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Together on a journey of discovery towards a better future?

AN EXPLORATORY STUDY INTO COLLABORATIVE GOVERNANCE IN PUBLIC-PRIVATE PARNTERSHIPS WITHIN THE DEVELOPMENT OF SMART CITIES

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Summary

While smart cities offer promising new opportunities for governments, their citizens and industries, finding the investments and knowledge to support such opportunities can be a complex business. One strategy of public bodies to generate investments and knowledge, involves bringing the private sector into the fold. The engagement of private actors to public initiatives is often done by cooperative arrangements, which are called public-private partnerships (PPP's). They are established for benefiting both the public and private sector. However, bringing these two different elements together can also prove to be challenging in practice. One predominant challenge that has been noticed has to do with achieving a strategic alignment between the key actors of smart city development in public-private partnerships like the municipalities and the industry.

Over the past decades, a new approach of governance called 'collaborative governance' has emerged. This strategy of governance focuses on bringing multiple stakeholders together in order to engage in consensus-oriented decision making and planning.

The research has been done accordingly to the Collaborative Governance Framework of Emerson, Nabatchi and Balogh. According to this framework, it is necessary to understand how interaction between stakeholders, functions within governance systems.

The aim of this study was to identify what dynamics of collaboration within the framework can be found in public-private collaboration and what role they play in smart city developments oriented towards the collaboration between public bodies and industry through partnerships. Therefore, these 'collaboration dynamics' and its composing dimensions were the central topic of this research study.

The study has been done by an exploratory research where the aim was to use qualitative research methods in order to study as much information of interpretations and perceptions of the selected organizations. The results of this study are therefore rather than giving concrete solutions, more based on contributing to existing theory and knowledge and possibly find interesting new insights that have not been highlighted in current literature.

The findings have shown that collaboration is strongly based on the underlying interests and relations of the involved people and really goes to the very base of the interaction. The collaboration dynamics play a role in the multiple layers of collaboration in practice that starts at the very beginning but should constantly be considered as the dynamics at the beginning also influence the collaboration at the end. Without proper attention and understanding of the collaboration dynamics, public-private collaboration within smart city development will remain on weak pillars which will result in stumbling blocks and limitations on multiple domains in practice.

Preface

This research stemmed from my interest in urban planning, innovation and technology.
The research that you have in your hands is the final product of my acquired interdisciplinary knowledge during the master's program Spatial Planning at the Radboud University Nijmegen. Writing the thesis was not always easy and I have experienced the necessary challenges. However, I can say that I have learned a lot from this research process and every part of it was interesting and challenging to do. After a lot of brainstorming and a very broad start, I finally managed to ship the research to results and a final version that I am proud of as a researcher.

First of all, I would like to sincerely thank my supervisor Mr. Peter Ache. Mr. Ache has given me the guidance I need as a student, where I get enough space to conduct my own research, but when necessary I can always knock on the door for critical feedback that never overlooks even the smallest details. My head often goes in all directions and the supervision has ensured that I have learned to be able to convert doubts and broad thoughts into simple thinking that often led to the most interesting outcomes. I can say with certainty that this research process in combination with the guidance of my supervisor has resulted in a significant improvement of my academic and research skills.

In addition to my supervision, I would also like to thank the respondents of my research, who, despite this difficult period of time, still offered their help and participation to my research.

At last, a few people also deserve my gratitude, Greta Gasperini, my initial partner in the research process that always offered help and feedback, and Remo Schimmel and Martijn Mes, who gave me the opportunity to ask for advice on specific questions and to give a fresh perspective from the outside every now and then.

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1. Introduction

1.1 Background

Cities are the base of more than half of the world's population and when looking at the future, they are expected to add another 2.5 billion new citizens by the year of 2050 (McKinsey & Company, 2018). Cities are continuously and rapidly growing and are confronted with increasing challenges such as environmental pressures, infrastructure needs and a growing demand from citizens to deliver a better quality of life and to do so at sustainable costs (McKinsey & Company, 2018) (Giourka et al., 2019) (Angelakoglou et al., 2019). In order to face these challenges, cities can initiate the development of smart technologies, and currently they are already being enabled globally as the next wave of public investments (Bélissent, 2010). Smart technologies can for example be used by governments on different scales, to respond to environmental challenges such as fluids, or creating better mobility facilities within cities (Bélissent, 2010).
When transforming a city into a 'smart' it asks for the interaction between different actors, both from the private and public sector, as well as the citizens and knowledge institutions that takes place at multiple scales (Bélissent, 2010).
Therefore, city makers and developers have to be able to interact with various different stakeholders, both within the city or on a larger scale if they want to transform their city and successfully reach their visions. Moreover, smart city initiatives and projects often require multiple sources of investment. Attracting appropriate sources of capital for a given project requires effort, innovation, knowledge and an understanding of the project's fundamental elements (Zygiaris, 2013, Angelakoglou et al., 2019). While the smart cities movement offers promising new opportunities for governments, their citizens and businesses, finding the investments and knowledge to support such projects can be a complex business. One strategy of public bodies to generate investments and knowledge, involves bringing the private sector into the fold.
By bringing the private sector into the fold, funding, technical know-how and expertise, and innovation that complements public-sector efforts can be provided (Zygiaris, 2013).

1.2 Research problem statement

Public decision-making within cities is a comprehensive process that includes the involvement of relevant stakeholder's perspectives and interests (Angelakoglou et al., 2019). When it comes to relevant stakeholders from the public and private sector within smart city initiatives, policy-making bodies and local authorities are of great importance. Policy makers and local authorities are mainly responsible for providing services towards smart city implementations and the organization and utilization of smart city solutions in a way it benefits public interest. Also, the private sector which is composed of industry and private market companies, has an important role by providing solutions for smart city development. Industry and companies bring innovative technologies for smart cities to the market and create and apply new business models for smart city solutions to different sectors and fields within a city, such as healthcare, security, mobility and sustainability (Giourka et al., 2019). Smart city projects are usually initiated and put on the agenda by the public sector because of the primary responsibilities governments have to look after the quality and development of their city and life of citizens. However, the market of innovation and technology development

is certainly within the reach of the private side (Hollands, 2008). Upscaling smart city projects asks for large amounts of investment and knowledge which puts strain on the budgets and capabilities of the public sector. Therefore, most governments are open to look into the possibilities for engaging the private sector in smart city developments (Lam & Yang, 2020). The engagement of private actors to public initiatives is often done by cooperative arrangements, which are called public-private partnerships (PPP's). PPP's are co-operation projects of "some sort of durability between public and private actors in which they jointly develop products and services and share risks, costs and resources which are connected with these products "(Hodge & Greve, 2005, p. 4). They are established for benefiting both the public and private sector. However, bringing these two different elements together can also prove to be challenging in practice (Hodge & Greve, 2005). Though, PPP's can be seen as considerably beneficial for smart city development, there might also be a pitfall to collaborate with the private side. One predominant challenge that has been noticed has to do with achieving a strategic alignment between the key actors of smart city development in public-private partnerships like the municipalities and the industry. The challenges that these actors experience could range from technical to managerial to governance challenges (Hodge & Greve, 2005). According to Carr and Hesse (2020) one problem of smart cities development and private involvement can be the conflict between underlying public and private interests and perceptions. Therefore, it would be beneficial to know how these underlying interests and perceptions interact with each other and how this establishes collaboration between these actors, which in this case are public decision makers or organizations and private companies and industry (Pierce & Anderson, 2017).

When looking at the development of smart city initiatives, the governance model of a smart city initiative is an important factor (Anindra & Supangkat & Kosala, 2018). According to Loorbach (2007) policy making is becoming very complex with regards to societal problems and unpredictability, since many different actors and perspectives are involved. There appears to be an increasing level of general agreement in governance research about the effect of top-down steering by government and liberal free market approaches to generate (sustainable) solutions and societal level (Loorbach, 2010). Over the past decades, a new approach of governance called 'collaborative governance' has emerged (Ansell & Gash, 2008). This strategy of governance focuses on bringing multiple stakeholders together in order to engage in consensus-oriented decision making and planning. According to Ansell and Gash (2008), knowledge is becoming increasingly specialized and distributed and due to the increasing complexity and interdependence of institutional infrastructures, the demand for collaboration increases. As mentioned earlier, smart city development is a complex process that asks for the interaction between different interests of public and private bodies. Initiating smart city developments can be done by partnerships which would benefit both public and private interests, however there should be a well-functioning collaboration in order to get a strategic alignment between the involved stakeholders in the process (Emerson, Nabatchi & Balogh, 2012). This research focusses on the collaborative interaction between the key public and private actors that are involved in partnerships oriented towards the development of smart cities. The research will be done accordingly to the *Collaborative Governance Framework* of Emerson, Nabatchi and Balogh (2012). According to Emerson et al., (2012), involving different stakeholders in local affairs has increasingly gained space in cities' governance discussion and in order to deal with this involvement of different stakeholders, it is necessary to understand how interaction between stakeholders, functions within governance systems.
Researching in which way the collaborative governance process can be identified within public-private partnerships in smart city development specifically focusing on the interaction

between public side and industry side, has had little attention in smart city literature and will therefore be a relevant topic to study.

1.3 Research aim and question(s)

The research aim of this study is to identify what dynamics of collaboration within the Collaborative Governance Framework (Emerson et al., 2012) can be found in public-private collaboration and what role they play in smart city developments oriented towards the collaboration between public bodies and industry through partnerships. According to Emerson et al., (2012) collaborative actions and outcomes for certain issues and initiatives are strongly influenced by the underlying dynamics of the collaboration (process). Therefore, these 'collaboration dynamics' and its composing dimensions; principled engagement, shared motivation and capacity for joint action, will be the central topic of this research study.

As a starting point the following research question and sub-questions have been set up:

What role do collaboration dynamics play in public-private partnerships (PPPs) between public bodies and industry in the development of smart city initiatives in the Netherlands?

The question will be researched based on the *Collaborative Governance Framework* of Emerson, Nabatchi and Balogh (2012) which will be applied to the subject of smart city development within Dutch cities and regions. The methodology (Chapter 3) will deal more specifically with the selection of this subject.
There are also a few sub-research questions in order to examine the main research question:

- What is the role of ***principled engagement*** in public-private partnerships between public bodies and industry within the development of smart cities?
- What is the role of ***shared motivation*** in public-private partnerships between public bodies and industry within the development of smart cities?
- What is the role of ***capacity for joint action*** in public-private partnerships between public bodies and industry within the development of smart cities?

1.4 Significance

1.4.1 Scientific relevance

This research study is of explorative nature, where ideally insights of the study can contribute to topics of existing scientific literature that are currently limited in knowledge. When it comes to existing knowledge on the concept of smart cities, it can be noticed that a smart city is often perceived as a holistic and futuristic approach for looking at urban development. However, according to Vanolo (2014) the idea of a smart city should not be followed blindly as a new form of utopian thinking and should therefore be more critically researched and discussed. Vanolo (2014) advocates that for a contribution to current studies, the interaction and governance between politics and smart city development, different strategies about cities and technologies and the role of knowledge and policies should be researched.
Also, when it comes to the current knowledge and literature on smart cities and collaboration within, literature shows that over the years more and more research has been done on the role of citizens in smart cities and that the interaction between public and industry with regard to collaborative governance in partnerships, is lacking as a topic of interest (Pereira et al., 2017). Therefore, the goal of this study is to focus on the interaction between public and industry in smart city development and hopefully contribute to the limited knowledge on this, where adding the perspective of public-private collaboration is worthwhile.

1.4.2 Societal relevance

Smart technologies are a way to help cities meet increasing urban challenges, and they are already enabling the next wave of public investments. Innovation and technology play a key factor to developing competitive and sustainable cities as they are the place where innovation is often initiated and adopted. Therefore, the role of (local) governments and other involved actors within cities is an important driver for the development of smart technologies to face increasing challenges (Hodge & Greve, 2005). However, governments need not be alone in this fight against urban challenges. Involving the private sector, such as the industry and working together in partnerships can be an effective and efficient approach for local governments to make smart technologies usable in the city. If managed well, this approach can bring benefits to both the public and private sides, while improving urban life. However, if managed badly, these collaborations can also experience limitations, leading to unsuccessful initiatives and development of the city. Therefore, it is important to look at these public and private interests, agendas and roles in the partnerships to find out which and how certain characteristics of collaborative governing affect the development of smart cities (Bloomfield, 2006, Loorbach, 2010, Holland, 2008). The results of this exploratory study can contribute to a better understanding of the interaction and collaboration between in the first-place public decision-makers and industries with regard to smart city initiatives and can be useful for regional, national and international governments and policy makers, in their objective to develop their city towards a smart city and improve social life. In addition, the results or insights of the research can also be beneficial for the management of private organizations and industry with regards to the development of their businesses. Therefore, the explorative nature of this study has a societal contribution to give insights to both public and private side within the story of smart city development, with the end goal of improving the quality of life within the Netherlands or world.

2. Literature review and theoretical framework

2.1 Smart cities: background

Although the term 'smart city' has been specifically developed as an idea over the past twenty years, the roots of 'smartness' of a city appear to date back in history to the vision's about urban existence from previous centuries Angelidou (2015). In order to get a more comprehensive idea about visions of early innovative cities, multiple concepts of historical studies will be briefly discussed.
The first rational ideas that urban planners had about the future of urban regions and structures in the context of the development of technologies started to appear in the second half of the nineteenth century. One of those ideas is the vision of a functional and healthy city. According to E. Howard, who wrote the book 'The Garden Cities of Tomorrow' (Angelidou, 2015), "the healthy and functional city, as an answer to the acute cities of the early industrial revolution" (Angeliodu, 2005, p. 96). With his work, Howard was a pioneer in putting forth the conception of an ideal city in the industrial era. Also, T. Garnier, a functionalist with an ideal on the industrial city, stated the importance of technology as a central element of vision. Through the lifetime of his work he demonstrated that future cities should embrace industry and its technological achievements (Angelidou, 2015).
In the second half of the twentieth century after the ending of World War II, the development of planned cities and suburbs increased rapidly due to the need for shelter and proper living conditions. Many cities were developed as a substitute to the existing congested and polluted urban areas. Because of the more modern way of building and constructing from this period of time, planners, economics and sociologists started to adapt the idea of the importance of technological advancement for the development of cities.
During the 1960s, urban scholars that were inspired by new technologies started to speculate what the effect of these technologies would be on cities. Planners found interest in trying to understand how information systems and flows of cities would affect the built environment.
Starting from the 1960s, there was a significant increase in visionary ideas with regard to the influence of the emerging information society. Throughout the 1980s, the vision of instrumenting cities with (technology) networks, led to the popularization of concepts such as 'information cities', 'digital cities' and 'intelligent cities (Angelidou, 2015). Many of these concepts portrayed a vision of what future cities might become, without always being realistic for that period of time. The last decades of the twentieth century experienced an accelerating technological change that enabled the popularization of Information and Communication Technologies (ICT). By the middle of the 1990s, many planners and scholars popularized visions about the future of cities in which ICT would be one of the predominant drivers of democracy and city management (Angelidou, 2015).

2.1.1 Knowledge

According to the World Bank (2007), knowledge has always been of great importance in the history of human civilization and local development. In the 21th century the importance of innovation and technology-led development has been acknowledged globally and is being performed in knowledge-based facilities such as innovation clusters, technology districts and creative hubs. Without a doubt, it is becoming obvious that knowledge has a strong link between urban development and planning, because operating within the city can be designed to stimulate the existence or cultivation of knowledge.

When looking at smart cities, Angelidou (2015) sees the knowledge and innovation economy as an "essential driver" (p. 99) of the smart city concept. Knowledge economies have played an important role in the origination of smart cities ideas. According to Angelidou (2015), who elaborates on relevant economics and innovation theories, the smart city area can be constructed under two distinct drivers which are *technology push* and *demand pull*. The technology push means that innovations and new solutions are an outcome of rapidly advancing innovation and technology which is pushed by supply, separately from the needs of society (Angelou. The demand pull however implies the solutions and innovations which are being developed as a result of the demand of the society. On the side of the demand pull, administrators and policy makers are increasingly piling up their agendas and strategies to become (more) smart and innovative. Becoming smart could tackle the urban and regional challenges city makers are facing and they aim for achieving economic growth and better quality of life for their citizens. City leaders strive to use the efficiency and opportunities that technology can bring to different urban elements such as transport, labour, living, safety and sustainability (Angelidou, 2015).

2.2 Conceptualizing smart cities

When defining a city as being 'smart', it is difficult to come up with a specific and unique definition. The concept of a smart city is still lacking consensus both in how the research defines and understands the topic, as well as practice communities. When conceptualizing a comprehensive definition of a smart city, according to Nam and Pardo (2011) many cities can be seen as already smart and it is rather a matter of in which degree and nature cities are smart, instead of a dichotomy between 'being smart' or 'not being smart'. Overall, the most common idea and conceptualization of a smart city should at least include the components, at its base, management, policy and technology. Moreover, smartness should be seen as a collection in which local governments, citizens and other stakeholders think about and implement initiatives that attempt to make a city smart.

2.2.1 Dimensions and components

According to Garcia, Ramon, Pardo and Nam (2015) smart cities can be built on multiple core components, which are illustrated in Figure 1. The components should be seen as essential to the conceptualization of smart cities and can be underlined by four dimensions: technology & data, physical environment, society, government.

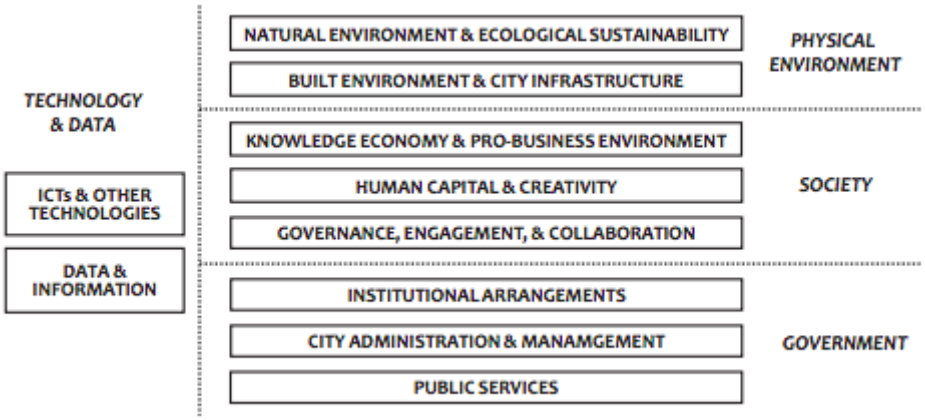

Fig 1. Core components and dimensions of smart cities (Garcia et al., 2015, p. 69)

The different components show that a smart city is a very multidimensional and multifaceted concept. According to Nam and Pardo (2011) components can be classified into three main dimensions which are the technological dimension, human dimension and institutional dimension. As shown in the figure above (Fig 1), different components and dimensions such as technology, government and society can be recognized regarding the three dimensions of Nam and Pardo (2011). Hence, why the three main dimensions are being discussed as a further explanation on the core components of a smart city. These dimensions will be briefly discussed below.

Technological

According to the technological dimension, a smart city entails a large degree of information communication technologies (ICT) which are instrumented to critical infrastructure parts and services. The use of technology in cities could among others relate to increasing role of citizens by adapting technologies to their needs rather than adapting their needs to the development of technology. Technology and ICT have the power to address governance challenges for cities and improve the quality of life for citizens. Also, literature shows that large technology corporations also believe in the importance of the technological dimension as the key element to their perceptions of smart cities (Albino, Berardi & Dangelico, 2015) (Vanolo, 2014). According to them, technology is a means to tackle the challenges and changes that the world will experience in the future and that the world is asking for the supply of technological and innovative developments and applications.

