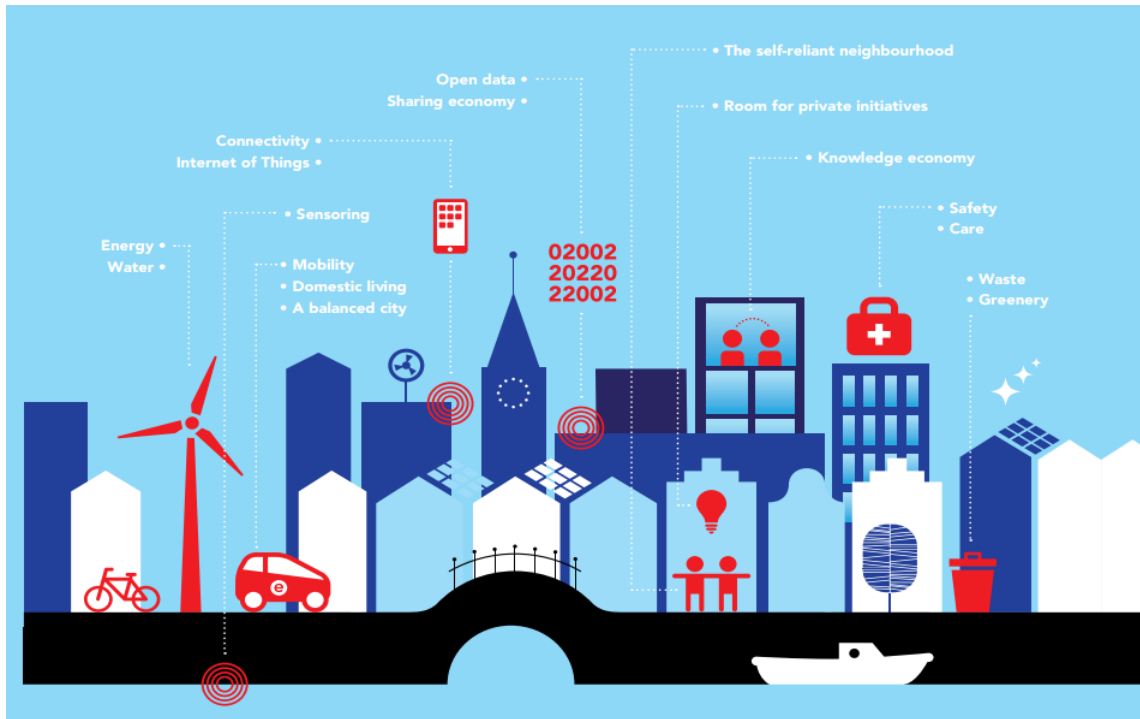


Smart Growth for future Smart City: mutual influence study in the Netherlands and illumination for the future urban management

MSc thesis



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Amsterdam Smart City: "Best & next practices and lessons learned from a global village"

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PREFACE

Smart Growth and Smart City are currently wide spreading urban development strategies all over the world. For decades, though suffered with some critical comments from varied fields, those two strategies have been highly recommended by governments and planning organizations of all sorts. Especially in the western countries, US has adopted Smart Growth idea in the land use planning as a counteract towards urban sprawl since the early 1970s, and the Netherlands applied Compact City in the city plan even can be traced about a century ago. Still, they both consider its necessary to carry on this strategy nowadays. However, with time passing by and technologies moving forward, people start to pay more attention to the recently arisen urban development strategy – Smart City. Usually speaking, there won't be many cross-fields or conflicts between those strategies, since Smart Growth mainly concerns about the spatial planning implementations and solutions. Smart City, however, expect to resolve the exist and potential future urban problems with advanced ICT breakthrough, thus is more inextricably associated with the technology field. Nevertheless, consider the institutional approach to realize those two strategies, things might be more complex than it appears to be. Spatial planning in Smart Growth requires institutional and organizational framework to ensure public welfare get protected, and technology improvements from initiatives need an institutional platform to get their idea spread as well. In turns of the new uprising of Smart City, it can seek advice from the success part of Smart Growth at the institutional level to some extent. However, consider the differentiations existing between them. Possible dilemma could occur in during the process. This research is here to give a new perception towards the question and look into the possible way to tackle the dilemma.

