engage and involve citizens in planning, as a tool to gather/distribute information/data) and in environment, especially in energy management (e.g. as a means to manage and control energy production, cf. Figure 10:1 and 10:2). The smart city has emerged as an approach in urban planning targeting these matters (Angelidou, 2014, Komninos, Schaffers, Pallot, 2011). Consequently, like I have discussed above, in practice several frameworks have been developed to manage and evaluate smart city progress (Giffinger et al., 2007). In research focus has been on conceptual frameworks on how to understand smart city initiatives (Alawadhi et al., 2012) and identification of core components of a smart city (Gil-Garcia, Pardo, Nam, 2015; Nam and Pardo, 2011a). Digitalisation is *one* component/dimension among others in the smart city, others are economical and political, social and environmental sustainability (Caragliu et al., 2011; Chourabi et al., 2012). This study also shows that many of the components or dimensions of the smart city are not new to urban planning and development. On the contrary, many of the dimensions characterising the smart city have already been covered in urban planning and development – yet – in different policy practices and thus being parts of separate policy discourses, meaning that they have not been gathered under a common umbrella (like the smart city). We have also seen that the division of policy discourses have done that repertoires of discourses on digitalisation vary in prominence depending on context/practice. However, the smart city could be seen as an attempt and approach to bridge gaps between different policy discourses on urban planning and development and digitalisation. As we have come to see in this study, institutionalised discourses are hard to change (Fairclough, 2001; Scott, 2014). As digitalisation is an issue crossing sectorial and organisational borders, and that it primarily is seen as a means or an infrastructure, makes it a secondary issue in urban planning and development. Consequently, new steps in line with the intelligent city (Komninos and Sefertzi, 2009), the ubiquitous city (Nam and Pardo, 2011a) and eventually the smart city appear to take time to realise in practice. If we, in the context of urban planning and development, want to take actions in line with the smart city and make use of the opportunities that digitalisation entails and make a better world with ICT (Walsham, 2012), we need to address these variances in discourses.

If smart city discourses are to prevail in practice, it is important that such developments learn from prior IT developments. However, I argue and some with me that the city as an arena for smart developments puts even more pressure on local governments and stakeholders involved in the development to understand implications of digitalisation

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(cf. Viitanen and Kingston, 2014; Kitchin, 2014; Hollands, 2015). I argue that these types of developments are complex and examples of what Dawes (2009) refers to as dynamic and open socio-technical systems. Hence, these developments not only call for an understanding of technical components, e.g. different technologies and complexities in systems integration, but also other components in the context of use, e.g. data and information resources, human elements, societal elements, governance systems (component which also have been acknowledged in smart city literature, e.g. Gil-Garica, Pardo, Nam, 2015; Alawadhi et al., 2012). Even though we have seen different frameworks on how to understand smart cities, I argue that these still focus on components and their relations, but not so much on a multi-dimensional view. Hence, in Figure 10:3 below I have developed a tentative model to approach digitalisation in a smart city context. This tentative model is aimed at policy-makers as an instrument to understand and pinpoint what digitalisation is, where it can be applied, what governance levels are involved and how to approach them. This multi-dimensional model is based on a sociomaterial view (Orlikowski and Scott, 2008; Cecez-Kecmanovic et al., 2014 with its roots in the sociotechnical), meaning that the social cannot be separated from the material. Further, I argue that discourses are an example of this, where we by using language both construct and construe understandings of the social reality at the same time (cf. Burr, 1995; Berger and Luckmann, 1966), and this also applies to material things like an IT artefact. Based on these assumptions, I argue that we need not to have a too narrow view of digitalisation in the context of urban planning and development, nor should we black-box the IT artefact (like we have seen examples of in the Vallastaden case in this study). Instead, we need to focus on relational aspects between objects, people and technologies and taking different dimensions into account at the same time, i.e. governance dimensions, application dimensions and digitalisation dimensions.

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Figure 10.3. Tentative multi-dimensional model of digitalisation in a smart city context

A central dimension in the model above is *humans*. I argue that humans (in different roles) are central to both urban development and to developments that involve IT artefacts. Human activity (cf. social practices) is both part of the development process as well as the goal of the development (use). A basic idea underpinning the model above is thus that social activities cannot be separated from their context of use. Hence, the illustration of humans inside the model. Developments have to depart from user a perspective, understanding different user (stakeholder) needs.