Human

The people are important players within a smart city, since they form the city through their interactions and behavior. Human characteristics are even recognized as a key driver of smart cities, and especially factors such as their creativity, education and knowledge have central roles in a smart city. According to Florida (2002) it is important to create a suitable environment for the existence of a creative class. Social infrastructure, such as knowledge and social behavior is an attribution or even strength for smart cities as it stimulates connections and relationships between people.

Institutional

The last dimension is the institutional dimension. This dimension emerges from the perspective of knowledge that arise bottom-up and focusses at communication between

different actors from the society. The attention for this dimension is based on the concept of smart communities in which citizens, companies and institutions collaborate to transform the city environment, and should therefore be stimulated to feel the need to participate in the development of their city.

With this being said, Nam and Pardo (2011), see the three dimensions of a smart city as interconnected. Smart cities start from the human and institutional side and are supplemented by technology infrastructures in order to stimulate sustainable growth and increase the quality of life. Therefore, it is important that the fundamentals of collaboration between actors works because based on that, technological developments can be implemented.

2.2.2 Six characteristics of smart cities

According to Giffinger et al., (2007) the concept of a smart city is often perceived as an ability of a city, without aiming at just one particular aspect. However, in order to understand the bigger picture, it is important that for further definition certain characteristics are being identified. Besides the different components that have been mentioned earlier, Giffinger (2007) (Albino, Berardi & Dangelico, 2015) mentions that there are also six characteristics which smart cities are built on. The six characteristics are illustrated in Table 1 below.

Characteristics	Theories/Description	Features
Smart people	Social and Human Capital	Level of qualification, Affinity to lifelong learning, Flexibility, Creativity
Smart economy	Competitiveness	Innovative spirit, Entrepreneurship, Productivity
Smart governance	Participation	Participation in decision -making, Public and social services, Transparent governance
Smart mobility	Transport and ICT	Local accessibility (Inter-national accessibility), Availability of ICT-infrastructure, Sustainable, innovative and safe transport systems
Smart environment	Natural resources	Attractivity of natural conditions, Pollution, Environmental protection, Sustainable resource management
Smart living	Quality of life	Cultural facilities, Health conditions, Individual safety

Table 1. Giffinger's six characteristics of smart cities (author compiled: Giffinger et al., 2007, p. 12)

Giffinger uses the six characteristics for analyzing the strengths and weaknesses of a smart city and ranking cities based on certain assets. By identifying cities on the six characteristics these rankings can be used by cities to enhance their profile and to improve their position within competition.

Also, in related literature, there are different perspectives on the six characteristics of a smart city and they can be associated with different aspects within cities. Lombardi, Giordano, Farough and Yousef (2012), for example, have linked the six characteristics with various aspects of life within urban structures. According to Albino et al., (2015), the different characteristics of a smart city are based on traditional and neoclassical theories of urban growth and development which are competitiveness, transport and ICT, natural resources, social and human capital, quality of life and participation (see Table 1).
There is one particular characteristic that is of importance within governing smart cities, which is 'smart governance' (see Table 1). Smart governance can be defined as the engagement of various stakeholders in the process of making (public) decisions and public services within smart city initiatives and that new technologies are used to strengthen the collaboration between urban governments and other stakeholders such as citizens, organization and companies (Viale et al., 2017). One important element of this form of governance is to collaborate across departments and with societies to make operations and services more central to the needs of citizens. Viale et al., (2017) mention that the development of technology and ICT promises as a key driver for smart governance, because it enables governments to carry out their work more effectively and efficiently and through different urban platforms. ICT presents new opportunities for the city, in particular for local governments to encourage new ways to communicate with and be connected to different stakeholders within the city. Therefore, smart governance has been incorporated in this research as one main characteristic of smart cities, since the study focusses on the governance of smart city initiatives.

2.2.3 Critical views

Over the years the concept of a smart city has also gained critical views on how it should be interpreted for urban development and planning. According to Vanolo (2014), one critical perspective comes from the ideal type of the smart city, which might become adapted as 'univocal' and 'natural' when it comes to strategies, ideologies and policy making. Another critical perspective comes from the risk that urban vision making is reducing to a single technology and innovation centric vision of the future city. This could somehow restrict other possible imaginative planning approaches and the creation of alternative solutions to current and future urban problems.
Therefore, though the concept of smart city can be perceived as a holistic approach and futuristic approach for looking at urban development, critical debates about smart cities should be stimulated in order to not get attached too much on a possible utopian idea. Vanolo (2014) advocates for the need of studies regarding the interaction and governance between politics and smart city projects, different strategies about the city and technology and the role of knowledge and policy for shaping the future cities.

2.3 Public-Private collaboration and stakeholder typologies

2.3.1 Public-Private collaboration and partnerships (PPP)

According to Hodge and Greve (2005) most definitions of public-private partnerships (PPP) emphasize that their establishment comes from benefiting both the public and private sector. PPP's are co-operation projects of "some sort of durability between public and private actors in which they jointly develop products and services and share risks, costs and resources which are connected with these products" (Hodge & Greve, 2005, p. 4). These collaborations take place over a longer period of time and ask for a longer-term commitment and cannot take

place in short-term contracts. Furthermore, the share of risks, costs and other factors can be emphasized as an important component. In a successful partnership, both parties should come together on equal terms in the sense that they both play an equal distribution in the risks of the project.

The concept of PPP's has increased in popularity since the innovative collaborations and contracts should theoretically offer substantial public benefits, as mentioned before. In practice, however, long term commitment can also bring some challenges regarding the success of implementing initiatives at local level. Bloomfield (2006) mentions that this public-private collaboration through partnerships asks for practical impediments in order to achieve outcomes as "market-driven competition, equitable risk sharing, effective performance guarantees and appropriate transparency in innovative long-term contracts" (Bloomfield, 2006, p. 400). According to Bloomfield (2006), local governments that want to collaborate by means of contracts for a long period of time, must invest in expertise, effective management and strong governance structures, in order to tackle possible negative outcomes of the partnership such as risks of uncontrollable circumstances, barriers to transparency and the impact of local resource constraints.

Moreover, there seems to be a conflict between theory and practice when it comes to the applicability of public-private partnerships. In theory, the partnerships allow governments to control the competitive powers of the private markets, creating contractor incentives for performance and efficiency and decreasing costs and improve the quality of public services. However, practically, there are also some major barriers to strong competition for innovative, long-term contracts. These are deregulation and project-related barriers to competition. Barriers can arise for example, from laws regarding designer selection, construction bidding and financing of capital projects. Therefore, in order to have a successful public-private partnership, it is important to examine and address the shortcomings of innovative projects and how collaboration is governed within partnerships on the part of both public, as well as private stakeholders (Bloomfield, 2006).
Before we take a deeper look at how PPP's can be seen within the concept of smart cities, it is important for this study to make clear how the concept of public-private partnership is specifically defined. Since PPP is quite a term that can be interpreted both broadly and narrowly (Roehrich, Lewis & George, 2014), it has been decided to take a definition that is most closely related to the elements that are being investigated in this study with regard to public and private collaboration in (smart) city development.
According to Forrer et al., (2010) public-private partnerships are: "on-going agreements between government and private sector organizations in which the private organization participates in the decision-making and production of a public good or service that has traditionally been provided by the public sector and in which the private sector shares the risk of that production" (Forrer et al., 2010, p. 476).
This definition of a PPP accommodates the collaboration conditions that the private sector has a cooperative role in the decision making of how goods or service should be produced or delivered.

2.3.2 Conceptualizing PPP's in smart cities

According to Holland (2008) it has been observed that many smart city initiatives originate from a partnership between the public and private sector. Smart city projects are usually initiated and put on the agenda by the public sector because of the primary responsibilities

governments have to look after the quality and development of their city and life of citizens. However, the market of innovation and technology development is certainly within the reach of private actors. Upscaling and experimenting with smart city projects ask for large amounts of investment and knowledge which puts strain on the budgets and capabilities of the public sector. Therefore, most governments are open to look into the possibilities for engaging the private sector in smart city developments (Lam & Yang, 2020). There must be mentioned, however, that asking for private finance might not be the cheapest to obtain, but it might generate innovative capability and efficiency gains, which can be seen as external gains to sharing costs.
However, though PPP's can be seen as considerably beneficial for smart city projects, there might also be a pitfall to collaborate with private actors. According to Carr and Hesse (2020) one problem of smart cities development and private involvement can be the conflict between underlying public and private interests. As mentioned earlier, governments mainly have the interest to increase the quality and sustainability of their city. Smart city agendas driven by private companies and industry side might view a city as a burgeoning market for their technology products and services. Their interest could be focused more on exploiting their businesses and investments.

2.3.3 Typology of stakeholder groups

The importance of stakeholder involvement in smart city development has explicitly been mentioned. This section tries to provide more insight into the various stakeholders involved in smart city development and initiatives and the collaboration between them. The relations and interactions between the stakeholders are discussed briefly in the upcoming subsections and in the last part of this section there will be an illustrative representation of this by means of a self-composed figure (Figure 2).

When it comes to public and private collaboration in smart cities and the identification of (key) stakeholders, the triple helix model can be used for addressing relationships between different stakeholder groups within a society. The triple helix model is often used in a knowledge-based economy in order to define main stakeholders and their relations to each other and consists of the following categorization: university, industry and government (Leydesdorff, 2012) (Leydesdorff & Deakin, 2011). Between these stakeholder groups, different relations and interactions can arise which can shape each other's actions and capabilities. According to Leydesorff (2012) the triple helix model recognizes the importance of balanced interactions between the three main stakeholder groups in order to optimize the collaborative power to reach common interests and goals. By shifting their traditional roles, which might get in each other's way in certain situations, the stakeholders shift to a joint and common course. In this way multi-lateral networks and hybrid organizations can be created (Etzkowitz & Leydesdorff, 2000).
However, in response to the triple helix model, there must be mentioned that over the past years the engagement of the citizens or civil society has gained more attention regarding collaborations in cities (Edelstam, 2016). However, due to the research aim of this thesis, there has been decided to leave this fourth stakeholder group out of the scope and focus mainly on the public-private collaboration between government, knowledge and industry. This general identification of the involved stakeholder groups will be the starting point for identifying and selecting the relevant stakeholders for this research study.

In the previous section the three main stakeholder groups have been identified according to the triple helix model (Leydesdorff, 2012) (Leydesdorff & Deakin, 2011). This section will focus more in depth to the identification of the different stakeholders that are involved within these groups. In this study, the three stakeholders are interpreted more broadly than how they are used in the triple helix model, especially universities will be fall under a broader term 'knowledge', since there can be various sorts of knowledge institutions rather than just universities that can be involved in the development of smart cities (Fernandez-Anez, Fernández-Güell & Giffinger, 2018.

The first group of stakeholders is the *government.* Policy making bodies, local authorities and other relevant public facilitators and administrators are mainly responsible for providing services towards smart city implementations and the organization and utilization of smart city solutions in a way it benefits public interest (Giourka et al., 2019). Besides the regulatory and authority role of governments, smart cities also ask for new roles of public administration that focuses on creating a more supportive environment for smart city initiatives (Milenkovic et al., 2017). First of all, this can be done by stimulating enthusiasm on the creation of smart city-driven technologies and initiatives. This can be done by putting sustainability and smart city development on the public agenda and making it a priority. Secondly, the government and other public administrative institutions can play a more 'facilitation' and 'participation' role for experimenting with innovative ideas. One example of this is creating (online) platforms to connect different parties with the common interest of making a city smart (Ojasalo, 2015). Thirdly, there can be governed more from a bottom-up perspective which focuses on making a supportive environment for private companies and knowledge institutions to innovate for certain public domains. This can be done through collaboration and partnerships.

The second group is the *industry*. The stakeholders within the industry can be identified as a wide range of public and private companies being active on the industry side. Smart city development can be seen as an attractive opportunity for companies to expand business, since possible developments and initiatives cover a large set of different domains that asks for many industries to develop them (André & Crutzen, 2015). Besides technological knowledge and expertise, private funding is of great importance when it comes to financing smart city projects. This creates an opportunity for companies to contribute to the developments of smart city projects and collaborate with different partners. Firstly, these can be corporate firms that are in possession of financial instruments and technological expertise and knowledge. Secondly, there are small and medium enterprises (SME's), startups and social enterprises, which produce small or medium scale development and interventions (Kummitha, 2019). In the previous section there has been mentioned that within public-private collaboration, private companies can have different agendas or incentives than the public side.

Companies within the private sector mainly focus on exploiting their businesses while minimizing their resources input and risks on investments, rather than having the main goal to strive for public investments and development. Participating in city development and initiatives and especially in the case of innovation is often motivated by companies being able to strengthen their reputation, competitiveness, innovation or expanding their business network and partners. Though, the private sector also benefits from the smart city initiatives and outcomes which increases economic growth and social well-being, and this could also play a role for their participation, the main difference that should be made with the public agenda comes from their specific private interests to increase their own business economic interests (Hahn & Kuhnen, 2013) (White, 2009).

Lastly, the third group of stakeholders are the *knowledge institutions* which in this study can be divided into two groups: the public research institutions and the academic research institutions. Generally, knowledge institutions are created or designed in order to produce and validate knowledge (Van Beers, Berghäll & Poot, 2008), and besides some other incentives, their main incentive is the creation of knowledge. Knowledge is of great importance when it comes to innovation and its relevance for social wellbeing economic growth. Public research institutions can be seen as organizations that are designed to generate, connect and disseminate knowledge for social concern. These organizations are closely related to governments since they can be used for realizing governmental responsibilities and to achieve societal goals. Their agendas and work are largely driven by the requirements that authorities, businesses, industry and other involved sectors ask for (Van Beers, Berghäll & Poot, 2008). Next to the public research institutions, there are academic focused research institutions such as universities, which play a large role for businesses to get access to research or expertise due to their fundamental research.
Universities and public research institutions are important for generating knowledge and contribute to social innovation and therefore in order to get the most out of this, they are often involved in the collaboration with industries and private businesses. Private companies have the knowledge of the market and the incentives to exploit business from research into innovation. Working together, knowledge institutions can cause (knowledge) spillovers to arise from which the industry and other businesses can benefit. According to Van Beers, Berghäll & Poot (2008) the collaboration between knowledge institutions and industry can be seen as a major component for converting public research into commercialized innovations and technological development. Therefore, governmental bodies have the aim to bring these various stakeholders together in order to increase the public wellbeing.

This section has tried to give an insight into the different stakeholders and their roles within public-private collaboration and within the concept of smart city development. Smart city development and collaboration between different stakeholders asks for the interaction and integration between interests, responsibilities and opportunities and in order to illustrate this interaction and collaboration, Figure 2 below has been compiled. This research focusses in particular on the interaction and collaboration between the public and private side, which consists of the governmental stakeholders and industry stakeholders. Therefore, within the concept of a triple helix, the interaction between these two is demarcated. However, since the third group of stakeholders, knowledge institutions, is of great importance for the outcomes of smart city development, the interaction with the other two stakeholders will be considering on how this influences the collaboration between industry and government.

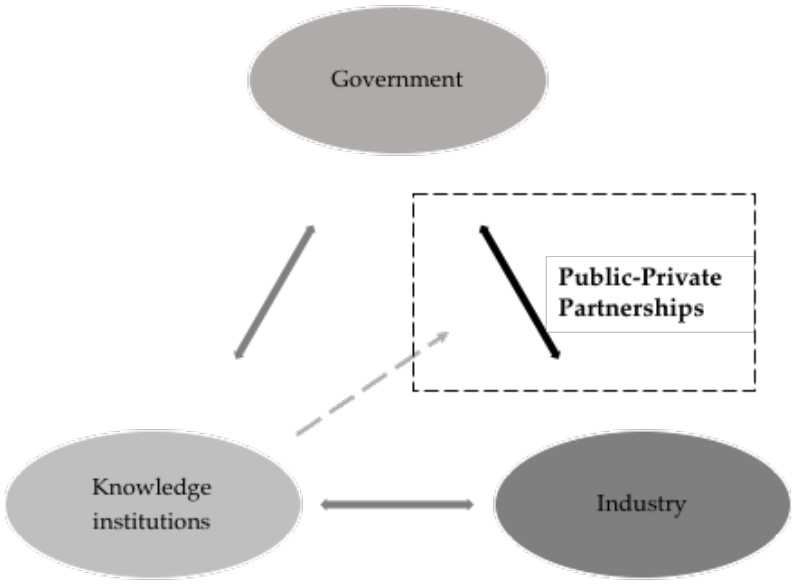

Fig 2. Interaction and exchange on interests, responsibilities and opportunities between stakeholders within public-private collaboration based on theory (author compiled)

2.4 Collaborative Governance

Over the last decades, many modernized European regions have experienced a movement from being central government-based towards more liberal, market-based and decentralized in terms of decision-making and governance structures. Top-down policy making of central governments have been decreasing, which led to increasingly diffuse policy making structures across multiple layers and levels of government. According to Loorbach (2010), current practices of governments in mostly West European nations is increasingly developing policies by interacting with different societal actors. Interaction between multiple actors in network structures can create societal consensus which policy decisions are grounded on.
However, Loorbach mentions that policy making is becoming very complex with regards to societal problems and associated uncertainties, since many different actors and perspectives are involved and should be considered. Over the years, different visions and approaches have been developed regarding the way governments can and should deal with an integrated society. These new view points for governance focus mainly on understanding network processes for formulating and implementing policy problems. According to Prins and Raynar (2007), societal problems can be persistent in the long term and therefore requires governance approaches that give special attention to learning, interaction, integration and experimentation on the level of society instead of just policy issues.
There seems to be an increasing level of consensus in governance research about the effect of top-down steering by government and liberal free market approaches to generate (sustainable) solutions and societal level (Loorbach, 2010). The way to which city change can be influenced by policies from governments or brought by market forces is becoming outmoded, however it is at the same time inevitable to govern change without them. In order to bridge the gap about the influence of these two approaches, new ways of governing are aimed to find that decrease the lack of direction and coordination with governance networks and increase the effectiveness of current forms of government and the ways plans are made and carried out. This implies a new balance between different actors from government, market and society (Loorbach, 2010).

2.4.1 Collaborative Governance Framework

Over the past decades, a new approach of governance called 'collaborative governance' has emerged. This strategy of governance focuses on bringing multiple stakeholders together in order to engage in consensus-oriented decision making and planning. According to Ansell and Gash (2008), knowledge is becoming increasingly specialized and distributed and due to the increasing complexity and interdependence of institutional infrastructures, the demand for collaboration increases.
According to Emerson et al., (2012), the approach of collaborative governance has become a familiar concept in the public administration literature. Involving different stakeholders in local affairs has increasingly gained space in cities governance discussion and in order to deal with this involvement, it is necessary to understand how interaction between stakeholders, functions within governance systems. Governance is of great importance in determining who has influence, makes decisions and how decision-makers are held accountable. Therefore, according to Cruz and Sarmento (2017), the greater the participation of different stakeholders in the decision-making and planning process, the greater the evidence of collaboration and possibly a more successful performance of the process.

Emerson et al., (2012) define collaborative governance broadly as:

The processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished. (Emerson, Nabatchi & Balogh, 2012, p. 2)

Emerson et al., (2012) enable collaborative governance to be interpreted more widely as a systematic concept in public administration and allows variations among different applications and scales. According to them, this definition of collaborative governance is a broader response to the observations by other scholars (Emerson et al., 2012) (Ansell & Gash, 2008). This definition "captures a fuller range of emergent forms of cross-boundary governance, extending beyond the conventional focus on the public manager or the formal public sector" (Emerson, Nabatchi & Balogh, 2012, p. 3). Moreover, Emerson et al., (2012) advocate for their definition of collaborative governance for not only limiting to formal, state-initiated arrangement and the engagement between government and non-governmental stakeholders. Their definition encompassing 'multi partner governance' which can be for example, partnerships between the government and private sector or joined-up arrangements between public and private. Since, we are focusing on the state and private interaction in this research, the decision has been made to use this definition and scope on collaborative governance.