Although the scientific research of advanced environment technologies is pretty interesting as well, what draw my attention are the differentiations exist between two urban development strategies and what it caused to the appropriate way of institutional adaption. For one thing, the government could play different role specifically depending on the strategies, what's more, all the stakeholders would hold varied interests and join in the strategy accordingly. In which case means the institutional control need to be adapted based on that. All those questions stimulate me to find the conflicts between different urban development strategies and work out a suitable way for better social livings within my capability. This would consequently result in my main attention on the institutional dimension study on Smart Growth and Smart City. During the research, possible institutional impacts towards the realization of urban goals would be investigated.

Besides the curiosity towards the subject, I intend to do the research also contains the purpose of making a commitment to the development of China. Because of the late starting in industrial development, China is comparatively disadvantage in the urban management experience, what is needed now is the optimized way of urban development management that ensures a better quality of life for citizens in China. And I can offer my power to improve this situation by studying this subject right here in the Netherlands. It will be of helpful as they are requisite to construct an urban framework that is suitable for people as well as environment development.

Finally, I want to offer special thanks to those who helped me, cooperated with me and stimulated me in the research study process. First of all, I want to thank my thesis supervisor, Prof. Leonie Janssen-Jansen, who supported and encouraged me from the start to the end. She also provided precious ideas and comments when I lost the track, taught me to be more reflective to what I dug into. Also, thanks to the active cooperation of all the stakeholders for the interviews, thanks to Wageningen University for providing such a suitable platform for the social study. Last but not least, thanks to my parents and friends for just staying along with me.

I hope you enjoy reading this.

Feiqian Wu

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ABSTRACT

Smart City plan is profoundly fashionable as the current urban development strategy which is broadly involving multiple social practice dimensions for the implementation. According to the description made by Nam & Pardo (2011), a successful Smart City requires the accomplishments in both technology dimension, human dimension and institutional dimension. Whereas the key to institutional success may need to seek the help and enlightenment from the previous success urban development strategy - Smart Growth. The problem, however, resides in the process of reference and institutional modification from Smart Growth because little research in that aspect has been done before and those two urban development strategies are, after all, can't be simply viewed as the same condition.

We've already known Smart Growth (In Netherlands, Smart Growth shares the same meaning as Compact City concept) played an important role in Amsterdam construction history. In fact, concepts for compact forms of urbanization have played a major role since more than half a century in the Netherlands, and it is still effecting the urban structure in its own ways nowadays (Nabielek, 2012). However, Amsterdam has transformed the main focus into Smart City Plan now (Future Cities, 2015), and has won the European Capital of Innovation City 2016 Award (European Commission, 2016). Consider the current situation, it is a perfect city for me to study this topic.

Therefore, this research has specifically aimed at building a clear image of the current relationship between Smart Growth and Smart City, particularly in the institutional dimension by studying the case of Amsterdam. Besides, it also focuses on developing an appropriate institutional framework for future Smart City by comparing the inherent differentiations within them. Research questions mainly on the comparative study on Smart Growth and Smart City in the institutional dimension in order to offer new illuminations for future urban management in the end. Special attention has been paid to study how do Smart City and Smart Growth relate to each other. Do they have certain shared goals? if is, how to make them coordinate with each other to achieve those goals and earn the mutual benefits together? Also, do they have conflicts to each other in the implementation stage as well, from the governance, policy making and stakeholder collaboration level?

This has consequently resulted in detail empirical comparative study in institutional dimension. In order to investigate this problem, institutional dimension oriented research study combined with stakeholder interviews are applied throughout this research. All the procedures follow the research framework that I conducted specifically to achieve this research goal. This institutional framework prescribes the main institutional factors within the institutional dimension that would have profound influences on the urban strategy implementation.