Closely linked to the human dimension is the *application dimension*. In order to develop viable smart city solutions, we need to understanding digitalisation in its context of use (see Figure 10.3). In this study we have seen that smart city developments have a holistic approach to urban development (e.g. Gil-Garcia, Pardo, Nam, 2015). Subsequently there is an expectation that digitalisation can be used to integrate and coordinate data on activities between different city services and functions. This is a complex thing to achieve as this not only presupposes contextual knowledge and understanding, but also understanding of different stakeholders' stake, as well as understanding of institutional patterns and elements (like we have seen in my prior discussion).

In this study we have seen that the smart city also entails a new wave of technology developments, i.e. embedded systems and wireless networks (cf. Schaffers et al., 2013). The *digitalisation dimension* in the figure above targets different aspects of recent technology advancements, i.e. future internet, internet of things (cf. Komninos, Schaffers,

Pallot, 2011; Anthopoulos and Fitsilis, 2012). In this context different layers are targeted, instrumentation pertaining to equipping cities with necessary tools to deliver services (cf. Gil-Garcia, Pardo, Nam, 2015). Examples of tools are sensors, smart devices used to collect data and information (cf. Allwinkle and Cruickshank, 2011). Additional layers are interconnection and intelligence, where the purpose is to connect physical networks with software systems (cf. Harrison et al., 2010) to be able to process and make use of gathered data on city activities (Kitchin, 2014). However, even though capabilities exist this still is a complex design issue, where contextual and human aspects need to be addressed. In the figure above issues of digitalisation need to be addressed on different levels (local, national, and EU/global), concerning standards and interoperability, which I will discuss more below in relation to the governance dimension.

In the literature on the smart city governance issues have been identified as vital to success (e.g. Gil-Garica et al. 2016; Gil-Garica, Zhang, Puron-Cid, 2016). In this study we have seen that many issues related to digitalisation call for actions on different levels. In this context, issues related to interoperability are the most prominent and urging. Hence, the governance dimension focuses in this figure on interoperability issues and where they are to be targeted. Interoperability, like we have seen in this study is multifaceted. Goldkuhl (2008), for example, categorises interoperability into four categories; judicial, organisational, semantic and technical. Judicial interoperability concerns regulations and/or frameworks connected to digitalisation. Organisational interoperability concerns governance systems (alignment of work processes, values and goals, understandings, collaborations). Finally, semantic and technical interoperability concern alignment of concepts and technical standards. All of these issues are important to take into account in smart city developments.

In this study we have seen that in planning practices of urban development digitalisation is not a prioritised issue, nor is it explicitly addressed in discussions. At the same time, we have seen that digitalisation underpins ideas and discussed solutions, almost exclusively as a means to achieve/do something else, i.e. deliver services, communicate, engage. This also means that the technology is black-boxed (cf. seeking the IT artefact, Orlikowski and Iacono, 2001). This also indicates that discourses in practice appears to focus on application rather than the technology as such, only taking one dimension (see Figure 10:3) into account. Perhaps this would not be a problem if the receiver of such information is knowledgeable on digitalisation issues. In urban planning however, the receivers of such information often have a background as a land surveyor or city planner, or architects of some sort, which does not necessarily mean that they have knowledge about sociotechnical implications of digitalisation. This lack of knowledge together with a dependence of other stakeholders to implement digital solutions shows that:

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- Digitalisation needs to be a priority also in the practice of urban planning.

In the studied case we have also seen that digitalisation is a prioritised issue on the political agenda, however, as the prevailing repertoire is to see it as a means to be applied in different service contexts/functions, it sometimes tends to fall between the “cracks” in both policy and practice of urban planning and development. This lack of coordination within local administrations shows that:

- Digitalisation needs to be part of a “control structure” in planning processes (e.g. a requirement for exploitation and procurement)

In order to design and implement viable solutions for the future, we need (like Viitanen and Kingston, 2014; Kitchin, 2014; Hollands, 2015) also to caution against a too technocratic view of the city and the design and use of digitalisation in this context. Urban planning and development can learn from insights within the IS field, and from electronic government in particular where focus has been on engaging citizens in development processes (cf. user involvement in e-services, Lindgren, 2013; Axelsson, Melin, Lindgren, 2013). In this particular study we have seen an example of a development project where different stakeholders through citizen dialogues, dialogue meetings, workshop cafés, have been engaged in the project. However, what is striking is that one group of stakeholders have had little influence (however often spoken of in third person but not there in first person,) and that is future residents. This reinforces what IS researcher already have seen in IS developments where citizen needs are guessed and not really analysed (cf. talk about rather than talk to citizens, Axelsson and Melin, 2007). This lack of focus on residents' needs is crucial in order to develop viable smart city solutions, therefore:

- Digitalisation needs to be addressed from a user perspective, departing from user needs.