Emerson et al., (2012) have developed an integrative framework for collaborative governance, which identifies a set of dimensions that contains a system context, a collaborative governance regime and internal collaborative dynamics and actions that can generate impacts and adaptations across the systems. The purpose of the integrative framework is to provide a wide visual representation that can be used to explore (different) components and elements of cross-boundary governance systems that could range from intergovernmental cooperation, collaboration with non-governmental stakeholders or public-private partnerships. The framework has been illustrated in Figure 3 below.

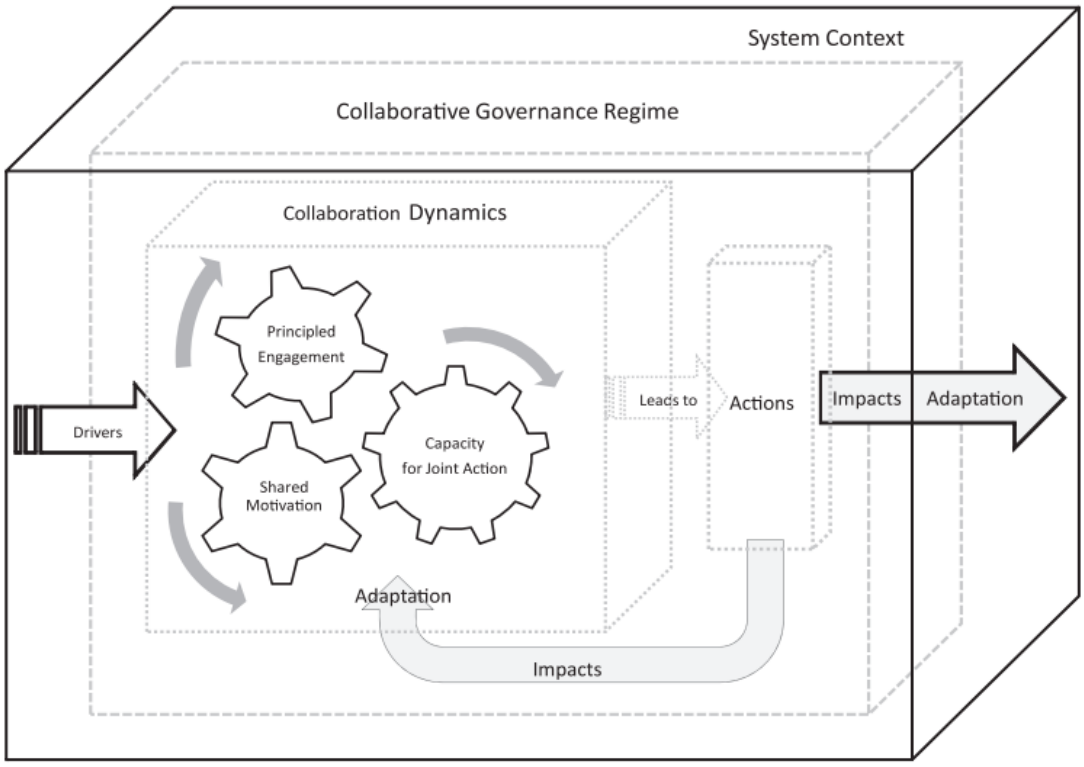

Fig 3. Integrative framework for collaborative governance (Emerson et al., 2012, p. 6)

The figure shows that the integrative framework is built on three dimensions, illustrated as boxes (system context, collaborative governance regime and its containing collaborative dynamics and actions). The system context is the 'generator' of opportunities and constraints and affects the collaboration dynamics. Out of the system context, drivers emerge, which include leadership, consequential incentives, interdependence and uncertainties, which help initiate and set the direction for collaborative governance regimes.

According to Emerson et al., (2012), it should be noted that their framework incorporates many components of collaborative governance which are also identified in other framework from literature, however their framework configures these components in a way that propounds causal relationships between the dimensions and their components and elements, with a focus on how these interact.
This approach to collaborative governance can be used for testing theories as it advances on (common) preliminary assumptions about the effect of certain factors on collaboration and how the components work together to produce certain outcomes. The integrative framework offers a broader perspective on what and how factors lead to collaboration.

2.4.2 Dimensions and components

System context

According to Emerson et al., (2012) collaborative governance exists within a multi-layered context which consists of political, legal, socioeconomic, environmental and other different influences. These different influences create an 'external system context' that creates opportunities and constraints where the Collaboration Governance Regime (CGR) unfolds and is shaped. The system context of the governance framework has several elements that

affect the nature and prospects of a regime, such as resource conditions, policy frameworks, existing networks, power relations and socioeconomic diversity (Bryson, Crosby & Stone, 2006). Emerson et al., (2012) mention that the system context should be interpreted in their framework, as a surrounding three-dimensional space that consists of external conditions, like economic downturns, weather events, elections etc., that may influence the dynamics and performance of collaboration during a collaborative governance regime. Thus, these external conditions could open up new possibilities or create challenges.

Drivers

According to Emerson et al., (2012) their integrative framework on collaborative governance, notions the importance of essential drivers for the existence of collaboration. To a certain extent these drivers can be seen as an intermediary between the system context of collaboration and the various dimensions and components that lie within it. The table below explains the four drivers: leadership, consequential incentives, interdependence, uncertainty.

Driver	Characteristics	Source
Leadership	▪ Presence of an identified leader that has the position to initiate and help secure the support and resources for a collaborative governance regime. ▪ Willingness to absorb high transaction costs for collaborative efforts ▪ Commitment to problem solving and be a member of a party.	Emerson, Nabatchi and Balogh (2012)
Consequential incentives	▪ Internal or external drivers for collaborative action (problems, needs, interests, opportunities, threats, crises). ▪ Induce leaders and participants for engagement.	Emerson, Nabatchi and Balogh (2012)
Interdependence	▪ Individuals and organization are unable to accomplish certain things on their own. ▪ "Sector failure" and "constraints on participation"	Ansell and Gash (2008) Bryson, Crosby and Stone (2006) Emerson, Nabatchi and Balogh (2012)
Uncertainty	▪ Challenges "wicked" societal problems. ▪ Cannot be solved internally within groups of individuals. ▪ Collaboration to reduce and share risks.	Koppenjan and Klijn (2004) Emerson, Nabatchi and Balogh (2012)

Table 2. Drivers collaborative governance (author compiled; sources in table)

Collaborative Governance Regime

One central component of the integrative framework is the Collaborative Governance Regime (CGR), which derives partially from the drivers that emerge from the system context. Emerson et al., see the CGR as: "a type of public governance system in which cross-boundary collaboration represents the predominant mode for conduct, decision making and activity between autonomous participants who have come together to achieve some collective purpose defined by one or more target goals" (Emerson, Nabatchi & Balogh, 2012, p. 18). Decision making is mainly based on cross boundary collaboration which is influenced by behaviour and activity of the involved actors. In order to prevent confusion on the term

regime, Emerson et al., (2012) argument about their interpretation of a regime in this framework. According to them some might critic the use of regime given that its traditional use focusses more on authoritarian and specific forms of political systems and power. In the CGR, however, the concept of regime can be referred to (sustained) cooperation between state and non-state actors in which they act according to a governing arrangement that is inspired by "a set of explicit and implicit principles, norms, rules and decision-making procedures" (Emerson & Nabatchi & Balogh, 2012, p. 6).
Though, as mentioned earlier, the Collaborative Governance Regime is initially shaped by the drivers from the system context, however, is also influenced by two other components: collaboration dynamics and collaborative actions (Emerson et al., 2012). First, the collaborative actions and its related components in the framework will be shortly discussed, then the three interacting dimensions of the collaboration dynamics; principled engagement, shared motivation, and capacity for joint action, which form the base of this research study, will be discussed more comprehensively.

Collaborative action

Collaborative actions can in short be referred to as actions that cannot be attained by organizations when they are acting alone (Emerson et al., 2012). These actions can, for example, be related to very broad goals such as strategic developments or certain policy areas or can be related to more narrow goals on specific issues or projects. Characteristic about collaborative actions is that they can be carried out by the various and often all participants and partners in the collaboration, provided that this is done in consultation. When there is sufficient clarity about the shared goals and interests and the reason for executing the actions, a collaboration action can easily be achieved and assessed. However, not surprisingly, if this is not the case and the various actors involved are not aligned, collaboration actions are difficult to achieve. During the explanation of the collaboration dynamics in the next section, this "alignment" and shared goals and interests in collaboration, will be further clarified. A strong and working policy and collaboration will be achieved when there is clarity about the goals of working together as partners. According to Huxham (2003), the shared goals are not always easy to meet in practice and operationalize according to them. Due to the variety of organizational and individual agendas in the collaboration process, it is sometimes difficult and unclear to hop on the same boat. According to Huxham (2003), the extent to which an efficient collaboration action can be taken or implemented is influenced by various factors, including various dimensions of the collaboration dynamics.
When looking at the framework (Emerson et al., 2012) the two components *impacts*, and *adaption* can be derived from the collaborative actions. The impacts can be seen as the intentional or unintentional outcomes and/or changes from the actions that happen as a result of the interacting collaborative dynamics. Impacts of a collaborative action may apply, for example, to the increased value of goods or innovation and can be physical, environmental, economic, social and political (Emerson et al., 2012). Aside from the impacts, collaborative actions can also lead to adaption. This means that certain outcomes lead to new changes in the collaborative regime or system context. Think of this as for example, the addition of new stakeholders, new resources or other decisions about collaboration (Emerson & Gerlak, 2014).

Collaboration dynamics

(1) Principled engagement

The first component of the collaboration dynamics that will be discussed is the principled engagement. This form of engagement focusses on the engagement of different stakeholders with different issues and goals that work across their institutional, sectoral and jurisdictional boundaries in order to come up with certain solutions on problems, solve conflicts or create value (Emerson, Nabatchi & Balogh, 2012, p. 10) (Cahn, 1994). Characteristics of the principled engagement are that it occurs over time and often take place in face-to-face or virtual format, 'cross-organizational networks' and public and private meetings.
The involved stakeholders of the principled engagement can be referred to as the participants and their role or purpose depends on the context and objectives of the regime. Examples of these participants are for example, decision makers, agencies, NGO's, companies and corporations or communities. Each of the participants of the engagement bring a set of individual attitudes, knowledge, interests, goals or ideas to the table.
According to Emerson et al., (2012) (Ansell & Gash, 2008) it is important that these participants that are brought to the table should be the "right people" in terms of interaction between different perspectives and interests. Including multiple perspectives and interests into a collaboration process, allows the development of decisions that are broader and more considerate about the (positive or negative) consequences of the actions. Principled engagement happens over a period of time through the repetition of four basic dimensions of the process (Emerson et al., 2012), these are definition, deliberation, discovery and determination.
The first dimension *discovery* regards the present individual and shared interests, concerns, values and in which way relevant information can be identified. Secondly, there is determination. *Determination* means that different collaborative determinations, such as procedural decisions like agendas, discussions, assignments, and substantive determinations should be incorporated within the engagement (Emerson, Nabatchi & Balogh., 2012, p. 12). Thirdly, the dimension *definition* focusses on the efforts that should be made to build a shared meaning by coming up with a shared purpose and common objectives. These could for example be, agreements on concepts and participants, expectations of each other and clarifying tasks and criteria (Emerson, Nabatchi & Balogh., 2012, p.12) Lastly, the fourth dimension *deliberation*, characterizes the formation of multiple interests, which can be done through the examination of different issues and perspectives of the participants and coming up with public agreements on what can be seen as the common purposes.

Based on the four dimensions in the engagement processes, the partners or participants that collaborate, develop a shared sense of purpose and how actions should be carried out in order to achieve this purpose (Emerson et al., 2012). The shared thought or idea of the actions should be based on an understanding of the whole group about the problems or challenges, group activities and interventions (Williams, 2007) (Bresnen & Marshall, 2000).
To sum up, the principled engagement and its role in the collaboration process, when done successfully, can have a numerous positive outcome on the collaborative process between different stakeholders. These outcomes could for example be of influence on the improvement of clarity on key issues, facilitate a more effective and efficient management of the interests and conflicts, increase trust and shared understanding, integrate knowledge and increase decision making capacity.

(2) Shared motivation

Previously has been mentioned that during engagement between different actors, it is important that there is a shared idea and purpose for the key issues and actions that underlie the collaborative process and outcomes. In the Collaborative Governance Framework (Emerson et al., 2012) this shared idea is defined as *shared motivation.* The shared motivation highlights the relational and interpersonal elements of the collaborative dynamics and contains of the four elements: mutual trust, understanding, internal legitimacy and commitment (Ansell & Gash, 2008). The four elements of shared motivation will be shortly discussed below.
The development of *mutual trust* between stakeholders is a process that happens over time, due to carrying out work together, getting to knowing each other and to prove to one another that they are reliable, reasonable and predictable partners (Bresnen & Marshall, 2000). Trust can be seen as an essential element of shared motivation since in practice in can be used as an incentive or instrument to, for example, reduce transaction costs, improve investments and relations and the exchange of knowledge and innovation (Williams, 2007). Trust between the different stakeholders enables them to go beyond their personal or institutional borders and see issues, interests, possibilities etc., from different perspectives.
Secondly, when people trust each other, it is most likely that also *understanding* arises within the collaboration. Understanding is referred to the appreciation of the differences in others. Rather than agreeing on shared thoughts, values or goals (Ansell and Gash, 2008), in the integrative governance framework, the (mutual) understanding is more based on really understanding and respecting each other's positions and interests (Emerson et al., 2012). The third element is the *internal legitimacy*. Internal legitimacy can in easy words be referred to as the confirmation that the involved participants are trustworthy and credible, even though they have their own interests and perspectives. By trusting and understanding each other there arise some informal interpersonal norms during the collaboration process. Eventually, this leads to the creation of *commitment*, which is the fourth element of shared motivation. The commitment or shared commitment means that the different participants cross their sectoral, organizational or jurisdictional boundaries in order to collaborate in a shared path, which can be seen as a key factor in collaboration dynamics (Ansell & Gash, 2008) (Emerson et al., 2012).

(3) Capacity for joint action

The third element of the collaboration dynamics from the *Collaborative Governance Framework (CGF)* is the capacity for joint action. People, stakeholders and participants in general that choose to collaborate, make this choice mainly out of the purpose to generate outcomes together that they could not accomplish individually. Emerson et al., (2012) speak of the capacity for joint action as: "a collection of cross functional elements that come together to create the potential for taking effective action and serve as the link between strategy and performance" (Emerson, Nabatch & Balogh, 2012, p. 14). In other words, because different participants with diverse functional expertise work towards a common goal or purpose, the increasing capacity of working together will most likely result in a higher potential of effective actions and performance (Krajewski & Ritzman, 2005) (Luo, Slotegraaf & Xing, 2006).

In the *CGF* the capacity for join action is conceptualized into four interacting (essential) elements: procedural and institutional arrangements, leadership, knowledge and resources. Before, explaining the four elements, there should be mentioned one important thing. In the explanation of the previous two elements of collaboration dynamics, it became clear that these elements are, not surprisingly, very related to each other and influence the development and

existence of one another. Capacity for joint action is more or less an intermediate result or outcomes of the interaction of principled engagement and shared motivation (Emerson et al., 2012). Previously has been mentioned that collaborating groups or partnerships can face different challenges which ask for the creation of a 'shared' thought and some sort of collaborative atmosphere. In order to get the most successful outcomes from the collaboration, there should be an interaction that is based on respecting multiple perspectives, interests and functionalities to push each of the stakeholders to get the best of achieving mutual goals (Krajewski & Ritzman, 2005) (Luo, Slotegraaf & Xing, 2006)
Elements of the capacity for join action could be offered before a collaboration by the initiator of a plan to induce other stakeholders to hop on board of the plan (Emerson et al., 2012).

The first element of the capacity for joint action that will be discussed are the *procedural and institutional arrangements.* These arrangements can be explained as the organizational structures and protocols which are essential for managing the interactions of stakeholders (over time). Think about these as for example: agreements for rules, operating protocols, decision rules etc. However, 'informal arrangements' or 'norms' are not strong and sufficient enough as a base for long term collaborations, which especially are necessary public and private partnerships (Bloomfield, 2006) (Emerson et al., 2012). When it comes to large, complex and long-term collaborative networks, there should be very defined structures and procedures for the administration and management of how work will be carried out (institutional design factors) (Ansell & Gash, 2008). The arrangements should be clear and defined at multiple levels, on the one hand it should be defined how individual groups or organizations will govern and manage themselves in the collaborative initiative, which can be referred to as the interorganizational level. On the other hand, groups should define how they will govern and manage together in the Collaborative Governance Regime (CGR) and integrate with the external decision-making bodies, which takes place at interorganizational level (Emerson et al., 2012).
The importance of *leadership,* which is the second element, speaks for itself. When it comes to collaborative governance, leadership can be an external driver, as we have seen in the system context earlier, and an essential component of collaboration. Collaboration governance asks for multiple roles of leadership such as for example, sponsors, facilitators, mediator, representative and so forth. Good leadership and clarity on the roles are essential for critical moments in collaboration, such as conflicts
(Huxham & Vangen, 2000).
The third element of the capacity for joint action is *knowledge*, which can be seen as the 'currency' of collaboration (Emerson et al., 2012). Knowledge flows, as it were, through the various networks of collaboration and is shared and generated together. Knowledge is more than just information and data, as it serves to guide action of people. Because of cross-organizational learning, combing existence knowledge can lead to the creation of new knowledge and therefore increase social and human capital of a group (Inkpen, 1996) (Bozeman & Corley, 2004).
Lastly, the fourth element *resources*, is the potential of exchanging resources which is one of the main benefits of collaboration (Thomson & Perry, 2006).
There are many different kinds of resources that can be found or shared in collaboration, such as funding, time, assistance, skills, expertise etc.

So, we have seen that collaborative governance is of great importance in determining who has influence, makes decisions and how decision-makers are held accountable. Therefore, according to Cruz and Sarmento (2017), the greater the participation of different stakeholders in the decision-making and planning process, the greater the evidence of collaboration and

possibly a more successful performance of the process. According to Emerson et al., (2012) after the explanation of the different interacting dimensions of the collaboration dynamics, the following proposition could be made about defining the collaboration dynamics: "the quality and extent of collaborative dynamics depends on the productive and self-reinforcing interactions among principled engagement, shared motivation, and the capacity for joint action" (Emerson, Nabatchi & Balogh, 2012, p. 17)
In own words, in which way the presence and role of collaborative dynamics can be identified in the collaborative process is strongly determined by the nature, relationship and interaction of the three dimensions principled engagement, shared motivation and the capacity for joint action. In the next section, this will be further explained in more detail in on the basis of a conceptual framework.

2.5 Conceptual framework

Based on the theoretical framework, a conceptual framework, as illustrated in Figure 4 has been established. This research study focusses on the interaction between the public and industry side within smart city development, as has been defined during the theoretical framework. Based on the triple helix (Leydesdorff & Deakin, 2011) the relevant stakeholders have been converted into a graphical representation, which aims to show the triangular interaction between the three stakeholder groups of this study (Fig 2). However, since the research focusses specifically on the interaction and dynamics between the public and industry side, the knowledge stakeholder group is partly excluded.