Research findings suggest that Smart Growth and Smart City in Amsterdam have distinctive varied institutional structure, in terms of governance, policy structure and stakeholder engagement. Those differences therefore caused different consequences followed by their own processes. In the end, a synergized management approach is proposed for a better functioned urban management system.

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1 INTRODUCTION

The urban area is currently in face of a serious challenge towards the upcoming population and future urban development. In 2014, 54 percent of the world's population is urban. The urban population is expected to continue to grow, so that by 2050, the world will be one-third rural (34 percent) and two-thirds urban (66 percent) (UN, 2007). With the rapid population growth and urban expansion, people are longing for an 'intelligent city' strategy that could make the city itself clever enough to deal with the inherent urban problems such as mass transit. Smart City is thus raised among the urban development strategies.

As a wide favored urban development strategy around the world, Smart City is expected not only to apply the advanced ICT technology and mass data utilization into the urban management, but also to stimulate the upgrade of institutional and social dimension as well. As they are all, crucial aspects to improve the quality of life. Since the technology dimension is not my main study area, research on the human/social dimension focuses on how people's knowledge, values, and behaviors influence and are affected by the urban development process as well, not my main concerns. The main focus of this research would stay in the institutional dimension. The institutional dimension here contains the mainly three aspects: governance, regulation policies and stakeholder collaborations according to the explanation in the theoretical chapter. Just like the previous wide applied urban development strategy - Smart Growth, the institutional dimension plays a fundamental role concerning conducting an appealing implementation environment. As institutional factors have long been considered as a decisive factor to successful urban development, planners and policy maker are enormously challenged to redefine their role and position in these changing contexts (Nam & Pardo, 2011). Academic planning literature has enormously contributed to the discussion of institutional structure in urban level by emphatically focusing on governance model and citizen participation (Capra, 2016). What I could do now is to conduct a comparative research of the successful parts in those two urban development strategies, based on that, crafting an appropriate modification for future Smart City implementation accordingly.

From my personal view, the mutual relationship between Smart Growth and Smart City concepts are not well studied yet, and it is key for us to identify a better urban management plan based on having a clear mind of the mutual influences between Smart Growth and Smart City. It is essential to conduct a well-covered comparative study in different aspects if we aim to construct a sustainable society. For instance, Smart Growth, as we know, focuses on the development of the mix-use urban region and aims to avoid urban sprawl (Daniels, 2001; Jepson & Edwards, 2010), this means in the ideal smart growth vision, the urban scale will be constrained in a certain way. However, in the Smart City situation, with the help of high technology, people get freed from the distance limitation which allows the outward expansion of the urban boundary (Zhao et al, 2014). In this case, it is crucial for us to balance the pros and cons of each side and find out the best urban developing solution considering the detailed situation within the city. Many other potential conflicts and benefits are existing just as this and they all need to be paid attention to, and this is why I find this topic is important to the future urban management and broader groups.

We should know those details make things different. New technological and social arrangements have evolved simultaneously, as the parties involved in the process is growing larger and the information is not entirely restricted to small 'professional group' anymore. Those institutional arrangements would have to be adjusted according to the newly emerged changes from different dimensions as well. Local governmental institutions need to redefine their position, regulation policies need to cater to the strategy implementation procedure and the stakeholder engagement requires certain changed because of the interest variations. It is crucial for us to balance the pros and cons of institutional approach in both Smart Growth and Smart City, in order to find out the best urban developing solution considering the detailed situation within the city. These concerns lead me to the current problem and objective of this research.

1.1 PROBLEM STATEMENT

Given the complexities of the challenges facing us, we need to explore the opportunities for cross-border collaboration and multi-level coordination. In this era of networked knowledge production, bringing statistics to life is indispensable for effective policymaking and informing and involving stakeholders and the public at large, in cities, countries and Europe as a whole (Nabielek et al, 2016). This indicates that there are high potentials for advanced urban development in the institutional system in the current society. Still, Paskaleva (2011) mentioned that the Smart City approach of using open innovation for sharing visions, knowledge, skills, experiences and strategies for designing the delivery of services, goods and policies in cities is effective, efficient and sustainable. However, consistent frameworks, principles and strategic agendas are necessary to optimally bind these elements together. Consequently, the dilemma exists in identifying the appropriate adjustments and coherent institutional framework, considering how the urban development strategy works and what is worth taking reference with. And Smart Growth might offer a pragmatic view for a successful future Smart City institutional system building.