At the same time, there is a risk of solely focusing on user needs as users tend to be “stuck” in patterns and usages that characterise today's versions of digitalisation, something which this study also reinforces (cf. the limited range of repertoires on digitalisation identified in this study). Therefore, it is also recommended to take impression from technology developments and major technology advancements in order for leaps in developments to occur.

In this chapter I have analysed and discussed the results of this study. In the next chapter I proceed to the conclusions and areas for future research.

Chapter 11: Conclusions and future research

In previous chapter (10) I have addressed the three research questions one by one. In this final chapter my aim is to summarise and draw conclusions from the insights made in the analysis and discussion of these questions. I will also elaborate what I see as important implications of this study for research and practice. The chapter ends with reflections and suggestions for future research and work on digitalisation in urban planning and development.

Conclusions

Urban planning and development face many challenges and wicked problems, and in this context digitalisation has the potential to transform the city and improve many of its services/functions in the future, thus realising the smart city. However, this study has showed that transformation is not an easy task as 1) it involves many stakeholders and institutions, and 2) it takes place in an environment that is highly institutionalised, and 3) that discourses on urban development and digitalisation are institutionalised and as such hard to change.

In this thesis I have investigated how digitalisation has been spoken of in the context of urban planning and development and the smart city. The aim was to identify and analyse repertoires of discourses on digitalisation and how they can be understood in this context (ranging from different policy levels and foci to different stakeholders in planning practices). Hence, an analysis of discourses was carried out where two discursive practices were covered and analysed, i.e. a *policy practice* on digitalisation and urban development and a *planning (and building) practice* on digitalisation in an ongoing urban development project called Vallastaden. By investigating digitalisation in these two practices I in this study have been able to cover 1) a policy-making perspective, and 2) an implementation perspective on digitalisation in urban planning.

In this study we have seen that some discourses on digitalisation are more prominent than others. First of all, we have seen that in both policy and planning practices digitalisation is either spoken of as

- a *means* to achieve/do things, or
- a *communication infrastructure*

These two repertoires of discourses on digitalisation are taken-for-granted and produced and reproduced in the different practices of urban development, which makes them powerful and hard to change. I see three consequences of the presence of these

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repertoires. First, by referring to digitalisation as a means this also entails that the IT artefact is black-boxed. Second, by being dominant repertoires it also means that other discourses are pushed back. Third, these repertoires limit our understandings and views of the IT artefact. Hence, this is an illustrative example of how language and language use is fundamental in how we construct and construe understandings of phenomenon in the social world, i.e. in this case how different stakeholders in urban planning and development perceive and make sense of digitalisation.

Furhter, in the context of urban planning and development, this study has shown that repertoires on applications of digitalisation are most prominent in relation to services/functions connected to

- *environment* and *energy* services in particular (targeting *resource efficiency*)
- *governance* and *administrative* services in particular (targeting *participation, transparency*)

Same insights can be drawn in this context. These two repertoires of discourses on where digitalisation is to be applied are produced and reproduced in different practices of urban planning and development. Hence, other application areas and uses are pushed back. In this context I see two consequences of these repertoires. First, in these repertoires on applications the IT artefact is seen as a tool that can be engineered, designed and used to solve different problems in practice. This indicates a simplistic and technocratic view of the IT artefact, not taking into account sociotechnical complexities and dynamic aspects of these systems. In sum we can note that discourses on digitalisation are more prominent in policies than in practice. This is perhaps not a surprising finding and it could even be explained by the policy implementation gap.

This study shows that stakeholders involved in urban planning and development have different salience and stakes when it comes to urban development and digitalisation. In this study we have seen how stakeholders can be divided into different stakeholder groups. Different stakeholder groups have different stake in both urban development and in digitalisation. One conclusion to be drawn from this study is that in the context of urban planning, involved stakeholders' stakes in pushing digitalisation are minor in comparison to stakes in pushing urban development. In planning practices digitalisation is treated as a secondary issue, both in the policy making part of the planning as well as in actual discussions (and treated as a separate discourse). Instead, focus in planning practices has in this case been on social sustainability and resource efficiency and in these contexts digitalisation is either used or spoken of as a means to achieve/do something, or referred to as a communication infrastructure. Based on this study we can also note that discourses on the smart city still have not prevailed in practice and as long as these practices are institutionalised, i.e. settings characterised by different actors,

routines, roles, activities and relationships, settings with shared values and norms connected to urban development and in urban planning, changes toward a smart city are unlikely to take place.