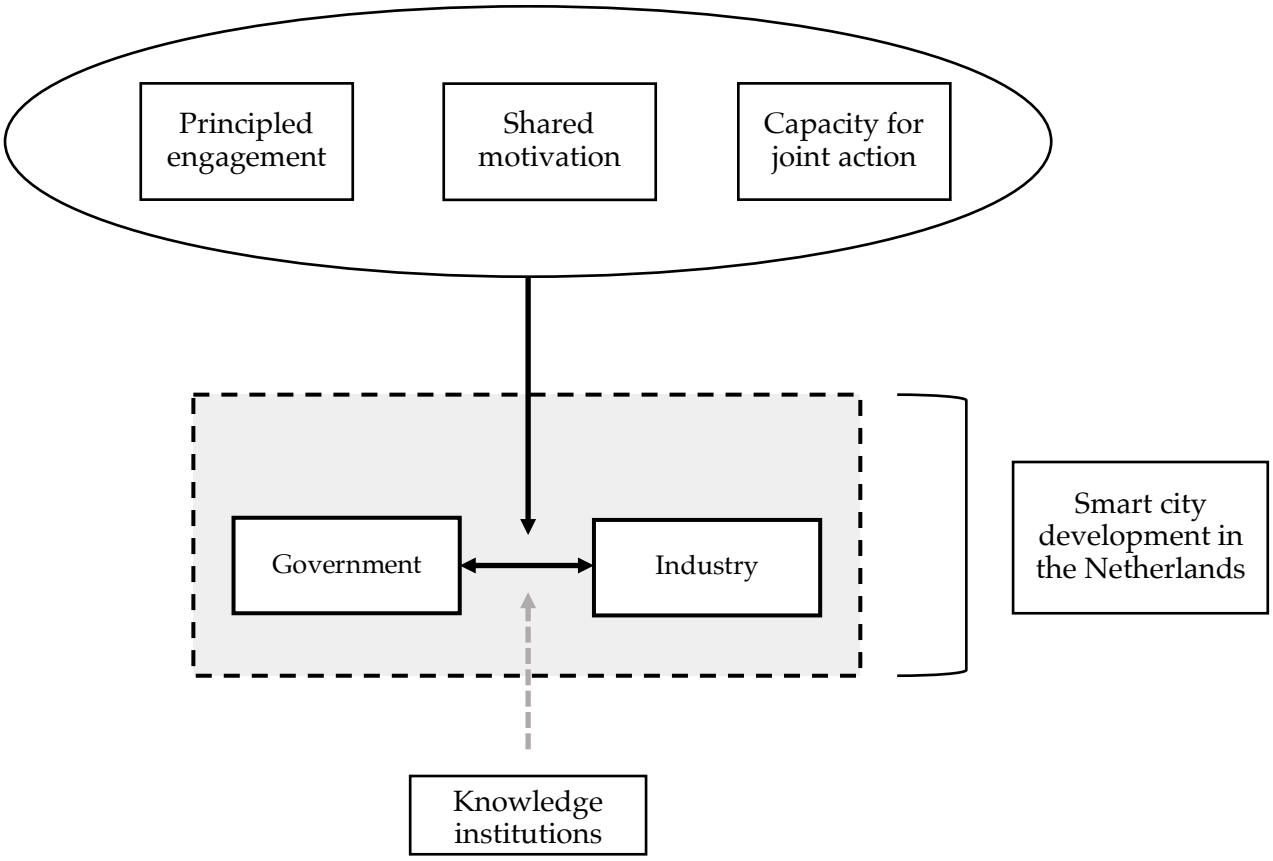

Fig 4. Role of the three dynamics on the public-private collaboration process between the interacting groups of stakeholders within the context of smart city development

The deeper structures of the governance and collaborative process depend on the interaction among the three collaboration dynamics: principled engagement, shared motivation and capacity for joint action. The conceptual framework displayed above illustrates the main research question and sub-questions where the arrow between public and industry represents the collaboration in through partnerships. This arrow is an important element in the framework and in the research study since it holds the interaction of the underlying interests between the two sides in the collaboration. This interaction exists within the context of smart city development in the Netherlands as has been displayed with the grey area. The research questions aim to explore the role of the collaboration dynamics, hence why the arrow from the three dynamics goes to the collaboration between public and industry. The last element of the conceptual framework is the influence of knowledge institutions as has been mentioned earlier.

It can be said that the conceptual framework illustrated in Figure 3 presents three important elements of this study: the interacting groups of stakeholders, the existence of public-private collaboration in smart city development and the role of the collaboration dynamics in this context.

3. Methodology

3.1 Research paradigm

When conducting a research study, it is important to be aware of the perspective from where you are doing your research. This is referred to as a research paradigm, that according to Guba and Lincoln could be seen as "a set of basic beliefs that deal with ultimates or first principles" (Guba & Lincoln, 1994, p. 107). In other words, it is the perception of the world that defines for a researcher what the nature is of the world, how the place of individuals should be viewed and what the possible relationships are in this world and its parts (Guba & Lincoln, 1994)). It is an important step at the basis of your research methodology to be aware of the paradigm from where you are going to do your research and how the data of the research phenomenon should be collected and analyzed. First of all, the ontological position that you take as a researcher is an essential step in your research. In short, ontology refers to the 'nature' of what is studied and how a researcher believes what the (social) reality is based on and exists of. In this case, the research phenomenon is believed to exist out of a subjective context where the reality is based on people's perceptions, experiences, interpretations and meanings. This research study focusses on the deeper underlying thoughts and personal beliefs of the respondents and is therefore believed that the reality is socially constructed by the people. The epistemological position comes from the 'nature' of knowledge with the question whether a researcher can actually know the reality (Guba & Lincoln, 1994). This research focusses on the concept of smart cities and partnerships. These are topics which can be interpreted in different ways and the differences in interpretations should be appreciated. The concept of smart cities is still a very subjective topic that is based on own perspectives and beliefs and consists of many aspects that should be reflected. Partnerships are constructed by people; their perceptions, motives, roles etc., and are therefore based or do exist on social interactions and constructions. Moreover, these open interpretations and constructions by people also relate to the dynamics of collaborative governance, which is the central topic of this study.

As a researcher in this study it is tried to get an interpretation of the phenomenon and come to a certain level of understanding. Thus, the ontological and epistemological position that is taken in this research can be seen as interpretative. The research paradigm that is central to the operationalization of the study is a constructivism paradigm. Before heading to the further steps of this research methodology, a few things should be mentioned regarding the interpretative perspective and constructivism in research (Bryman, 2012). The data of the study is subjective; therefore, the role of the researcher is important since the way that subjective data, perceptions, thoughts, beliefs etc., are collected is largely dependent on the way the researcher conducts his research methods. Another important thing within an interpretivist approach and constructivism is to be aware of the context in which people's actions and interactions are studied. This is of influence for the methodological position that has been taken in the research, which will be made clear in the upcoming sections.

3.2 Research strategy and design

Due to the limited existing research on collaborative governance and public-private collaboration within smart cities and still the vague and complex concept of a smart city in general, this study is of explorative nature. According to Van Thiel (2014) and Bryman (2012) explorative research can be used to investigate a subject about which is only limited

knowledge available. Through exploration, it can for example be studied how actors assign meaning to certain things or concepts. It should be mentioned that this exploratory research is not aimed to come up with concrete solutions. However, the research can contribute to determine the nature of the research problem and to get a better understanding, which could provide as initial groundwork for future studies.
Furthermore, due to time and occurred limitations with regard to the collection of data and findings, an exploratory research offers sufficient flexibility (Bryman, 2012).

Qualitative research is a research strategy that fits to the explorative nature of this research (Bryman, 2012). Therefore, it has been decided to use this strategy as the method of research in this study. During this research, the underlying thoughts and perceptions of the various involved stakeholders in public-private collaboration will be examined more deeply. Qualitative research is an appropriate research method when there is a need for insight into "how" and "why", and to gain an in-depth understanding upon a certain phenomenon, rather than researching quantitative correlations between variables (Van Thiel, 2014). Qualitative research can provide a deeper insight into attitudes, behavior and motivations of the respondents. The research questions aim to investigate the role of the *collaboration dynamics* and are therefore considered as explorative, where it is tried to find underlying elements that result into these roles. The theoretical framework has shown that collaboration between the public and private sectors in smart city development is a complex topic. Because this complexity mainly concerns interpretations of people and organizations, words are more important than numbers. Therefore, a qualitative study is chosen as a basis for this research design.

3.3 Selection of respondents

The first step of selecting the respondents was to operationalize the stakeholder groups from the theoretical framework to selectable respondents in practice. This has led to the operationalization in Table 3 below.

Stakeholder typology	**Representatives of**
Government	o Municipalities (directors, project managers or officials) o Public facilitation/coordination/network organisations or other public institutions. o National/regional/local governmental agencies with consultancy or expertise tasks.
Industry	o Large/corporate (international, national) companies o Local/SMEs/start-ups/entrepreneur companies
Knowledge (institutions)	o City and academic research institutions (universities and higher education schools) o Non-academic public research institutions

Table 3. Operationalization stakeholder typologies (Chapter 2)

Based on the operationalization of the stakeholders, exploratory research has been done on large (national) smart city initiatives in the Netherlands. First of all, the Dutch national Agenda Stad (MBZK, 2014), which is a national initiative that focuses on the overlapping areas of economy, livability and innovation, has been consulted. This initiative stimulates the

collaboration between different stakeholders in order to create opportunities and tackle challenges in urban areas. The collaboration of Agenda Stad works by City Deals (NSOB, 2017), which are cooperation arrangements between different levels of governments, businesses, civil society and other relevant stakeholders. The City Deals aim to achieve the objectives of the national Agenda Stad which are strengthening the economy, innovation and quality of life in Dutch cities. In addition, they also aim to create new forms of cooperation in which urban issues are addressed efficiently. Since digitalization and technology are rapidly changing our cities and regions, there has also been established a City Deal for innovation, which focuses on the development of 'a smart city'. This initiative has already gained the participation of multiple stakeholders from different sectors and domains, variating from regional and local governments, to large private companies and knowledge institutions. According to the City Deal, participants of the initiative are part of a large public-private network in the field of digitalization and technology in the city. Participants are actively involved within the collaboration and development of innovative initiatives.
Next to Dutch national Agenda Stad and the City Deals, during the exploration of smart city initiatives there was also found a smart city initiative in the region of Amsterdam, which is Amsterdam Smart City (Municipality of Amsterdam, n.d.). The Amsterdam Smart City initiative can be seen as a partnership between various stakeholders such as companies, governments, knowledge institutions and citizens. The initiative claims to be a public-private partnership that consists of a multiple partner platform based on different backgrounds. According to the involved partners, they have the common aim for the city and region to move forward when it comes to the smart and innovative development of the city and are convinced that this can only be achieved through collaboration. By integrating different assets and actions, it enables the partnership and thus the Amsterdam Smart City initiative to meet the most important challenges and transitions that the city is facing today.

Both initiatives have been explored thoroughly and because the respondents for analysis have to meet several characteristics that have been operationalized, the selection of respondents for this study has been done by the "purposive sampling" research method (Bryman, 2008). This means that the respondents will be selected by own judgement based on their value and involvement in the study. The selection of the representatives was done according to the following structure. First, the City Deal and Amsterdam Smart City initiatives were chosen because of the characteristics regarding public-private collaboration from the theoretical framework were noticed. Secondly, based on the operationalization of the stakeholders (Table 3) multiple participants were selected that were both visibly involved in the City Deal (for smart cities) and on the digital platform of Amsterdam Smart City. The third step was to do an exploration on these selected organizations and decide based on own judgement whether they were actively involved in smart city development and public-private collaboration systems.
Based on own judgement and the stakeholder operationalization, a total of 38 representatives of organizations have been contacted for conducting interviews, where eventually 11 have reacted and have been interviewed. It should also be mentioned that from the 38 representatives that were contacted, some of them recommended another person in their organization that would be more suited for the interview, this resulted eventually in the most valued representatives for the research study. A complete overview of the respondents, their field of work and their role in the selection, can be found in Appendix B.

3.4 Research methods and data collection

The qualitative research of this study consists of two parts: collection of secondary data through documents and the collection of primary data through interviews. The first part of the data collection consists of a study into (policy) documents related to the subject of this research. On the basis of this, an attempt is made to get an idea of the context of where the Netherlands is currently standing within the development of smart cities and the role of public-private collaboration in this matter. The study into the various (policy) documents offers leads that will be used for constructing the interview guide and will serve as background information for the in-depth interviews.

In this research, secondary data collection mainly serves as a basis for the primary data collection which are the in-depth interviews, as it is a way to prepare on knowledge of the research subject. If there is more background knowledge on the context of the research phenomenon, it is better to anticipate answers and thus create better questions and get the most out of the respondents' interviews (Bryman, 2012) (Van Thiel, 2014). This is especially useful in this research regarding the open and semi-structured nature of the interview guide. The secondary data collection is an exploratory activity; therefore, the aim is not to come up with concrete data, but rather to get acquainted with the context of the research phenomenon and problem. The findings of this data collection could be still important in order to see similarities of what has been mentioned in the primary data findings as a form of triangulation (Van Thiel, 2014).

3.4.1 Documents

The consultation of relevant policy documents regarding smart city development in the Netherlands and to public-private partnerships in practice in general, has resulted in sufficient background knowledge on the context of the research phenomenon and problem prior to the interviews. This background knowledge and findings from the documents have also led to the development of certain interview questions and was therefore useful as a first preparatory method of research and for establishing a basis for the primary data collection. The consulted documents can be found in Table 4 below. It can be noticed that only one document has been consulted. This decision is made based on the most relevant information that was found for this particular topic and scope. After consulting this strategy document, sufficient background knowledge was gathered prior to the primary data collection and other documents did not add any further interesting findings. Unfortunately, this lowers the validation by means of triangulation, however, as has been mentioned, was an extensive document analysis not the purpose of this secondary data collection. For the presentation of these findings, statements from the document have been used and translated from Dutch to English.

Document name	**Field**	**Year**	**Document type**
NL Smart City Strategie	Strategy/Policy	2017	PDF

Table 4. Consulted documents for secondary research

3.4.2 Interviews

One method that is often applied in qualitative research is that of the interview (Van Thiel, 2014). Interviews are a flexible way for collecting data, since it offers the researcher to ask supplementary questions during the conversations in order to gain a fuller understanding of the topic. Because this study focuses on the interaction between different actors, interviews can provide new insights. Interviews can be used to gather in-depth information from the experiences and underlying thoughts of respondents in order to arrive at answers to a previously formulated research question or problem. When making and conducting interviews, a researcher can choose from fully structured, semi-structured or open questionnaires. For this research it has been decided to use a semi-structured/ (semi) open interview method. In semi-structured or (semi) open interviews, the researcher often works without pre-structured questionnaires, but works on the basis of a topic list and a semi-structured questionnaire as basis and guideline. Through semi-structured interviews, the researcher can often get a lot of information about various subjects in a short period of time. Also, semi-structured interviews are believed to be a useful method in order to collect data in a context of limited previous knowledge about the issue (Reulink & Lindeman, 2005). The questions and topics for the interview have been established based on the theoretical framework and with background information of the secondary data collection. The interview guide can be found within Appendix A. The interview guide was literally used as a guide for the conversation and to be reminded to still focus on the relevant information for the research even though the openness and unstructured nature of the conversations. All interviews started with a short introduction of the research study and aim, followed by an introduction of the interviewee. Then the conversation would mostly kick off by talking about what their current involvement is within smart city development and gradually came to their role in public-private collaboration and the interaction and underlying collaboration dynamics.

The interviews have been conducted during the period from 29th of June to the 15th of July. The organizations have initially been contacted by email or by telephone with a short indication of what the study is about and if they would like to cooperate in my study. Most of the interviews have been held by phone and some of them by Microsoft Teams, and took around 30 minutes to 90 minutes with an average duration of around an hour. For the confidentially of this research, there was asked prior to the start of the interview if they agree that the conversation was recorded and if their information could anonymously be used for research purposes. As a result, 11 interviews have been recorded and saved as audio files.

3.5 Data analysis

The method for analyzing the results of the interviews has been done by coding. Codes are a way of indicating what certain units of qualitative data means, as it is a brief summary of the main attributes or features of the unit. Assigning similar codes to data units creates the possibility to compare differences in data (Van Thiel, 2014). Through an operationalization and a coding scheme in the methodology, conceptual elements and theory can be drawn from the theoretical and conceptual framework.
For the data analysis of this study, first the audio files of the interviews have been listened and written to a global transcript. The decision for writing a global transcript is based on the matter of time and the animosity of the interviews, during the interviews multiple times names of organizations or projects have been mentioned, therefore for the sake of animosity, recorded information such as examples are left out of the transcript. The second step of the

data analysis was to code the data by using the computer software ATLAS.ti. The coding has been done by using a pre-defined operationalization and coding scheme based on the dimensions of the collaboration dynamics and indicators that are drawn from the theoretical framework. This is a deductive approach to coding data, where the predefined scheme has been used as a reference and guide for the coding process (Gibbs, 2007). The coding scheme can be found within Table 5 below. In the scheme, every dimension has a color and the indicators are numbered. The same colors and numbers are used in the ATLAS.ti program so that it is easier to structure the different dimensions within the transcript. The third step of the data analysis was to read the transcript and assign the indicators or codes to certain parts of the text that would fit the indicator based on own interpretation. The dimensions have been categorized into the three groups of dynamics, so in the end it was clear how the presence of the three collaboration dynamics group was visible in the total transcript. The analysis has been done in three rounds of coding which has eventually led to the final results of the data analysis. An important thing that should be mentioned here regarding the data analysis is that the primary data collection has been done in the native language of the interviewees, which is Dutch. Therefore, statements that are being presented in the findings are translated to English and it was tried to translate these statements as close to the original as possible.

Collaboration dynamics	**Dimension**	**Indicator**
Principled Engagement Participation of different stakeholders with issues and goals that work across their boundaries to come up with solutions, solve conflicts and create value.	*Discovery*	1.Individual interest, goals, concerns and values
		2.Shared interest, goals, concerns and values
		3.Risks
	Determination	2.Identifying agendas within the engagement
		3.Coordination
		4.Alignment
	Definition	1.Efforts should be made to come up with shared interests
		2.Transparency and clarification on individual interests
		3.Matching individual interests and expectations
	Deliberation	1.Examination of different problems and perspectives to common objectives
		2.Jointly investigate
Shared motivation Highlights the relational and interpersonal elements that establish a shared idea that underlie the collaboration process.	*Mutual trust*	1.Establishment of relationships over time
		2.Knowing each other motivates collaboration
		3.Reliability
		4.Predictability
		5.Reasonability
		6.Trust
		7.Crossing personal, institutional and organizational boundaries
	Understanding	
		1.Respect
		2.Acknowledgement

		3.Acceptance
		4.Understanding
	Internal legitimacy	1.Trustworthy
		2.Credibility
		3.Conformation
	Commitment	1.Commitment
		2.Crossing sectoral, institutional, jurisdictional and organizational boundaries
		3.Shared path
Capacity for joint action Working together towards a common goal or purpose increases the capacity of working together and will most likely result in a higher potential of performance and outcomes.	*Procedural and institutional arrangements*	1.Define governance and management
		2.Interorganizational level
		3.Agreements, arrangements structures, rules, protocols, contracts
	Leadership	1.Visible leadership
		2.Roles/Functions
		3.Facilitation
		4.Mediation/Connection
	Knowledge	1.Knowledge
		2.Guidance
		3.Information, data, human capital
		4.Networks
	Resources	1.Exchanging resources
		2.Expertise/Skills
		3.Time
		4.Funding/Money/Support

Table 5. Indicator and coding scheme for data analysis in ATLAS.ti

3.6 Validity and reliability of the research

Qualitative research has advantages and disadvantages when looking at the reliability of the results. Reliability means the accuracy and precision of a procedure to investigate/measure something (Bryman, 2008). Easier said, it comes down to how often something can be repeated and still gives the same results. However, for this study it is difficult to repeat the study as it is not a quantitative study where measurements are taken. Reliability is therefore achieved as much as possible for this qualitative research by providing extensive explanations and arguments for the choices made during the methodology. Being critical of your own choices and flaws also increases reliability. It is often difficult to examine the interests and experiences of respondents, because they have their own agendas and, above all, have their own interests, but by discussing the same topics in all interviews, I hope to arrive at reliable results. There are a number of main topics that will recur in every interview that are based on the research questions, theory and preparatory research (Bryman, 2012). These topics have also been researched with the use of documents as a form of triangulation. In addition to reliability, validity is also very important in the methodology. The validity of the research can be described as the extent to (in scientific studies) what is actually aimed to be investigated is also being investigated (Bryman, 2012) (Van Thiel, 2014). In order to strengthen and ensure

the quality of this study as much as possible, during the methodology it was aimed to be as thoroughly as possible when making decisions and conducting the methodological part of the research. One example of this was to conduct interviews in the native language of the respondents, so possible language barriers would not be relevant and getting the most out of the conversation could be stimulated. Another example of the quality of the research was the data analysis. During the data analysis and in particular the part of coding, the coding has been done in multiple rounds in order to keep having a 'fresh' look and interpretation of the data, so no relevant data was left out of the analysis. This ensured that the most relevant data for the results were found. A comprehensive discussion on the quality of the research and methodology will be given in the reflection part at the end of the document.