Overall, although it seems the goal Smart Growth and Smart City try to achieve is not so different in respect to their goals (United States Environmental Protection Agency, 2006; Manville et al, 2014), those two strategies mainly pay attention to different approaches and different scales. One is from the spatial planning perspective and another is from ICT perspective, one is more driven by the citizen-centric idea and another perhaps rely more on the market and business opportunities (Windén et al, 2016), etc. Those motivations and working mechanisms have their own pros and cons in terms of the certain condition, but what matters is to find the balance inside them and induce the most desired impacts, in order to achieve the established goals we currently set. This demanding an in-depth study in the internal difference of Smart Growth and Smart City in the institutional level. After all, a detailed comparison is needed while the research relevant to this study now is in extreme shortage.

In order to elaborate on this dilemma, this research also focuses on the institutional dimension study to the institutional influence study of those two urban development strategies. Concepts of institutional dimension and its influences are varied accordingly, such as Scott's institutional theory in the macro-level (1995) and Lynne Zucker's institutionalization theory in the micro-level (1977). Therefore, it's also essential for the research process to definite the phrase in an

accurate way. By performing literature research which also stresses in the urban planning perspective, the institutional dimension will be dissembled into several more detailed institutional factors, making it possible to analyze the institutional dimension in a systematic way. Meanwhile, because of the inherent discrepancies exist in those two strategies, it is logic to think some conflicts would occur under the mutual effects. And the research aims to make clear about the influences of those problems as well. Naturally, the goal also is to identify what can be used by making reference to Smart Growth success and what is needed to be adjusted because of the inherent property resides in the Smart City. I, therefore, reflect on the institutional factors of Smart Growth and Smart City within the aim of establishing an appropriate institutional structure for future Smart City by exploring the case of Amsterdam.

1.2 RESEARCH OBJECTIVE

To identify how are Smart Growth and Smart City related in the Amsterdam first, and comparative study the characteristics of each other, based on that, reveal the mutual influences between Smart Growth and Smart City in different aspects, and offer a valuable application by lighting new illuminations for future urban management in the end.

This research is particularly working towards an establishment of a more thorough understanding of how the urban development responses to the differed institutional factors. Based on that, presumptions will be made to conjecture the suitable institutional structure for the better Smart City performance, also with potential conflicts that should be avoided by coordinating Smart City and Smart Growth in the institutional dimension. Considering the study case is specifically in the Netherlands, extra research aims should be paid attention to the Dutch context.

1.3 RESEARCH QUESTIONS

General Research Question

General research question of this research has been given to overcome the current dilemma we encountered in the urban management process, as well as showing the guideline throughout the research: How are Smart Growth and Smart City plan related to each other in the institutional dimension, take Amsterdam as study field, and how to balance them in an optimal way in the urban area based on the influences they have on the achievement of Amsterdam Urban Agenda 2016?

First of all, the study platform will be centered in Amsterdam. Institutional dimension here refers to the institutional framework that Amsterdam follows which concerns to carry out the urban development strategy. Institutional dimension and the factors within will be further explained in the theoretical chapter. In order to resolve this general research question, it will be decomposed into five sub-questions and followings and elaborated accordingly.

Sub Research Question

- How are *Smart Growth* and *Smart City* related to each other?

This sub-question aims at identifying the inner relation between those two urban development strategies by finding out the sharing part they have in the planning, coordinating and implementation process. As the premise of the whole research, the interrelationship needs to be clarified in advance before we can dig into the specified domain. Consequently, the study will be centric on the institutional dimension since it is essential to start with the interpretation of component that is in common. The outcome of comparative research is the finding that cases that may have been defined as "the same" at the outset are differentiated into two or more categories at the conclusion of the study (Ragin, 1994).