Reflections on quality and knowledge contributions

This study draws upon qualitative and interpretative work (Walsham, 1995, Eisenhardt, 1989) with a constructionist aim (Burr, 1995). This means that the results of this study are results of a sophisticated work with research methodology, a set of theories and empirics. This section deals with the overall quality and consistency of this work by discussing it in relation to steps and criteria for conducting and evaluating qualitative research (Cresswell, 2014) and by addressing the knowledge contributions (cf. Goldkuhl, 2011) in general.

Quality and consistency

In Chapter 2 I addressed significant features of qualitative analysis, e.g. coherence and consistency, abstraction and generalisations, and how these were to be approached in this study. In this section I will discuss these criteria in relation to the presented work.

Coherence and *consistency* could be seen to target three different things in the analysis. First, it is about interpretations of results. My way of targeting consistency in interpretations has been by providing the reader with different elements of coding in the descriptions of the empirical data. These elements have been the foundation for the identified repertoires. When presenting the empirical data, I have also included quotes and examples as way of providing the reader “elements” from the interpreted material. Coherence and consistency is also about how well I as researcher manages to communicate results. My way of targeting communication has been 1) by providing the reader with summaries and reflections in relation to different dimensions of urban development, 2) by illustrating results in figures and tables. However, at the end interpretations are still a product of the researcher which means that I also am a part in constructing and construing (Berger and Luckmann, 1966) what digitalisation is in the studied context. But by providing the reader with “details” on how I have come to the results in this study, I also open up for the reader to evaluate and question my constructions. I am aware that these constructions can vary depending on perspective.

A critique that could be put forward in this context is that coding and interpretations are dependent of the chosen documents and the studied project. This is a critique that applies to any research with a qualitative interpretive approach. However, the point in this context have not been to statistically generalise the results to a population, but rather to contribute with the particular. In this case this has meant to identify the taken-for-granted/common sense meanings, representations used to characterise digitalisation in particular practices of urban planning and development, which also is in line with

discourse analysis. The identification and abstraction of repertoires could be seen to consolidate knowledge within IS research. Different theories have been a vital part of in the work with *abstractions* and *generalisations* in this study. First, theory has played an important role in the process of working with data collection and analysis (cf. Eisenhart's, 1989 and Walsham's, 1995 discussions on the use and role of theory in qualitative research). In an early stage research on the smart city and discourse analysis functioned as guiding devices, i.e. helping me to understand the context which at the moment was unexplored from my part. Second, the work with developing a framework for analysing and understanding digitalisation in this context, has also been characterised by an iterative work between empirics and theory. Writing up the material in the end has also been a process in its own, where codes, repertoires and concepts have been refined and consolidated (cf. iterative synthesis, Stake, 2010). Eisenhart (1989) means that theory also can be an output of qualitative research. In this study I see my analytical framework (DiSSIPE framework) as a product in its own (hence a theoretical contribution), a framework that can be used to analyse other topics in other settings e.g. open data, smart grids to investigate how these are constructed and construed through discourses in specific practices (see knowledge contributions below).

Knowledge contributions

Knowledge contributions addressed in the introduction of this study were categorised as *descriptive*, *explanatory* and *prescriptive* (Goldkuhl, 2011). This thesis has been organised in four parts, where the first part covered aim and scope and research design. The second part focused on theoretical foundations for this study. The aim in the theoretical foundations was on the one hand to provide with a theoretical account of smart cities, and on the other hand to provide with theoretical accounts on different theoretical lenses used to analyse and understand repertoires of discourses on digitalisation in the context of urban planning and development. These lenses were discourse analysis, stakeholder theory and new institutional theory. Hence, this part of the study contains both *descriptive* and *explanatory* knowledge on these matters. Based on accounts in Chapter 5 an analytical framework for identifying and analysing discourses, stakeholders' salience, and institutional patterns and elements (DiSSIPE framework) was generated. This framework could be seen to contribute with *prescriptive* knowledge on how to analyse how digitalisation is spoken of and used in policy and planning practice of urban development. However, as a consequence (not anticipated from the beginning), the application of this framework have also resulted in *critical* and *normative* knowledge on digitalisation discourses in the studied practices. The framework has both been used to structure and to understand the empirical case, and this has resulted in descriptive and critical knowledge on repertoires of discourses on digitalisation in the studied context, as well as explanatory knowledge on how these discourses are constructed and construed by different stakeholders in different