4. Findings

In this chapter the findings of the research will be presented. First, the most interesting findings of the secondary data collection will be discussed. As already has been discussed in the methodology chapter (Chapter 3), the secondary data collection was done in order to gain background information on the context of the research topic and this has contributed to the collection of primary data. The second part of the findings will be the presentation of the findings of the primary data collection through in-depth interviews. Here, the different dimensions of the collaboration dynamics will be presented similar to the structure of the theoretical framework.

4.1 Context

In 2017 as a result of an initiative by the State, multiple experts from different disciplines came together to create a shared vision about the direction for Smart Cities, from society and practice. At the table were among others, national government, city governments, companies and scientists and other institutions. Eventually, they established the *NL Smart City Strategie* (2017) for the smart city development with regard to the joint transformation process of the Netherlands. This strategy describes how the current situation of the smart city transformation process in the Netherlands can be characterized and the 'how' and 'what' questions that should be asked with an eye to the future. The focus of the vision is on how new forms of collaboration across different domains can be used and facilitated and what preconditions and resources are needed to realize innovation in these domains.

In the next section, an overview will be given on the most important topics and assumptions that can be drawn from the document and will this provide an exploration of insights and knowledge prior to the primary data collection.

4.1.1 Urban and social challenges

When it comes to the transformation of cities to 'future ready', an important starting point is the resilience of cities. This means that cities are able to respond to unexpected challenges that may arise and to organize the systems in such a way that cities are ready for future developments and changes. As mentioned earlier, technological and innovation developments can help with this. In order to move towards the right form and degree of resilience, it is important that it strikes a good balance in what the current and future issues of society are or will be, and what can be achieved from the innovative and technological capacity.

"By working together more intensively from the start of projects, issues can be tackled more quickly in the implementation."
(NL Smart City Strategie, 2017, pg. 25)

As a result of the rapid developments, the responsibility of cities is becoming increasingly more complicated. Driving their agendas and policies requires actions and resources that are often beyond their own capabilities. Likewise, the concept on 'how' and 'what' a smart city should ultimately be is still a widely interpretable concept. Different cities, but also groups within cities, have their own perceptions about transforming a city into a smart city and what

this transformation really entails. Continuing to experiment independently with initiatives, visions and strategies will lead to fragmentation of knowledge and could ultimately limit the development of the shared (public) interest. It is therefore important that different domains and, more precisely, groups of stakeholders, come together and collaborate on tackling challenges together. This integration aims to promote the public value of smart city development in which the quality of the living environment can be improved with a view to sustainability and digitization. It is essential to facilitate new forms of collaboration between and within organizations from, among others, the private market, knowledge institutions, citizens and governments. Easier said, knowledge, networks and resources should be integrated as much as possible.

4.1.2 The use of smart city initiatives for social interest

Following on from the previous sub-section, sharing and integrating knowledge is an important starting point. This also involves the right forms of networks to reach each other. Developing and facilitating networks with an eye to the future requires visions that also focus on the longer term. Herein lies the task of (local) governments to be clear about what should be pursued in the long term and how this could be done (*NL Smart City Strategie*, 2017).

"Technology is a very important tool for realizing change. It is the common thread in all initiatives, but never the goal in itself. Smart Cities are about ongoing reorientation of urban issues on the basis of the fast-changing trends and technology in society."
)NL Smart City Strategie, 2017, pg. 28)

When it comes to the transformation to be 'smart', it is important to develop a clear and feasible (national) vision of how technology and society can complement each other. This ensures that the parties involved know where they stand, and where the fragmentation of knowledge and limited capacities can be converted into joining forces. It also contributes to implementation of technological applications in favor of the smart city transformation process. The development of technology is an important means in this, but it should not be the goal to be pursued. It is about the deeper change of systems and the formation of networks in order to make cities resilient to (future) social and urban issues and challenges through smart city development.

According to the *NL Smart City Strategie* (2017) a number of strengths and weaknesses can be drawn from the Dutch smart city transformation process, which can currently influence further development and upscaling. Due to a lack of investment and decisiveness, projects often find trouble to get off the ground. This is largely due to the lack of alignment between the actors that are involved. For example, private companies mainly look at their return on investments opportunities. These "economic" interests may clash with the questions from the political or societal angle regarding public interest. Upscaling of smart city initiatives and projects is therefore limited if individual interests do not reach common objectives.

4.1.3 Public-private partnerships in cities

This sub-section provides insight into one of the five preconditions that, according to the *NL Smart City Strategie* (2017), are essential for the smart city development process (in the Netherlands). This research focuses on public-private partnerships in smart city

initiatives/development, which is why this precondition is specifically highlighted and discussed in this research.

"Mutual trust, shared principles and agreements about the desired result."
(NL Smart City Strategie, 2017, pg. 64)

According to the *NL Smart City Strategie* (2017) collaboration and the joining of forces and capacities is an important starting point of the transformation process. Local governments are looking for opportunities to form networks with other involved market parties in order to achieve a collaboration that matches their public agenda and interests. However, in practice this collaboration with market parties often proves to be a major challenge. One of these challenges is the ability to actually take initiatives that are implemented in practice. This is because experimenting and taking risks are a factor of uncertainty for both sides. Without mutual trust, control and involvement in the end result, the management of initiatives seems to be out of the hands of the independent parties. Collaboration between public and private parties can be a powerful tool to promote smart city development but given the uncertainties of the concept and the long-term commitment it requires, it is important that mutual interests meet and that uncertainties are converted into beneficial situations for all parties involved.

"Also, for Smart Cities applies: not one size fits all."
(NL Smart City Strategie, 2017, pg. 36)

When it comes to public private partnerships it is hard to put a finger on one particular one-size fits all method or blueprint. However, there are multiple fundamental factors that seem to be present in the initiation and implementation of successful partnerships. On the frontline, there should be good governance and leadership from the public side. This results in for example clear objectives, defined responsibilities and capabilities, transparency and the consultation with stakeholders. These are several factors where public-private partnerships should at least begin with. In addition, it is essential that there is a clear identification of challenges or limitations that should be tackled and that partners are willing to commit to these on a long term. Furthermore, a clear identification of tasks and responsibilities and a clear management structure should be reached and involved stakeholders should be aware of the exchange of resources and contributions. Lastly, regulatory frameworks should be considering since they are able to shape interactions between the public side and industry.

All in all, the fundamental thought in many public-private partnerships that are related to innovation is to gain (broader) social and economic benefits from joint investments and actions. This supports the acceleration of innovative and technological solutions to possibly tackle key challenges in the societal wellbeing and economy. Partnering can help to establish a collaborative ecosystem in order to maximize expertise and capabilities among multiple stakeholders, such as governments, knowledge institutions and industry. As already has been mentioned before, in order to get this collaboration, it is essential that the main conditions for forming a partnership; common objectives, mutual benefits and resources, should be thrived for. This asks for an open interaction between the public side and industry, where informational and behavioral barriers should be overcome.

4.2 Collaboration dynamics

During the theoretical framework it became clear that collaboration is strongly affected by the underlying dynamics in the process. As has been shown in the previous findings on the context, documents and in this case also strategies for the smart city development in the Netherlands, acknowledges the importance of collaboration. Therefore, in order to get to know how this collaboration can be reached within practice, this section presents the findings of the collaboration dynamics that have been found during the primary data collection. The primary data collection has been done by conducting interviews, where the most interesting statements are highlighted and discussed. Before reading, it is advised to take a look at Appendix B, for an overview of the interviewees and reference.

4.2.1 Principled engagement

Discovery

The results of the interviews show that collaboration between public and private parties in smart city development often arises from a particular social or urban problem or urgency that is usually initiated by the public side.

"PPS often arises from an urgent problem or societal agenda put on by the government, researched at knowledge institutions and ultimately it is the private companies that see the opportunities because they are at the forefront of development." (ID 1-INDX)

"Importance of the triple helix, knowledge institutions and the organizations will need each other, when we talk about how PPP originates, we are talking about a driving force. Where the business community needs to see it, where the knowledge institutions can offer innovation and where the government can come to insight that it is facilitating." (ID 1-INDX)

Both quotes show that the basis of a public-private partnership often lies on the agenda of a government issue, in which it is then examined how other relevant parties can be included. The interviews show that, for example, these could be issues in which a municipality wants to implement new developments in a "smart" way and needs the help of the private side and possibly knowledge institutions.

The various interests that play a role prior to a collaboration are fairly clear from the interviews and how public and private interviewees relate to their interests. A similarity can be noted between the mentioned interests of the interviewees from both public, private and knowledge institutions. For example, the interviews show that public interests largely stem from the public interest to improve the quality of life in cities or regions. This public interest has also emerged in the theory and secondary research. The interests from the private side often come down to the economic interests, their revenue models and the space they need for their innovation. To begin with, the quotes below show what the different interviewees think about public and private interests. First of all, the most interesting quotes related to public interests are mentioned, followed by quotes regarding to the private interests.

"We concluded from the municipality that if you look around you and see what happens in society, then you see that digitization of new technology data is becoming an increasingly important part of society. So that means that you have to have an answer to this, either left or right as a government.

On the one hand because people are in broad sense, including private parties, asking for action on our part, but on the other hand, it can also be very beneficial for you as a municipality to make use of that." (ID 7-GOVX)

"We have said in our municipality with smart cities, we see it as a way of working together, smart city is a way of working with different stakeholders; citizens, private companies, knowledge institutions, educational institutions and governments, so the four to improve the quality of life. Improve what is the task of the city." (ID 6-GOVX)

"As a government, we also understand that the company wants to recoup their investment, we also have to provide space for that, which is a question of exploring what is the social benefit of the technological solution and how much space do we want to give for that?" (ID 6-GOVX)

From the quotes displayed above, it appears that the public side is hitting the course of, as it were, a new development and transition that society and cities are currently dealing with or about to experience in the future. It recognizes that the role of technology and digitization is becoming increasingly important in this matter and that the government must be able to deal with this. It is important here that technological developments can be linked to social objectives.

The interests of interviewed private organizations that become clear from the interviews is the potential that they can derive from the developments in the economic field. It is important for private parties to have a positive business case and to be able to convert their technological applications into a revenue model. This emerged from all private interviewees in every conversation. What was interesting, however, was the perspective of a large private organization that works strongly from an international 'portfolio' or interests. This clearly revealed a certain clash between public and private collaboration regarding to technological developments. The following quotes are used to demonstrate this.

"When it comes to development projects or initiatives that are first but are promising, we do not want to lose any money in that, but there must be a positive business case over the horizon. And then there is a trade-off; is it interesting? is it a growth market? is there potential for the future, can we do something with it? what is the prognosis? what is the relationship with other parties? how well do we know knowledge institutions? You have to see it, it is the trade-off between we put our portfolio in there and can we make or earn our living there." (ID 5-INDX)

"We also have a vision when it comes to smart cities, but we already have that vision. So, the problem is often that we as the Netherlands are a region from a large global device, our solutions are ready. We understand that the policy in the Netherlands is not yet ready, but we simply have all kinds of smart ideas and solutions." (ID 5-INDX)

This private organization is closely linked to the interests that come from a large organizational system and in which there is a certain portfolio that must be used for their decisions. This ensures that the consideration of participating in a collaboration may increase. Though, that it is potentially an interesting party for public parties to want to collaborate with given their size and capabilities, the interviews show that from the private side this potential to work together is not as smooth.

"We say, we just have the applications ready, cities can just get these technological applications, so you name it. If you ask me, the government wants an integral vision and policy on this, be my guest, but we cannot do that much. We can only say this, and we developed this." (ID 5-INDX)

"The question is asked how you see it for you to expand or integrate that, but then it becomes very difficult. Then you enter the playing field of local interests, the local field. It must be something that has been determined here and then we say that you can experiment, we often see that there is experimenting with all kinds of ideas and good intentions, but then we say if you are experimenting then we do not participate, because we are already done." (ID 5-INDX)

This tension arises from a certain expectation that a municipality has about a large private organization that deals with technological developments. The municipality sees this as an opportunity to experiment with developments in which various parties are involved. However, according to this interviewee (ID 5-INDX), a large private party does not always have the same way of working in this, because they are already working on technological applications from a specific interest and this small-scale experimentation phase does not always suit their portfolio.

In another interview, this "clash" is also sort of mentioned by an interviewee from the public side.

"Then you see that all tech companies in Europe are entering that market, but that is also a danger, because as a government you do not want a lock inn, we do not want to pawn our vulnerable communication network or have a lock inn with this type of large company, so there is a huge discussion of yes how you do that. On the one hand we know that just like sewers facilitations, internet must become a commodity, but to exploit and operate all of this is deposited with the service providers and there is a kind of gap between, you still need someone who is in between as a kind of urban operator or party." (ID 8-GOVX-INDX)

The different interests show that public and private collaboration in new developments relating to society, technology and digitization is very complex. The interviews show that people are aware of this complexity, but in practice the conflict of interests still causes them to struggle. A number of interesting quotes have emerged with regard to how the complexity is expressed and experienced and how the interviewed organizations deal with this from their own perception.

"There are few governments that really have an integral vision about the city how they want to make the city smart, that is a choice, something that is just going to happen and that happens to many governments. But they are not proactive in. Maybe very large municipalities do, but many municipalities are not proactive in this, while they will get these kinds of issues on their plate, you just see this will happen, only many governments do not yet realize what that means." (ID 4-INDX)

This statement was appointed by a private interviewee and mainly concerned the larger municipalities and regions in the Netherlands. For comparison, the same word "proactive" has been used by an interviewee from the public side.

"Then we said you can do two things, you can make it happen and wait for people and companies to come to you and ask you questions and then figure out what you want. Or you can turn it around and think let we consider how we deal with this in our own position and our own assignments, we have opted to proactively focus on this ourselves." (ID 7-GOVX)

There is an important starting point that has been reflected in almost every interview and is according to the interviewees of great importance in public-private collaboration and the formation of partnerships. This principle is to create clarity and transparency between the different interests, objectives and problems at the earliest possible stage. An early discussion on what could come later and how this would limit possibilities of solutions and control risks, should be clear and parties need to be transparent about their own agendas and interests, even when they shift along the way.

"Make a good inventory at the front, who are the stakeholders, what are the interests and engage in a dialogue with them, also manage them. SWOT analysis must be very strong and also keep up, regularly bring up again how everything was, let's have another conversation with that particular stakeholder." (ID 2-INDX)

"It is better to take the initial phase half a year longer than to think too early that we are here, we are going to do this and now we are going to fly. The start phase is so important that you really need to know for sure what you are going to do before you really start. If necessary, think about it for half a year longer, go and have a closer look, really have an eye on everything, as far as possible. It is so important that this phase is not rushed. Everyone must know what the scope of a project is, be clear and transparent about it. Don't get to work with each other if it is not clear and transparent and you think it will gradually come." (ID 2-INDX)

The quotes displayed above provide a clear picture of the importance of good (early) preparation in a collaboration. It is important that partners in a partnership throw as much as possible on the table and are clear and transparent about their interests, this takes time and effort in which both parties will have to participate.

The discovery dimension emerged in the results of the interviews as the part of getting insight into the various interests and uncertainties that underlie collaboration between public and private parties. The other dimensions that are part of the principled engagement, namely determination, definition and deliberation, have emerged in these interviews as the dimensions that mainly relate to the process of moving from individual interests and uncertainties to common interests, common objectives and alignment.

Determination

Knowledge plays a major role in new developments and knowledge institutions are an important factor in this. The knowledge or theory that lies with knowledge institutions, but which private parties also have themselves, must ultimately be converted into something that can be applied in practice. However, space for innovation must be created for this, in which governments must play an important role. The interviews show that in practice this is often not as ideal as what private companies hope for. This often has to do with what is discussed "in theory or on paper" and what is actually acted upon in practice.

"Knowledge institutions and business are very close; knowledge research institutions or universities are important because they create value by adding knowledge and innovation and business adds value to make concrete applications of that knowledge and innovation. You need space for that and that space must governments offer. Dividing line, is still little clarity and direction." (ID 1-INDX)

"You can make nice plans at the front, but if it is not picked up at the back by people who have to approve and manage it, then it will not work. We believe if you want to make plans at the front you have to take people with you, make sure you have commitment at different levels. Be part of the assignment, even if it does not fit the standard frameworks of the municipalities." (ID 2-INDX)

In addition, the private interviewees clearly state that the way of working between the parties involved must change in a collaboration. Smart city development requires new forms of collaboration and the abandonment of old and traditional thoughts in the way of working. This lies on both the public and private sides.

"Everyone is still busy, but no one knows the answer to that.
It is another way of working together, if you have a good team, you see a function in it, it is an ecosystem and way of working. It is nobody who knows everything alone, but that is still the old idea. Ultimately, there is a boss who will determine what we are going to do, in a very traditional way. But that is no more, there are several captains on the ship and together you have the most optimal solution. That is the change that is needed to get smart cities done. Governments cannot do this themselves, but commercial companies cannot do it alone either." (ID 3-INDX)

"What you see the way of collaboration that you sometimes have to do differently, we work together with governments in a certain way, that is very project-based, client, contractor relationship and that is fine for hard projects, something you have done a thousand times you do fine according to that structure. Only something you have never done before from both sides, you cannot do according to that structure, so you need a different form of cooperation." (ID 4-INDX)

Definition

Ultimately, it is important that the collaboration discusses the mutual interests and considerations in a transparent and clear manner, and that this remains the basis of a partnership that can express itself in a public-private partnership. It is interesting in this respect that a public interviewee points out that public and private parties must understand that this concerns the development of services and not ready-made products from the industry side. This is also linked to one of the preceding quotes, that the basis of a technological solution should come from a certain social question.

"Discuss to get a good taste of what is the intention and objective and the way of working of the market and how do you feel about it as a government." (ID 7-GOVX)

"That is important to look at; what are the considerations? what are the interests or considerations that we take if we now want to get into a PPP or do something together with other parties?
This is also a journey between government and business, more services need to be sold than products." (ID 6-GOVX)

Deliberation

During the interviews it was mentioned that in order to collaborate together and jointly investigate towards common objectives, clarity must be made about which frameworks and rules are involved and from which way of thinking there will be collaboration. What has

already been shown in earlier quotes is that the development of a smart city is a new process and involved parties hop on board of a joint journey of discovery.