- What is the *institutional dimension* in the urban development background?

The next step we need to overcome is to make a comprehensive examination on institutional dimension of both Smart Growth and Smart City in a systematic way. This sub-question here mainly to request a description of the main role of institutional dimension in their respective system. Here, various of concepts that are related to the institutional dimension will get involved, such as the governance structure, stakeholder involvement and regulatory policies. It is essential to analyze them as a whole incorporate with the Dutch context.

- How do those aspects influence the *achievement of Amsterdam Urban Agenda 2016*?

In combination with the experimental endeavors, the sub-question focus on the potential impacts the Amsterdam city would receive based on its goals of current Urban Agenda. The influence can be subdivided into two outcomes, either stimulating the achievement of goals or posing stress on realizing the goals. In order to have a deep understanding of the potential influence, interviews and investigations with experts will be implemented during the research process.

- What are the mutual effects they have on each other?

This sub-question looks deep into the mutual relationship between Smart Growth and Smart City again, and try to make a conclusion of facilitating or restraining influences which caused by carrying on the institutional factors according to the specific strategy.

- How can we manage to collaborate the mutual beneficial part and coordinate the conflicts?

This sub-question focuses on a pragmatic approach to make use of the obtained knowledge, in other words, attentions have been paid to reveal the inherent pattern of institutional mechanism. Based on the literature and experimental information we gained from above process, it is important for us to give appropriate suggestions to adjust the institutional structure considering the characteristics of the urban development strategy.

1.4 RESEARCH STRATEGY

This study is a combination of theory building and experimental research. It applies an explorative study, in which Amsterdam has been empirically researched as the suitable case. For exploratory purposes, flexibility and a lack of structure are assets, whereas, if the purpose is to

formulate a policy, measure the impact of an intervention or to work out the cost of an intervention, a greater structure and standardization and less flexibility are important (Kumar, 2014). Also, various peer review and literature research have been conducted to answer the research questions in a structured way, which eventually lead to the conceptual framework building. Various methodologies have been used as well to analyze the gathered data in a systematic way. The first and second sub-questions are examined by performing a literature review. Efforts have been made to incorporate the stakeholder views of the case study into the data analysis to solve the sub-question three and four. Last but not least, the fifth sub-question is being studied based on relative reference and logical scenario analysis.

Throughout the whole research, data would be gathered and analyzed in a pragmatic way. Besides of the theoretical data that get collected from relative literature and policy documents, interviews and topic oriented conversations are conducted based on the semi-constructed approach aim to obtain the up-to-date information. By using this method, 20 respondents including experts in this domain have been asked with their own special statements towards the topic. That information is considered valuable for the research because the answer is precisely aimed at solving the research questions. Thus, the interview conversation will be expected to be digitally recorded and transcribed afterward (Record will be taken with the approval).

1.5 OUTLINE

Overall, this thesis will be constructed into eight main chapters. First of all, in this introduction session, I will give an overview introduction on the subject of this thesis, including the detailed elaboration of existing problem and aims of the research. In addition, sub-questions that follow to the general question will be extended and explained according to its scientific and societal relevance. The second chapter is the background chapter which mainly will be the illustration of background information that is relevant to the research concept. As the theoretical mainline of the research, the detailed conceptual framework of this research will be revealed in the third chapter. Then, in the fourth chapter, I will have a description of the specific methodology I will use in the research process, along with the study material and research operationalization. To be more specific to the research, more information will be given in the case study chapter which is located in chapter five. As for the sixth chapter, Data collection will be executed for the upcoming data analysis chapter, brief elaborations will be given for better understanding after the result presenting. Next chapter is about the data analysis and design evaluation. In this chapter, I will first start with explaining how I am going to use this data. By having a clear idea about the above stuff, the data will be analyzed jointly. In the final chapter, conclusion and discussion, conclusive outcome of data analysis will give hints to alternative improvements for future advancement. Moreover, recommendations and future research will be listed in the end as well.