institutional practices of urban planning and development. Based on these findings I have developed a tentative model to approach digitalisation in the context of urban planning and smart city contexts. This model is based on a sociotechnical view technology and could be seen as a prescriptive contribution. The model together with the identified discourses on digitalisation in urban development and planning could also be seen as contributions to literature on smart cities. Last but not least, I think that the results of this study can be of interest for practitioners in the area, e.g. policy-makers (at different levels), city planners and local politicians working with urban planning and development and who are interested in smart city developments and want to learn more about digitalisation. Hence, my contributions could be summarised as follows:

- In relation to smart city research, I contribute with a discourse perspective on the smart city, where different repertoires of discourses on the smart city, and digitalisation in urban planning and development have been identified, described and analysed.
- In relation to information systems research, I contribute with a contemporary and unique case study covering policy and planning practices in urban development and how IS/IT is spoken of and used in these contexts. Uniqueness in the case study concerns coverage of different policy levels (EU to local) in combination with types of policies (urban development policies and digitalisation policies), where both a distinct and intertextual analysis have been carried out.
- In relation to ISR and smart city research, I contribute with an analytical framework – DiSSIPE framework, which can be used to analyse other topics in similar contexts.
- In relation to practice, I contribute with a narrative account of the project of Vallastaden and an example that policy-makers and other stakeholders can learn from in the future.

Future research

In this section topics for further research are presented. Based on this study I see several themes/areas that could be of interest for further research. First, the smart city as a phenomenon, concept and approach is only in its infancy. It is only until recently that researchers, policy-makers, and the IT industry have started to make use of the concept. This also means that there is no unanimous interpretation of the smart city. There is still a need to further explore the concept in research, where I think we need to apply an interdisciplinary perspective. Different research fields can contribute with different aspects and knowledge on the phenomenon. Digitalisation being one dimension of the smart city motivates as such further research from an IS perspective. From an IS perspective interesting topics for further research could be to explore and critically analyse information systems/information technology 1) by unpacking what the IT artefact is in the context of the smart city, 2) by focusing on design issues connected to

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the smart city, 3) by focusing on potential consequences of the smart city, and last but not least 4) by focusing on ethical considerations of the smart city. Ways to approach these aspects in practice could be through in depth case studies and/or comparative case studies on smart city developments. I also see that in this context it is important to cover and explore different perspectives, e.g. policy-making perspective, developer perspective, provider perspective (IT provider, energy provider). By focusing on different perspectives together with different stakeholders we can gain insights on understandings, values, incentives, interests in the smart city.

One contribution of this study is the DiSSIPE framework. In the analysis of the studied case in this thesis the framework has proven to be useful in identifying and analysing repertoires of discourses on digitalisation and understanding them in their organisational and institutional context. However, I see this as a first test of framework, but in order to validate its usefulness it needs to be applied in other settings/contexts with other topics in focus. Hence, a potential topic for further research is to use this framework to analyse discourses on smart cities and smartness in policy and planning of urban developments. This could be a future ground for conducting a comparative case study, where we can gain insights on policy shifts concerning the IT artefact in the context of urban planning and development. Another contribution in this study is the tentative model presented in Chapter 10. This model targeted several dimensions of digitalisation and urban planning in a smart city context. This model is still at an early stage and work needs to be done in relation to all dimensions. Hence, another topic for further research is to further explore dimensions of this tentative model.

The smart city – how smart can 'IT' be?

Finally, returning to the question posed in the heading of this thesis – The smart city – how smart can “IT” be? Well, I think the answer to this question is twofold. First, theoretically speaking we can establish that information technology or digital resources have no limits, however as long as discourses on digitalisation only concern digitalisation as means to do/achieve other things, and thus black-boxing the IT artefact as such, a leap in smart city advancements are unlikely to take place in practice. Second, today's practices of urban planning and development are characterised by a number of stakeholders with different salience and stakes when it comes to digitalisation and these practices and discourses are institutionalised and hard to change. Digitalisation and smart city solutions are not prioritised issues in these practices (yet), and as long as these discourses do not prevail in practice technical advancements will continue to be emergent. Finally, I also think that my question evokes an ethical aspect of IT developments in a city context, that is what kinds of advancements do we as citizens, residents, workers want and not want? What are the ethical implications of using IT in this context?

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