"Must clear frameworks and rules be set before you can start with these kinds of developments." (ID 2-INDX)

"We asked the market if you also want to develop and do you see a future in this, we also see that future, is it now an idea to jointly take that journey of discovery and see what joint steps we can take. Knowing that we cannot yet determine what it will look like." (ID 7-GOVX)

The following quotes show how interviewees think about new forms of collaboration.

"If you invest a lot in collaboration and a good idea, then at some point it will have to enter the market, in order to get legal form, you will have to develop a kind of innovation partnership together, which often leads to public-private partnerships. It is still a non-existing service, so no tendering obligation, not on the market and step by step with companies to find out exactly what we want." (ID 10-KNOX)

"It takes longer with large organizations and that is a limitation, with business you also notice that they often arrive with ready-made technical solutions and then look for a problem, we want it the other way around, so first a problem in society or an urban challenge. Determining a task and on the basis of this come up with a technological solution, that also means a challenge for business to start thinking differently and start offering products in a different way." (ID 6-GOVX)

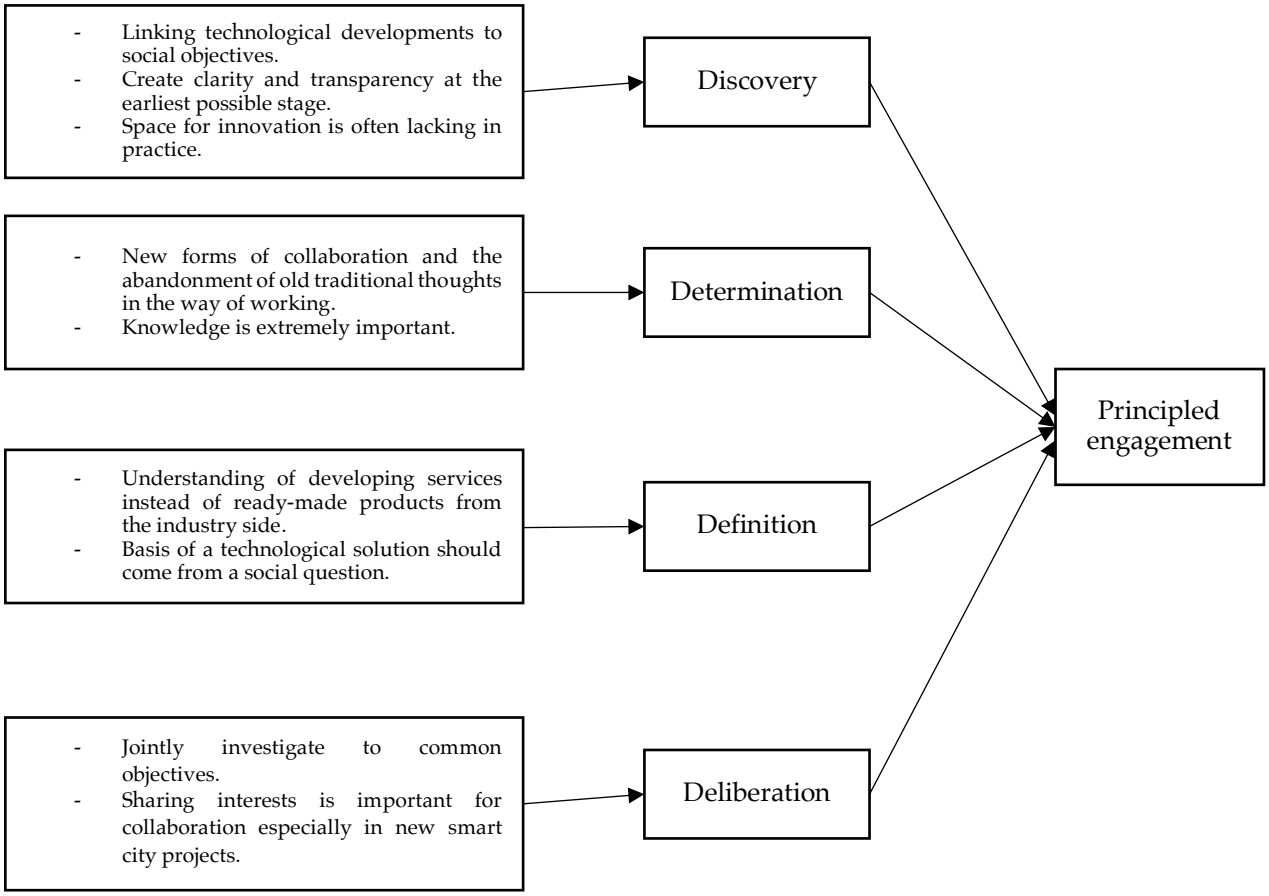

Fig 5. Summary of most important findings

4.2.2 Shared motivation

Mutual trust

During the interviews, the essence of relationships was mentioned several times by a number of private organizations. Because it is about collaboration, it is important according to the interviewees that you know who is on the other side of the table and what is going on with them. The following quotes give an indication of this.

"Piece of relationship management, keep your relationships good, keep in touch, know what is going on with the other person. Knowledge, resources and money is the hard side of the story, but the relationship is the soft side of the story, you need it, if it is not right, it is like sand in the engine and it starts to crack." (ID 2-INDX)

"It is important that you know people, projects through corona still run well remotely with face time because you already know each other, but starting new projects in this setting is difficult, because you do not know each other. The emotion is not there, the physical meeting, talking to each other is important in the start of a project. Getting to know each other, how is a person or organization put together. You need to know who you are dealing with from both sides." (ID 2-INDX)

In addition to the role of relationships raised by several private parties, the matter of trust is also important in the story of collaboration. In the previous section, we saw that the front end of a collaboration and the initial phase are very important, because different interests emerge here. The next step in the collaboration is to dare to jump into the deep together, where, according to interviews, trust plays an important role.

"Trust each other, be on speaking terms, so that the form of collaboration can be investigated. If people then see potential, in what form and condition could that happen, how do you fix that." (ID 1-INDX)

"You can trust everything on paper up front and agree on paper, but if there is no mutual trust between us and we will get the job done together, you will soon be thrown back on the paper story. Due to the difference in knowledge, partnerships can get stiff and it is very important that trust comes into play. You will encounter this in practice, all the beautiful contractual documents that form the basis are also all very nice and also important, because you have to be able to fall back on them. But trust and cooperation are so important if you really want something be able to bring to a good end." (ID 2-INDX)

These quotes also reveal why the front end of a collaboration needs the necessary attention and depth. Often this also involves all the papers and recording things to be able to interact. The next subsection provides insight into how interviewees view the matter of understanding and how the deeper understanding of each other happens according to their experience.

Understanding

When it comes to understanding each other's position in a collaboration, but also the possibilities and feasibility of certain initiatives, a number of findings can be obtained from the interviews. First of all, it is interesting to mention that from the private side it seems to be understood that both the public and private sides have a certain position and that this can have consequences for collaboration. For example, the public side has to deal with social responsibility and can also feel a certain pressure from it, which influences the position of a public party with regard to the dynamics of collaboration.

"The municipality feels the pressure from the provincial or national government of the social challenges. Consider, for example, the pressure of the housing shortage. That is why I think that the municipality sometimes steps in too quickly, sometimes I think that this is being abused because of the pressure for the municipality. To the disadvantage of the municipality and the benefit of the developer. Then someone with a bad taste in his mouth goes into collaboration, you don't want that as another partner who has the advantage. This is not a good basis for starting a collaboration, so you get less respect and cooperation." (ID 2-INDX)

On the other hand, according to a private interviewee, there is also something to be said about understanding the public side about the possibilities and position of a private party. One of the interviewees implies by means of multiple quotes that in practice they are often not correctly understood by governments and that there is often a certain prejudice on the public side.

"What is often thought by private parties is that we can do things for nothing, so that we have bags of money that we would like to distribute for fun initiatives, that is not so easy." (ID 5-INDX)

This is supplemented by the same interviewee with the image or feeling that this affects a certain award from the private side.

"We see a lot of investments or enthusiasm for start-ups by local authorities, which is nice for the start-ups, but when you talk about developing smart city parts, IT, business or apps or smart street lighting or whatever, we see that startups often have a lead when it comes to granting someone." (ID 5-INDX)

This creates a stumbling block that private parties do not feel understood and a certain image of the public side influences their position. This is also not a good basis for good collaboration and this often leads to rejection of collaboration, according to this interviewee (ID 5-INDX). During another interview, a possible cause emerges that may play a role in this. This is due to a difference in knowledge and expertise level between partners and to what extent the public side is aware and knowledgeable of what is actually feasible in practice when it comes to smart development.

"Substantively you need the same level you are talking about, if you have a different knowledge level, then you have a skewed relationship and you are often seen as the know-it-all. So, you have to make sure that you level and as a private party sometimes take a step back and first go to the level of the collaboration partner on the other side of the table and only then shift up." (ID 2-INDX)

It has become clear through multiple interviews with both public and private parties that collaboration with regard to smart city developments requires understanding each other and recognition and acceptance of other people's qualities and capacities. In several quotes it became visible that equality is important in this and that people must understand that it is a complex collaboration dynamic and that both the public and private sides have a certain scope. There are two quotes that describe this well.

"Which is very important that you understand from both sides where your goals are, but also your bumps and holes. Simply put, the market must understand that on the government side you are dealing with a political-administrative dynamic, with a new college every four years, with occasional major issues such as economic cuts, so the market must understand how it sometimes works in governments. On the other hand, as a government, you have to understand that a market party ultimately has to send an invoice of the costs, which, depending on the size of a company, is also very dynamic." (ID 7-GOVX)

"It is a subtle game and it is also looking for how we are going to do it between the two of us and I am convinced that it is people work and trust is important and understand each other's interests. If you keep that in mind and remain in the knowledge of we are both on a kind of journey of discovery and convinced that this is the way, we must go then you will get out eventually." (ID 7-GOVX)

Internal legitimacy

Internal legitimacy has been less reflected in the findings from the interviews and will therefore be an interesting point for discussion. However, what is interesting from an interview with a private party is how reliability and credibility can influence collaboration. This is shown in an example about a tension between public and private side.

"Construction companies threw in their own windows during the time of the construction fraud and then it came out that they had actually made the situation too much and they actually knocked out a lot of money for the citizen and earned a lot of money. As a result, the whole market is regulated by that, procurement law has passed, which means that as a company your projects become more public and are prescribed by the municipality, there is very little room for innovation." (ID 4-INDX)

Commitment

The interviews reveal that in public-private partnerships with regard to smart city developments, it is important that partners know towards what they are going to work. In the view of the smart city concept, there is still a lot of uncertainty and a lot of this is coming to both public and private parties. To make a collaboration work, this also requires a change of mind about the goals of the parties involved. Technology and digitalization, a large part of the changes that society is going to experience, are a broad and complex concept, where the various interviewees recognize that this is probably better known for the private side than for the public side. The private side can support the public side in this, but there must be the possibility and space for this. A number of quotes from private interviewees often prove this to be difficult in practice.

"You still notice the classical gap between public and private, which is sometimes enormous. Legislation may also need to be changed." (ID 1-INDX)

Added to this is a quote from a private party that has an example here of what sometimes happens from the public side in practice.

"Then you come to the official organization, there must be officials who can move that faster, every self-respecting municipality has a smart city working group or who does something in the area of. However, only between a working group and having a vision and really working in practice in the city is also a difference and there are still some meters to be made, it is all new." (ID 4-INDX)

Ultimately, it is according to the interviewees from public, private and knowledge side, important to reduce the gap between public and private, especially in topics that still cause a lot of confusion and uncertainty, such as 'smart' developments. This requires support from various parties and domains, including knowledge institutions and citizens. Looking at public and private, it is also about organizations being able to see for themselves whether they are willing and able to make the move to new technology and change this internally, which sometimes requires organizational and legal boundaries to be crossed. Having a common goal or ultimate goal and visions over a long term is an important starting point for public-private collaboration and is confirmed by almost all interviewees.

"What are the important starting points for this collaboration; a shared end goal, being convinced of what the end goal is that you need, the total social end goal and not a goal of something must come. Realizing that you cannot do everything alone and that you can ultimately do a part in the whole. But it is not a short-term goal." (ID 3-INDX)

"Doing something together at least to make the world a better place, you have to have that conviction. Change. One thing, technology is not the end goal, but a means to achieve the end goal and that requires different stakeholders. It is difficult to get things done together, you have to get used to each other. The focus is actually even more than just smart cities themselves." (ID 3-INDX)

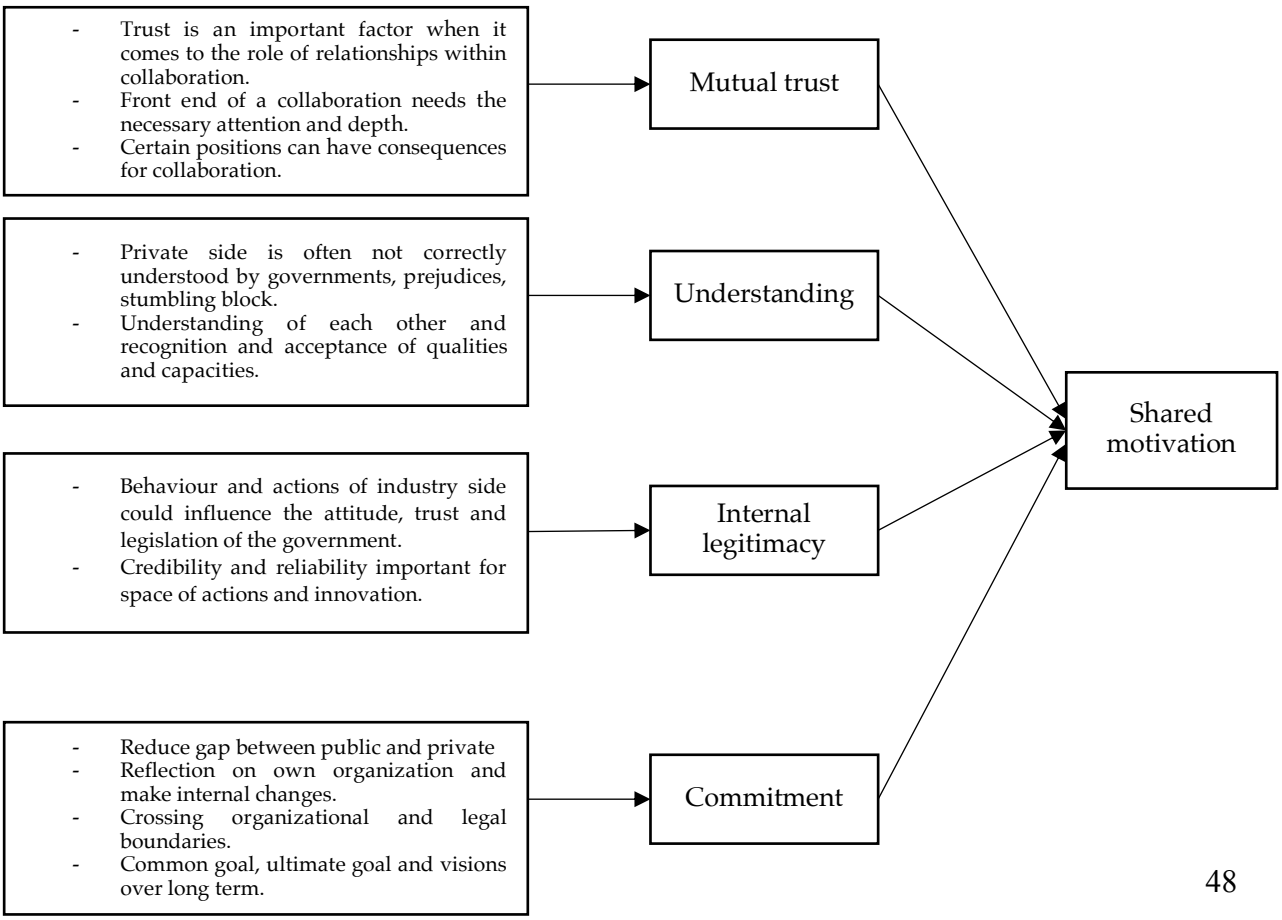

Fig 6. Summary of most important findings

4.2.3 Capacity for joint action

Procedural and institutional arrangements

From the interviews it appears that in public-private partnerships the increasing integral and multi-dimensional collaboration constructions must be considered. Because these collaborations often apply to multiple challenges and hook on each other, this requires thinking with multiple stakeholders and to see how the different parties get to work together. Thinking up and discussing something is the first step, but the second important step is to carry it out.

"Public-Private partnership constructions are becoming increasingly important because challenges also have to be viewed more and more integrally, it is no longer a problem that is one or two dimensional and then you can easily have it carried out privately with a public contract, but these challenges are often great and hook on each other, this requires further collaboration." (ID 1-INDX)

According to several private interviews, far-reaching collaborations require an important role from the government. Often the government quickly comes into play, because the export of developments (by private parties) requires permits and actions in public space. In practice, however, according to a number of private interviewees, this process is not always going as smoothly. This is evident from the following quote.

"At a political and higher level, for example, you have certain agreements, which will eventually be put on the local table of the municipality. They have a completely different world of experience and therefore many things are lost. There is always a lag behind between politics and ultimately the people who actually execute." (ID 2-INDX)

From the interviews and certain quotes, it appears that whenever private companies have a conversation with governments it often does not get any further in actual implementation in practice because of the elaboration plans that end up with the assessors of municipalities. There are several rules that a municipality has and whether other parties like it, in the end the municipality only has these rules to steer the game. According to the private interviewees, this results in a difficult way of collaboration, where you are constantly working with a list of rules and permits. According to one of the interviewees (ID 3-INDX), this is largely due to the legislation, which no longer fits in well with the changes in the world.

"The legislation may also have to be changed. The world changes are happening so fast, but the legislation is still dated, and you can no longer apply it, so you have to change the law and only then do you see how difficult it is to make a city." (ID 3-INDX)

This finding also emerges in another interview with a private organization.
This shows that the "system" or organizational structure of a country could influence smart city developments. The example is given that in other countries the market in the field of smart cities and the influence of governments is different than in the Netherlands. According

to this interviewee, the system is often difficult in the Netherlands because administrative issues are much more difficult than in other countries. An example of this based on the following quote.

"The Netherlands is a country with its own DNA, we would rather have the mayor say, dear market party, please realize this now, but I do not know whether this is better, more interests of a country are separate from the private interests of our party. But you eventually fail in the bureaucracy. How do you do this and do that, then we think yes that sum is not so difficult, and you have to want it. However, then there is too much writing, too many people, too many small bosses and it doesn't work. There is then the statement by the municipality to demolish those silos and become more horizontally, otherwise it will not fly." (ID 5-INDX)

In several interviews, the topic of bureaucracy and a limited organizational structure on the public side is raised, both by public, private and knowledge organizations. When it comes to getting things done in practice, people often experience that there is still a certain opposition on the public side, which comes from an uncertainty and fear of the influence of other parties in a collaboration. For example, it is stated that governments have ambitions, but do not know how to integrate them locally or are already trying to do things themselves. This may be due to the idea that, due to collaboration with (large) private companies, they can no longer be flexible and end up in a certain 'lock inn', according to one of the private interviewees (ID 5-INDX).

"That we are thinking internally to be soon in a vendor lock-in, we are no longer flexible, or we have an open standard. We can be resistant to all these things as a party, but you often see that people get cold fears or become more afraid of other party's roles." (ID 5-INDX)

Coming back to the organizational structure and system, this continues to be a topic that comes up in many interviews. There are many factors involved in collaboration, such as the legal and financial organization, but also the way of working of organizations and individuals. For example, an interview with a public organization shows that you often notice that larger public organizations and especially local authorities have their own programs and projects where a lot of meetings and exports take longer, this is not the most efficient way of working (ID 7-GOVX). According to a number of interviewees, this has to do with compartmentalization and the structure of various departments at municipalities.