2 BACKGROUND CHAPTER

2.1 SMART GROWTH

When it comes to going in detail with the concept of Smart Growth, it always involves in the urban sprawl. Urban sprawl is an increasingly common feature of the built environment in the United States and other industrialized nations. It has its origins in the flight to the suburbs that began in the 1950s. People wanted to live outside of city centers to avoid traffic, noise, crime, and other problems, and to have homes with more square footage and yard space (Frumkin, 2002). However, things turned to be more complicated when more and more people living in a decentralized way outside of the urban periphery area. There is considerable evidence that urban sprawl has adverse effects on public health and the environment. According to Freilich (1999), there are at least seven distinctive negative impacts from urban sprawl, which are community impacts, housing impacts, employment impacts, fiscal impacts, political impacts, transportation impacts, agricultural and open space impacts. This is the reason why policy frameworks are designed to combat sprawl—such as Smart Growth (Resnik, 2010).

It's always been a hard task for experts to come along with one single commonly recognized definition for Smart Growth, to be honest, even the origins of Smart Growth are unclear and hard to pinpoint (Knaap, 2005). In America, Smart Growth is often discussed and related to the concept of Growth Management, Compact City or New Urbanism. Some may even say Smart Growth is originated from growth management movement started in the late 60s of the last century (Yang, 2009; Hoch et al, 2000; Juergensmeyer & Roberts 2013). Whereas Yang (2009) claims as a counteract towards growing ugly situation of urban sprawl, in the early 1970s, transportation and community planners began to promote the idea of compact cities and communities, which then led to a new concept of Smart Growth. In most of the European countries including the Netherlands, Compact City stays longer and almost share the same role Smart Growth plays in the urban planning domain. However, what can be sure is, Smart Growth and Compact City all convey the meaning that is opposite to Urban Sprawl (Neuman, 2005; Yang, 2009).

Though it is hard to trace back the origins of Smart Growth, the rapid ascendance of smart growth still can be traced to three key projects. They are the Growing Smart project, the Natural Resources Defense Council and the Surface Transportation Policy Project in the mid-1990s, Smart Growth and Neighborhood Conservation Act of State of Maryland in 1997 (Burchell et al, 2000). The term 'smart growth' first appeared in the American media in 1997, during the debate over so-called 'Smart Growth' legislation in Maryland (Maryland Department of Planning, 1997). It is said, during the debate, that a smart growth pattern would create "high-density mixed-use and pedestrian-oriented development that promotes efficient land use and increases transit ridership". According to the Maryland Smart Growth legislation, there are five key components within as follows: Priority funding areas, brownfield redevelopment, the job creation tax credit act, the life near your work program and the rural legacy program. Since then, smart growth programs—at least in name—have been promoted by groups that range from the Sierra Club to the National Association of Homebuilders (Knaap, 2005).

In the Netherlands, Compact City is very close to the meaning of Smart Growth, in another word, the role Compact City plays in the Netherlands just like Smart Growth in the US. Although the two countries and their planning systems are very different, the planning objective is similar (Janssen-Jansen, 2007). For them, it is the key to limit the suburban sprawl and to obtain a more sustainable urban life. However, unlike the Smart Growth history in the US, Compact City shows its major role in the Dutch land since more than half of a century (Nabielek, 2012), which means Compact City has been active in the Netherlands even long before the Smart Growth has its role. In this sense, even though their main purposes remain close, it is not appropriate to view Compact City and Smart Growth as if they're closely interrelated to each other at different levels. They are, instead, like two branches extended from the same mainstream of urban sprawl solution, then they got developed and enriched in varied physical and cultural backgrounds while it comes to need. In order to extend the research in a more accurate way, the detail information on Compact City in the Netherlands will be illustrated in the case chapter.