"Municipalities are extremely compartmentalized, you have a department for public lighting, a department of public space. We as a company see a smart city that goes through, as it were, a satay skewer, which is very difficult for municipalities to form to indicate, because they have that compartmentalization. There are several levels at which people work and also have contact with each other. It is important that parties who are in contact with each other also understand this and mutually understand at what level people work together and what that means for the relationships in a collaboration process." (ID 4-INDX)

The interviews show that the organizational structure and legislation are issues that play a major role in public-private partnerships and that, in particular with regard to smart city developments and the technological and digital transition that awaits Dutch cities and regions, this requires a certain change. This occurs repeatedly in the interviews and therefore the most important quotes are used to highlight these findings.

"It is no longer so much a technological issue, but much more an organizational issue. How do you deal with it? Technologically this is possible today, but you run into outdated legislation, legislation is always behind social changes, let alone technological developments, the problem is not in technology. The problem lies much more in the legislation on the one hand and the business model of this type of business on the other." (ID 8-GOVX-INDX)

"One of the things that could help with the organization structure and compartmentalization of the municipality is something like the Environmental Vision, so you go away from the original destination plans, etc. But if you as a government will follow a vision that will then be filled in, then you already create space. You are going to force governments to organize themselves in other ways, but you have to realize that the reason why this vision is so slow to introduce and is constantly delayed, because the municipalities are not ready. Public organizations are not ready for this, IT is very difficult." (ID 4-INDX)

"Politics is lagging behind, but also the gap of how we as an individual are still behind the technology, innovation gap, only bigger. There is a big challenge with smart cities, but there is a broader context. How can you as a society, but also as a business community or knowledge institution deal with this and then you will notice that you have to move more towards adaptive or agile working, because you cannot keep up with these fast-changing processes." (ID 8-GOVX-INDX)

The above quotes in combination with quotes from other interviews show that the context in which collaborations and in this case with regard to smart city developments is becoming more comprehensive and complex. This also requires looking at a different way of governance and more interorganizational, in which from the public side sometimes less attention has to be paid to classical regulations, but companies must also communicate clearly in this. Systems need to be combined with each other, however, a lot of work is still being done in systems that do not meet the period and transition that cities and regions are dealing with.

From the interviews it appears that there can be seen similarities in possibilities for this gap between the current system and legislation and the technological developments. In this sense it is important that organizational limitations have to be overcome and that there must be a 'will' to change something. The municipal silos must be broken through, where more transparency comes from citizens to local authorities in order to improve the smart city, which means data information from society to the city. (ID 5-INDX)

"Change of organization, culture change, you don't do that in a year that needs time. You need both a top down and bottom up approach, from the management level you have to be able to determine the direction we need to take as an organization, so change of organization and culture. At the same time, you have to make it very practical and show what it means in practice for different domains. Show in practice what the possibilities of data and technology can be to show what can be done in the case of issues and challenges." (ID 10-KNOX)

According to many interviewees, how these organizational changes can ultimately be broken is still a difficult issue in practice. However, it does start with understanding the complexity and the different power fields and players that come to watch. It requires a new way of working and more interorganizational work. A number of quotes show that within partnerships different parties have to work together from the bottom up, because if you start from the top you quickly get stuck against the systems (ID 8-GOVX-INDX).

You have to work much more cyclically and not linearly. The systems we have now are mostly linear or built from a cascade model." (ID 8-GOVX-INDX)

The conversation with this interviewee, which is closely connected to a public-private partnership with regard to innovation and smart developments, also shows that it obviously helps to have a shared vision, but the big problem is that it must be based on a vision gone to a programmatic approach. A vision must therefore be translated concretely into resources and goals and from there to operations and projects. According to the interviewee, the problem is that vision often switches to operations and the necessary steps of action and a programmatic approach are missing. The following quote shows this from an interviewee's perspective.

"From vision to program to projects, you need to have a clear strategy of why we do something and what we do and why we do it and with whom. But often we see that from the question 'why', that there is often a switch to the 'how' and 'what' question. So, it starts from the what question but not the why question." (ID 8-GOVX-INDX)

Leadership

During the theoretical framework, it has already emerged that different roles apply to the partners involved in public and private partnerships. In the context of smart city development, a few things can also be said about this and it became clear from the interviews. It has been noticed in the interviews that clear roles can be assigned to the interviewees' personal perception and opinion. Several quotes provide an idea of the role of the government with regard to smart city developments and public-private collaboration. The quotes below show how the private side and the knowledge institutions side consider the role of public parties in this picture.

"The government is a bit of a problem holder, it serves the social interest and has the task to know, in which space they want to carry out something." (ID 10-KNOX)

Government has the twofold goal, optimizing digital accessibility and technological development, but on the other hand you do it for the citizens, the citizens must benefit from a good economic climate and quality of life, that is the goal of the government." (ID 3-INDX)

According to several interviewees from the knowledge and private sides, the role of the government largely comes from the social interest and the regulation and coordination of developments. In practice, however, this often turns out to be a difficult subject for governments because they have to do with the wishes of the market and market parties also have a certain role to play with the associated opportunities. For example, according to a private interviewee, the government cannot oblige something to a company and if a company wants to implement something, the government often has to swallow it. The legislation is often not adapted to this. In addition, the government is still concerned with the role of the market, especially in the case of major challenges and technological development, due to its limited capacity and resources.

"Private companies and knowledge institutions go on and push the limits of what is possible and allowed. The government is obliged and forced at some point to think about it and to set frameworks and rules, otherwise private side can simply continue." (ID 1-INDX)

When it comes to this position of governments, the interviews reveal that governments must recognize that their traditional standard approach and role is no longer the smartest approach. Governments are increasingly getting variables on their table that they have to include in their decisions, even though this is not necessarily their field of expertise. Then one quickly comes to the point that there is a lack of knowledge and that they are dependent on the role of the market. According to several private interviewees, this requires a new role from the public side where more attention needs to be paid to facilitating and offering space on the side where developments are made possible, at the private side and knowledge institutions.

"The government is increasingly realizing that it is not the one that determines everything, but it is also much facilitating, they choose the direction or make policy, but they do not have a lot of control over the structure of the policy in practice and often come from the business community." (ID 1-INDX)

On the other hand, it is also interesting to see how this insight and image of the public interviewees itself emerged during the interviews. To begin with, a conversation with an interviewer from the public side shows that, as governments, they are given a certain assignment, such as national elections or plans, and this can sometimes be complex, especially with regard to smart city. The smart city concept is very different, and people have to understand each other in this and that sometimes causes frictions. It is therefore important that one understands that this also makes relationships different and that roles must be seen differently, both on the public and private sides.

According to the public interviewees, it is important to also reflect on the public side on what the role of the government will be in the future. The government was an organization that always thought carefully about how the city should develop and they did this themselves because they also had the people within their organization for this. However, according to these interviewees, cities and regions are increasingly moving towards a situation where different visions come together, and participation comes from different layers and the original role of the government is therefore changing.

We are now moving towards a situation where citizen participation and individuals are becoming increasingly important and have access to a lot of different information and use this to talk to the municipality. As a government, you will have to think about what role you will play in the position in relation to your inhabitants in the future. That means more participation, transparency, openness, use of data and which political decisions you take is another issue." (ID 7-GOVX)

"We then facilitate the infrastructure and the network, but it is then up to the citizens and companies to make use of this, we are not going to hang sensors, people are allowed to do that themselves, that is then a facilitating role that we choose and that works." (ID 7-GOVX)

"We are establishing a network in the Netherlands of smart city activities at an administrative and official level. The purpose of this is that we know what we are doing and that we can also find each other when we have questions, so building up networks for knowledge." (ID 6-GOVX)

It is interesting to see that the findings of the interviews show that the public side also states that a more facilitating role of the public organizations in collaboration may be required. The role of the private side also emerged visibly during the interviews. This role seems to be mainly expressed in the implementation and fulfillment of technological and innovative developments. The following quote shows this.

As a region developer, you are a spider in the web, we are the ones who take care of the financing for certain matters and as a result parties can be brought together. We can invest in research etc. without losing too much money." (ID 2-INDX)

"The public has to spend the land and do quality control and see whether the objectives are achieved and vice versa, you need the companies to implement the latest innovation in that area." (ID 11-KNOX)

Finally, it has been pointed out in the theoretical framework that in public-private partnerships knowledge institutions are often involved as third parties, in which the collaboration results, as it were, into a triple helix construction. During the interviews, the role of knowledge and knowledge institutions was discussed by several interviewees. In the next subsection, the dimension of knowledge in public-private partnerships in smart city developments will be discussed in more detail and will there also be more discussion about the role of knowledge institutions

Knowledge

With regard to the topic of where knowledge institutions stand in the picture of public and private collaboration in smart cities, it may be interesting to start with how the role of knowledge was interpreted by the knowledge institutions themselves in the interviews.

"You are a neutral party, we have no interest in the service, but we are the oilman and understand what the parties are, you also have some input in terms of knowledge to help the process, for example we can help you with good tests and research to determine whether there are gaps in the process. For parties it is often also nice to work with knowledge institutions because they are neutral. They can give advice without self-interest." (ID 10-KNOX)

The neutrality mentioned in the above statement and the input of knowledge to help the process is also mentioned by a number of private interviewees. Knowledge institutes are seen as parties involved in the collaboration that are on the line of division but are still at the start of a public-private partnership. They are more of the 'lubricant' between other parties and therefore the triple helix is important. (ID 1-INDX).
Another interesting finding, from a private interviewee, was that knowledge about innovation and smart developments should increasingly gradually enter the system of society and slowly emerge from below. For example, besides universities, schools should pay more attention to technological developments and possibilities.

"Knowledge institutions must also investigate things, which is an important aspect. Schools must also get this more and more, all things that are slowly emerging to get the city further." (ID 3-INDX)

In addition, it is especially important for these issues that require knowledge, that knowledge can actually be implemented in practice. One of the interviewees of knowledge institutions, referred to this in the interview as the interaction between theory and practice. For example, it is important that theory is converted into practice and knowledge institutions can help with this, for example by getting innovative ideas to private companies. The collaboration between knowledge institutions and the private side is therefore also important in this case. On the other hand, this interviewee says that their research is characterized by converting questions or challenges that come from practice, like societal or technological questions, back into

theoretical issues. In this way, the circle of social and urban questions, converting research into knowledge and then converting knowledge to applications in the market, remains that the triple helix is an important aspect in public-private partnerships with regard to smart cities. The following quote has already been mentioned in the first subsection but was worth mentioning once more to show the importance of different interests and roles.

"Importance of triple helix, knowledge institutions and organizations will need each other, when we talk about how PPP originates, we are talking about a driving force. Where the business community needs to see it, where knowledge institutions can offer innovation where business sees something and where the government can insight comes that they see that they are facilitating." (ID 1-INDX)

Resources

According to a public interviewee, the public side of smart city developments and tackling social challenges often comes up against a number of things. Municipalities often have ambitions and would like to get certain things done, but they are also assigned their capacities and resources.

"But you also have to have the capacities and resources and that is the annoying thing about the situation now with the municipal government. Many municipalities have increasing financial deficits due to all the statements in the social sector and the deficits there and with the economic crisis over it, this also means that the number of social assistance benefits will go up and this will all end up with the municipality, which means that the municipalities will have less financial impact, which means that the investments from local authorities must come from other sources." (ID 6-GOVX)

The interviews show that the interests of governments therefore come from different angles and that they deal with many different domains and the associated consequences. According to a number of interviewees, the lack of clout, capacity and budget, which are particularly important for initiating technological developments, the public side tries to supplement in collaborations with private parties. Technological developments require the deployment of knowledge and expertise, which costs money, but also generates money again. The market also knows this and may therefore be more inclined to collaborate with the government in this matter because of their interest.

"That is why governments often contact reliable developers to get a certain raft. Sometimes governments try themselves, but there is a lack of clout, particularly financial clout, but also clout in knowledge. It is becoming increasingly difficult with governments to hire capable people." (ID 2-INDX)

The interview with the private partner of which the above quote has been mentioned shows that public authorities often lack the expertise, knowledge and capability to be able to understand and implement certain developments. According to this interviewee, there is still room for improvement in the level of knowledge and expertise of governments.

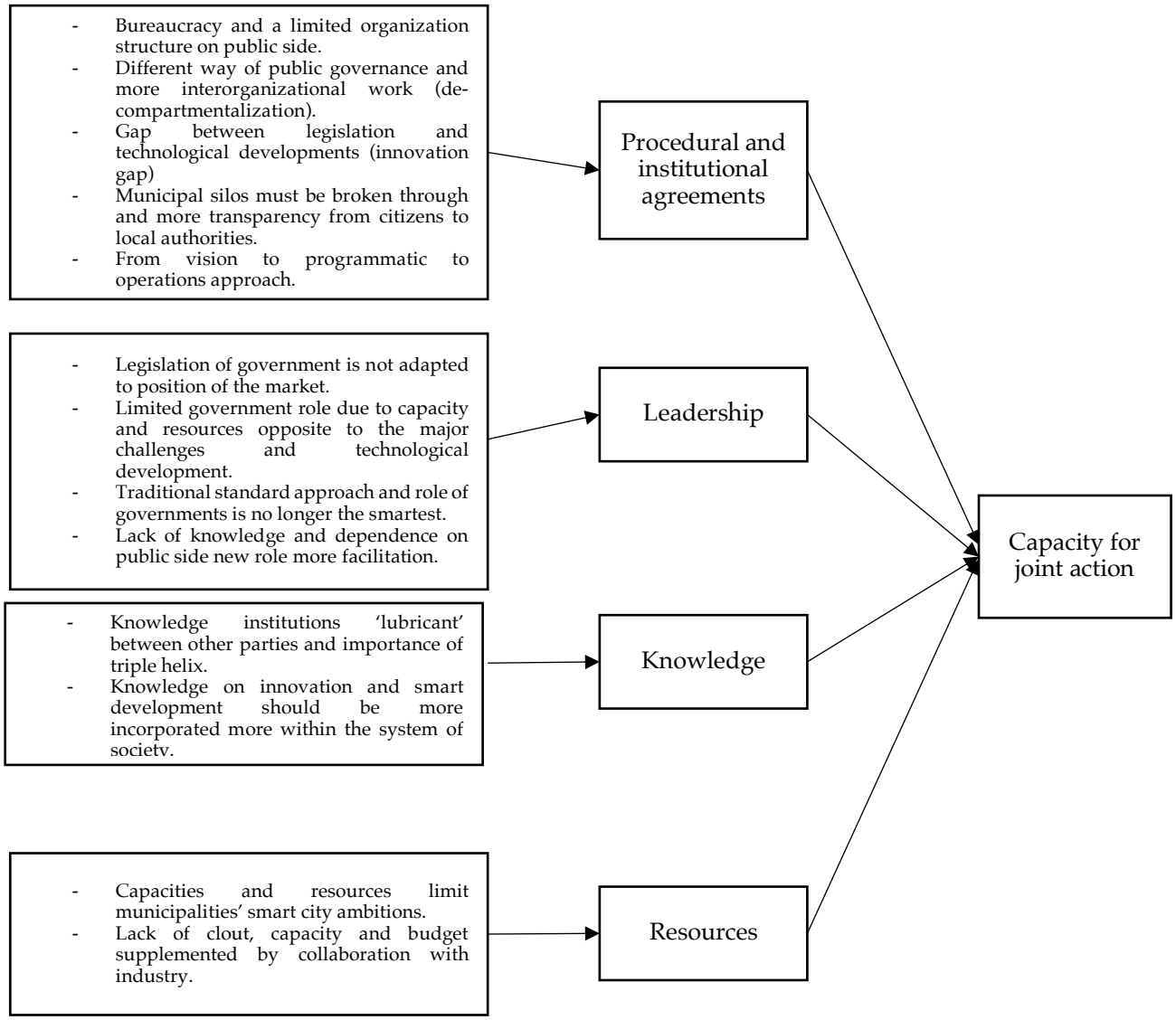

Fig 7. Summary of most important findings

5. Conclusion

During the introduction of this study it became clear that public-private collaboration through partnerships can be a way to benefit both the public as industry side when it comes to the development of smart cities. However, in practice, it often proves to be challenging where one predominant challenge is to achieve a strategic alignment between the key stakeholders. This could be based on the underlying public and private interests and perceptions. Therefore, it was interesting to study how these underlying interests and perceptions interact with each other and how this establishes the collaboration between these actors. The research aim of this study was to identify what role the dynamics of collaborative governance from the Collaborative governance framework of Emerson, Nabatchi and Balogh, play in smart city developments oriented towards the collaboration between public bodies and industries. This study has been done through an exploratory study with qualitative research methods and a conclusion of the findings will be given in the upcoming sections. Eventually an answer will be given to the sub questions and the central research question of this study below.

What role do collaboration dynamics play in public-private partnerships (PPPs) between public bodies and industry in the development of smart city initiatives in the Netherlands?

Principled engagement

From the findings it became clear that when it comes to the engagement of people in a collaboration and their underlying interests, there are a few conclusions that can be drawn. First of all, it has been noticed that at the basis of a collaboration and this should be at the earliest possible stage in the front end, there should be focused on creating clarity and transparency of the different interests. From the perceptions of interviewees, it became apparent that different organizations in a collaboration are often aware of the importance of sharing interests, but in practice this often still remains inside people without really communicating and speaking up. This results in a gap between expectations and possibilities between both public, industry and knowledge side. A noticeable consequence of this was the lack in space for innovation facilitated by the public side. Secondly, the results of this study show that at the basis of smart city developments and the collaboration between public and industry, technological developments and applications should be linked to social objectives. From the public side during the interviews, it became clear that there is a misunderstanding from the 'wishes' of governments and what industry side is actually doing with regard to technological developments. According to these findings there should be a change from developing ready-made products from the industry side to more service-based applications. This asks for a new form of collaboration and role of the public side as well, where the old traditional thoughts of the way of working are abandoned and parties should jointly investigate to common objectives and their interests at the front end of the collaboration before heading into a partnership.

Therefore, to answer the sub question

What is the role of principled engagement in public-private partnerships between public bodies and industry within the development of smart cities?

It can be concluded that principled engagement plays an important role in public-private partnerships in the development of smart cities, especially at the basis of a collaboration. Before hopping on board of a collaboration it should be clear and transparent at the front end, what the interests are because this could later influence the way developments are reached within the society. Therefore, it is essential that before technological developments are discussed, the social question or objective should be put on the table.

Shared motivation

The findings from the study with regard to this sub question show similarities to the previous findings of principled engagement. These are among others the importance of the necessary depth and attention at the front end of a collaboration. Certain interests, but also the positions and roles that come with these interests, can later have consequences for the collaboration. One example of this, is that of things that can be discussed on paper, in practice often happen to be different. However, certain agreements or rules would already have been written on paper which influences the position and actions of parties. Important in this matter is that both sides of the table should understand each other better and prejudgments should be broken through as much as possible, so stumbling blocks should be avoided. This asks for an understanding of each other and the recognition and acceptance of qualities and capacities.

One other interesting finding from the study was the organizational gap between public and private side in a collaboration. This will become clearer in the next sub question but has already been noticed during shared motivation. During the findings it became clear that sometimes within a collaboration there could be some sort of action-reaction, where in this case, behavior and actions of industry side could influence the attitude, trust and legislation of the government. When governments for example, have a certain attitude or trust feeling about the credibility and reliability of the industry side, they have the position to influence the space of actions and innovation, which has in practice showed not to be ideally for both sides. Lastly, from the findings of the study, the reflection on own organization and making internal changes was noticed. The things that have been mentioned above are important to discuss with partners within a collaboration, however these elements exist exist and arise internally within an organization. Therefore, findings show that it is essential to cross organizational and legal boundaries where there is understanding that certain perceptions and ideas that may influence the interaction, should be reflected for the sake of getting to a common and ideally ultimate goal and visions over long term.

Therefore, the answer to the sub question:

What is the role of shared motivation in public-private partnerships between public bodies and industry within the development of smart cities?

Shared motivation consists of understanding each other, be aware of the other parties at the table and make a commitment to reflect on yourself and this may cause some boundaries to be crossed. This concludes that more attention should be paid to have deep discussions with each other in a partnership to overcome certain stumbling blocks, but also discuss internally how you should stand as an organization within a public-private collaboration and understand that you are dealing with other people in a larger context.

Capacity for joint action

The final sub question of the study has resulted in a large number of findings and insights, where the most important findings will be concluded. One very interesting finding of this study is the gap between legislation and technology (developments). In multiple cases it was noted that in practice there is a noticeable gap between the legislation from public side and the technological developments and applications that the industry and market can offer. This was referred to as an 'innovation-gap'. According to the findings of the study, digitization and technology, two major principles of smart city development, are rapidly changing our societies, however legislation is not yet adapted to this. The old traditional approach and role of governments is no longer the smartest, where a lot of bureaucracy and limited organizational structures is limiting the position and possibilities of the market. This has mostly to do with a lack of knowledge on the public side and the way of public governance and work is carried out (compartmentalization). If public ambitions and thus societal objectives should be supplemented by technological developments, municipal silos must be broken through where more transparency from citizens to local authorities should be facilitated and the position of the market should be facilitated with the help of the public side rather than organizing things independently. This asks for an interorganizational change in the way of working at the public side and to see 'becoming smart' not in particular as a goal, but rather as a means of improving the quality of life within cities and regions. This starts with a vision, followed by a programmatic approach and eventually leading to operations, instead of jumping from an ideal vision of becoming a smart city to experimenting with developments.
Another interesting finding is the role of knowledge institutions. Knowledge and resources are two important elements of public-private collaboration, especially within the development of smart cities and technology since at the end, ideas and objectives should be translated into applications. Knowledge institutions play a role as a sort of lubricant between other parties and offer the creation of knowledge out of a social or public interest but helps to connect this with the role of the market and industry to get this knowledge into the society. Therefore, the triple helix approach should be involved within public-private partnership as a 'mediating role' and lubricant between the interest of the public side and industry.

Therefore, the answer to the sub question:

What is the role of capacity for joint action in public-private partnerships between public bodies and industry within the development of smart cities?

Capacity for joint action has shown in this study that there is a visible gap between public and private side within public-private partnerships with regard to smart city development, based on a gap that exist between outdated traditional legislation and the technological developments that the industry can offer. There are interorganizational boundaries and silos that should be broken through at the government side and the realization of new roles that should be taken in the context of smart city development. Important in this case is that the concept of smart city should not be blindly followed or aimed at, but rather seen as a means for an end goal that is to benefit the society and quality of life.

Central question

The aim of this study was to be able to give an answer to the central question that has been mentioned in the introduction chapter.

What role do collaboration dynamics play in public-private partnerships (PPPs) between public bodies and industry in the development of smart city initiatives in the Netherlands?

The collaboration dynamics play an important role when it comes to public-private partnerships between public bodies and industry in the development of smart city initiatives in the Netherlands. Since the concept of smart cities bring a lot of uncertainty and new changes to the society, collaboration is becoming more important than ever. Researching the dynamics have shown that collaboration is strongly based on the underlying interests and relations of the involved people and really goes to the very base and forefront of an interaction and relationship. The collaboration dynamics play a role in the multiple layers of collaboration in practice that starts at the very beginning but should constantly be considered as the dynamics at the beginning also influence the collaboration at the end. The specific role of each dynamics has been discussed in previous sub sections, and together it can be concluded that without proper attention and understanding of the collaboration dynamics, public-private collaboration within smart city development will remain on weak pillars which will result in stumbling blocks and limitations on multiple domains in practice. It has also been noticed that the dimensions did not represent an equal relevance. The findings show that the dimensions of capacity for joint action have been found the most, where it is regarding to this dynamic, important that interorganizational boundaries and silos should be broken through. The second most present dynamic was principled engagement, in which collaboration at the forefront and transparency in various interests was one of the most interesting outcomes for the role of this dynamic on public-private collaboration. Thirdly, the dynamic shared motivation plays a role to make people understand that it is important to get a deeper understanding of the collaboration process and the underlying interests of partners and that interests most of the time exist within a larger context. Further explanation on these findings will be discussed in the upcoming chapter.

6. Discussion

As has been mentioned earlier in the thesis, this study was of explorative nature where the aim was to use qualitative research methods in order to study as much information of interpretations and perceptions of the selected organizations. The results of this study are therefore rather than giving concrete solutions, more based on contributing to existing theory and knowledge and possibly find interesting new things that have not been highlighted in current literature. With this in mind, in the text below the most interesting findings will be discussed and reflected on.

The first part of the results of this research, where preparatory research was done based on secondary data collection, largely revealed the same topics discussed in the theoretical framework. As a researcher, this did not necessarily give me a lot of new information, but it was interesting to get certain things confirmed in practice and additional insights into the situation and visions in practice, prior to the primary data collection. But for this discussion, the results were not sufficiently new and interesting to discuss here.

With this being said, I would like to reflect briefly on how the findings of the research generally turned out and experienced in comparison to the expectations that arose during the course of the research and theoretical framework, followed by the most interesting and remarkable insights of the research study.

First of all, the results and data analysis of this study have shown how the three collaboration dynamics were identified in the primary data collection of the research. It has been noticed that the dimensions of capacity for joint action have been found the most, followed by principled engagement and shared motivation.

It was interesting to note that the dynamic shared motivation was noticeably underexposed in comparison to the other dynamics and where shared motivation consisted of dimensions that I had expected the most in advance, such as trust and commitment, these dimensions ultimately turned out to be the least present in the primary data findings. The reason for this may be that these dimensions and dynamic generally play less of a role in the collaboration in public-private partnerships, or that the questionnaire was insufficiently elaborated to identify this dynamic. Also, the sample of the primary data collection ultimately remained small and there was no proportional representation of the different stakeholder groups, therefore it is difficult or possibly impossible to generalize these findings of the dimensions. However, due to the lack of generalizability, I still want to discuss the most interesting findings and insights of this dynamic, in order to have a number of results through this explorative study that can add something to the existing knowledge.

One interesting finding is the relation to what is discussed on paper and what actually happens in practice and how. This finding supports the idea of the challenges that public and private bodies face when trying to collaborate and get things done, that has been seen in the theoretical framework (Bloomfield, 2006). According to the findings of this study, certain agreements or rules are often already been written on paper, which influences the position and actions of parties. Because people are aware of a certain list with rules, their behavior and position seem to be influenced. This could result into an unnatural relationship between the

parties involved, where, for example, prejudices based on the actions of another can influence the collaboration process. It is therefore important that parties understand from each other that certain actions and also counter-reactions can be expected, and the reason for these actions can also be influenced by certain qualities and capacities. The point to be made is that in theory it does indeed turn out that what is discussed on paper does not always apply to practice. The findings of this study show that this often has an underlying reason or cause, such as the positions and roles based on the context of rules and agreements, but also certain thoughts that parties have of each other. It is therefore important that you sit at the table together at an early stage and interpret and discuss the "piece of paper" together.

When it comes to the findings of the other collaboration dynamics, capacity for joint action was the most prominent in the findings, followed by principled engagement.
The findings of this study show some interesting results with regard to principled engagement. Firstly, the findings reveal a gap between expectations and possibilities between both public, industry and knowledge side, and a noticeable consequence of this was the lack in space for innovation. It becomes visible in the literature that people are aware of the fact that innovation and technological developments need space to experiment and that the public side should create or facilitate this (Bélissent, 2010) (Zygiaris, 2013). However, in practice this often proves to be challenging. This has in the first place to do with clarity and transparency about what is actually expected and what is possible. As mentioned earlier, the government has certain wishes that arise from the objectives for the well-being of society. This is support by the literature (Hodge & Greve, 2005). On the other hand, it is also not a new finding that the industry has the capabilities to deliver certain developments which also brings certain expectations of their side. In practice, these underlying expectations and opportunities that come with this, often seem to clash when it comes to the various underlying interests of principled engagement. In this sense, it is important that attention is at least focused on looking together at how technological possibilities can be linked to social objectives and this starts at the very front of a collaboration, as is evident from the results of principled engagement. The focus is on developing more service-based applications instead of ready-made products. These findings are in line with what was previously expressed in the literature. However, this study adds to the existing knowledge on the gap between expectations and possibilities and more attention should be paid to what happens at the earliest possible stage within a collaboration. This corresponds with the findings of the previous dynamic.

The last of the three dynamics that will be discussed is the capacity for joint action. As already has been mentioned in the conclusion of this study, one very interesting finding is the gap between legislation and technology. There has been noticed that in practice there is a noticeable gap between legislation from public side and the technological developments and applications that the industry and market can offer. This was referred to as an innovation gap. The study clearly showed that our societies are changing rapidly and that the role of digitalization and technology is becoming increasingly important. In my own interpretation, I also found this to correspond with the literature that talks about the technology push and demand pull that applies to smart cities (Angelidou, 2015). One may wonder whether there is, as it were, a gap between the supply and the demand side of technology. This could possibly be a point of discussion for recommendations.
When it comes to the rapidly changing societies and the use of technology, the findings show that governments are often not ready for this due to their traditional and outdated organizational structures and legislation compared to what is possible from the industry side

with regard to technology. There is, as it were, a limitation in making cities 'smart', which actually means to improve the quality of life with technology as a tool, due to the stuck structures in governments, which are largely the result of bureaucracy and compartmentalization. It was also interesting to note that multiple cases from the primary data collection mentioned that the concept of smart city should not be seen as a specific end goal where technological development is the aim. Rather, it is a new way of thinking and working, where collaboration is very important, and technology is a means. These results are in accord with perceptions and also critical views that emerged during the theoretical framework (Angelidou, 2015) (Vanolo, 2014). This insight in the literature becomes clear from the study and it emerges that the public side must recognize that if they really want to apply smart city thinking, they must realize that it is not necessarily the question of 'what' comes next, but rather 'why 'and 'how' something comes. This requires sometimes moving away from the traditional line of thought and making certain opportunities possible by breaking through stuck and limited legislation. A major step in this which is mentioned in the study is to break through the municipal silos and to get more transparency from the citizens to governments. In addition, the approach of the public side must change from first a clear vision that arises through collaboration, followed by a concrete programmatic approach in which it is clear what the hard side of the story is, think of resources, money, expertise etc., and as soon as the vision and programmatic approach are clear the operations can be put into practice.

Before it seems that I am trying to proclaim a certain truth or name concrete outcomes and solutions, it is important to mention the following in this discussion. As I said before, the distribution of my representatives in the primary data collection was not complete and reliable. The results have therefore already been somewhat compared to results from my preparatory research through secondary data collection, but this was still too little to be able to say anything concrete. The representatives mainly consisted of private parties, which is why this finding of a 'lack' on the public side may be more prominent than, for example, a limitation on the private side. However, it has been observed that the public representatives also mentioned this gap or problem and it is therefore worth mentioning as an interesting finding of the study.

Finally, an important topic in this study that participated as a kind of third factor, was the role of knowledge institutions and the triple helix. When it comes to the role of knowledge institutions, an interesting outcome was that they play a major role in moving from theory to practice and vice versa. The changing society brings new issues, where knowledge institutions can incorporate questions from practice to research. These issues are then converted back into theory that can be put back into practice. This is largely done via the industry. Knowledge institutions therefore play an interesting role in the collaboration between the public and private side, because they represent the interests of the public sector on the one hand and contribute to the private sector on the other. It is therefore important that they remain neutral in this story and rather take a position in the public-private partnerships with regard to smart cities as a kind of lubricant or mediator. This role of knowledge institutions was also discussed during the stakeholder typology in the theoretical framework and has thus been confirmed, as it were, in this study as an interesting outcome and part of pub-private collaboration (Leydesdorff & Deakin, 2011) (Van Beers, Berghäll & Poot, 2008). Coming back to the position of knowledge institutions in the conceptual model (section 2.5), even though the findings of the study show that the interaction between public and industry is still the most important for the actual development of smart cities, the arrow of the knowledge institutions play an important role as a third since it influences among others the exchange and use of knowledge,

possibly connects or mediates actors and should be seen as important for the underlying interest of both public as private side in the collaboration.

All in all, on the base of the discussion of my results I can say that I did not come with very specific and concrete findings or solutions to a certain research problem. Afterwards, this research could have head into the direction to research many representatives and use the results of the primary data collection for verifying the theoretical framework, come up with new findings and possibly establish some new theories. That is why I decided in the context of the nature of my study that it was still worth mentioning the most interesting things that came to the surface during the study, and that certain things are not overheard and could possible lead to new in-depth studies to these topics. Therefore, the findings of my study can still be considered as valuable for science and society and could possible contribute to new studies into the topics that were discussed during the findings of this study. To come back to the methodology of my study, I can thus say that the exploratory nature of this study has resulted into a valuable research and giving insights into new possible research problems and topics, where a qualitative research method was suitable due to the open and interpretative character.

Contribution to theory and recommendations

The explorative nature of my study has made me realize that it is important to also have a good sense of criticism on the findings. When being honest and critical, the statements that have been mentioned in the findings are mainly from the industry side and even this group of representatives is also only a small proportion of a larger group. Therefore, I think that when it comes to concrete solutions and contributions to current literature it lacks in validation and my research should be put into perspective. Earlier in the discussion, I have mentioned that I am not trying to proclaim a certain truth or specific generalizing statements and solutions for my research topic, but there are still a few interesting outcomes, insights and questions that arose during my research and I would like to discuss these in this section.

The exploratory research of this study has resulted in a number of new interesting insights that can add something to the existing knowledge and literature with regard to the research topic. However, due to the limited validity and generalizability, this study lacks concrete statements and therefore would be more valuable for conducting a follow-up study into the most important results of this study, rather than directly contribute something to theory. Based on the results of my research I am sure that in particular the insights in the gap between legislation and technology can provide new insights for the literature and existing knowledge. For example, the term innovation gap is used and may perhaps contribute as a research topic to current knowledge about public-private collaboration with regard to the development of smart cities. Further research should study this gap more extensively in order to arrive at concrete results and perhaps new theories or solutions that can contribute to the theory but are also relevant for practical matters within the society.
Therefore, I advocate and recommend as a researcher, on the basis of my study, that the gap between legislation, the traditional organizational structures and municipals silos and on the other side the technological changes that our society will face in the future, should be researched in further research and can be done, for example, through a grounded theory research method and the use of a case study, and doing a similar research with a larger sample of representatives.

Based on the findings of my study I would like to suggest and explain a few questions that could be researched in future studies regarding to the topic of this study.

The findings have shown that it is important that the current structures and silos at local governments must be broken through, and that more space must be created for transparency from the societal level. Therefore, it is interesting to conduct research studies into the role of citizens and transparency for breaking through current structures and how the vertical way of working from governments to society can be substituted into a more horizontal way of working, where society stands next to governments. Based on the findings and own rationale, I suggest that this can be done by, for example, involving technological developments and digitization into local environmental plans and visions and by creating awareness of what is possible for citizens with regard to their interests with the help of smart city developments. This requires further research, that can be done qualitatively as well as quantitatively, where the perspectives of the various parties involved must be included.

- How can technology play a role in the involvement of citizens to public decision-making regarding the improvement of the quality of life in cities?

- What is the role of transparency between local governments and citizens in the development of smart cities?

- How can current municipal structures be characterized and how do they affect the role of technology in the public decision-making process for the development of smart cities in the Netherlands?

- To what extent are citizens aware of the role of technology for their participation or involvement in public decision-making and how does this affect their attitude towards smart city developments?

Secondly, based on the findings of my research, I recommend that more attention should be given to finding a balance between legislation and technology in the current system, and in the view of the changes and issues that our society will experience in the future. The point here is not to look at how current legislation can be used, and which pieces of the puzzle fit to each other, but also 'where' and 'how' the legislation should be adjusted or changed. Rather than continuing to deliberate and look at how current legislation can be adapted to the technology, it has to be recognized that it cannot always be made appropriate and sometimes also needs to undergo a drastic change and take distance from traditional approaches. Therefore, I think that this requires further research into public administration and technology and finding specific characteristics of the relationship between technology and legislation.

- What factors play a role for the adaption of technology to the development of cities regarding the current legislation in the Netherlands?

- What characteristics can be found in the relationship between technology and legislation and how do these affect the development of smart cities?

Finally, during the findings of the study, it emerged that the wishes from the public side arose from the development of more serviced-based applications instead of ready-made products carried out by the industry. Products and services essentially remain different in character and unfortunately it has not become entirely clear in the research findings what is exactly meant by this. The sample of the research was too small and not representative enough to get a clear and generalizing picture of what the public side sees in this distinction between products on the one side and services on the other. However, it is important, and this has already emerged during the theoretical framework, when defining public-private partnerships, that the industry is more involved or participates in the decision-making of the production of public goods or services. At this moment there is apparently a misunderstanding between the wishes of the public side and what the private side is carrying out and I would therefore advise to involve the industry more in making decisions about this concern, so that it is already determined in advance what is meant by products and services and how the production should be carried out and with what purpose.

- How can the industry side be involved in the decision-making process of the production of public services and goods?

- What characteristics can be identified in the decision-making of governments on the production of smart public goods and services and what role do they play for the collaboration of the industry in this process?

- What similarities or contradictions can be identified between the interests of governments and industry in the development of public smart city applications within Dutch cities?

7. Reflection on methodology

When I critically reflect on the methodology of my research, there are three main things that I would like to say.
First of all, I personally think that with regard to the methodological part of this research, unfortunately a specific defined case is lacking. A specific case for research was chosen in the first sense and the data collection methods were established, ready to be used for conducting the primary data collection of my research. However, during the data collection and contacting the respondents, what seemed to be heading into a positive direction, unfortunately resulted into a stumbling block where I could not do this initial research anymore due to insufficient cooperation and participation. When I critically reflect on myself, this was a crucial moment in my thesis, but I was not really prepared for this with a second plan.
The second thing that I would like to say about the research methodology, has to do with the selected respondents. As has been mentioned in the methodology chapter (Chapter 3) a total of 38 representatives have been contacted for conducting an interview where 11 interviews have eventually been conducted. Unfortunately, this resulted into an uneven representation of the stakeholder groups, where there are noticeably more respondents from the industry side than the public side. Of course, this has also to do with being dependent on the response rate of the contacted respondents, however, if this research was conducted earlier, without the short time frame, possibly more people would have been able to cooperate in the data collection and a more equally representation of respondents could have been collected. In the reflection of the results, this will be discussed more deeply.

The last reflection that I would like to make on the methodology are the interviews itself. When conducting a qualitative research and using semi-structured or open questionnaires during interviews, you should keep in mind that you do not steer the conversations too much or be biased. I noticed for myself as a researcher that this was sometimes hard due to the openness of the conversations. Because you gain more knowledge and information through the phase of interviews, I noticed that the first interviews would feel a lot different than the last interviews because it was easier to talk with the respondents and be more knowledgeable. This made it sometimes difficult to not get to certain topics that I heard in other interviews and I had to constantly remind myself that I also needed to get certain elements from the interviews. This made conversations, because of the openness but also the interview guide, sometimes a little bit chaotic where topics would cross each other. However, eventually, I can say that in almost every interview I have discussed the same topics and got the information related to all questions that I wanted to be answered.

All in all, I have experienced a few complications within my research study and when I critically reflect on myself, I would do certain things different next time. I am aware of the fact that the way my research methodology has carried on, affects the validity and reliability of my research. This has largely to do with my selected respondents and the scope of my research.

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