In this research, we would mainly focus on the content study rather than searching the root of urban development strategy. In which case, a clear definition is needed before into the in-depth discussion, and the central idea inside Smart Growth and Compact City is almost the same, I would like to begin with the Smart Growth definition according to EPA (U.S Environmental Protection Agency). EPA is an agency of the Federal government of the United States whose main purpose and mission are to protect human health and the environment. Since its inception of 1970, EPA has been working for a cleaner, healthier environment for the American people. Various of legislation has been issued and various programs have been executed for this purpose. Officially speaking, EPA is at the front line of environmental protection and policing, playing its role in setting and enforcing standards to safeguard the environment and human health. According to their description, "Smart growth" covers a range of development and conservation strategies that help protect our health and natural environment and make our communities more attractive, economically stronger, and more socially diverse. Ten principles of Smart Growth have been key to success (United States Environmental Protection Agency, 2006). See the principles below:

- Mix land uses.
- Take advantage of compact building design.
- Create a range of housing opportunities and choices.
- Create walkable neighborhoods.
- Foster distinctive, attractive communities with a strong sense of place.
- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Strengthen and direct development towards existing communities.
- Provide a variety of transportation choices.
- Make development decisions predictable, fair, and cost-effective.
- Encourage community and stakeholder collaboration in development decisions.

In a more specific sense, Smart growth can also be defined as a policy framework that promotes an urban development pattern characterized by high population density, walkable and bikeable neighborhoods, preserved green spaces, mixed-use development, available mass transit, and limited road construction (Frumkin, 2004).

2.2 SMART CITY

It is said, on one level, Smart City refers to intelligent and sustainable urban development, whose origin can be traced back to the Smart Growth (Harrison & Donnelly 2011), whereas the ICT can make it even more efficient to solve the emerging problems nowadays. The phrase has been adopted since 2005 by a number of technology companies (e.g. Cisco, IBM, Siemens) for the application of complex information systems to integrate the operation of urban infrastructure and services such as buildings, transportation, electrical and water distribution, and public safety. However, what made this concept widely spread over the world is the beginning of IBM Smart Cities work in late 2008, while many cities throughout the world showed their interests to it (Harrison & Donnelly 2011).

At that time, Smart City is more understood as an Internet technology rather than a concept serves for a better future in the human and environment level. The definition shifted and developed with the change of time and background, even different regarding the projects, initiatives. For instance, IBM referred Smart City is a new system which can bring the computer system into the urban management process such as intelligent medical system. In China, smart cities are more focused on the technological issues, and pay less attention to the innovation, creativity and entrepreneurship, enacted by smart people (Li et al, 2015). Though complicated and differed definitions exist in Smart City, according to the research topic is in the Netherlands, it would be preferred to cite the Smart City definition used by the European Parliament document. That is a Smart City can be considered as a city seeking to address public issues via ICT-based solutions on the basis of a multi-stakeholder, municipally based partnership. Six main characteristics would be proposed in a smart city according to the Smart City study in EU (Manville et al, 2014). There are:

- Smart Governance
- Smart Economy
- Smart Mobility
- Smart Environment
- Smart People
- Smart Living

By comparing the principles Smart Growth contains and the characteristics Smart City proposes, it seems those two concepts mainly pay attention to different focus points and processing ways. One is more from the governance perspective and another is technological perspective (utilizing information technology to improve city services including enhancing governance system), one is more driven by the citizen-centric idea and another perhaps rely more on the market and business opportunities based on the specific stakeholders' interests (Windén et al, 2016), etc. Those different motivations and working mechanisms of them have their own pros and cons in terms of the certain situation. For instance, driven by market opportunities could be more

efficient for developing new strategies to overcome a problem which is highly relevant to the economic profits (e.g. mass traffic), while some less profitable domain will get neglected conversely (e.g. air quality). Nevertheless, the goal they try to achieve is not so different after all—better quality of life, so it is essential for us to balance out depending on the current analysis outcome.

Since its conception, the Smart City notion has evolved from the execution of specific projects to the implementation of global strategies to tackle wider city challenges (Monzon, 2015). Multiple projects have been successfully implemented in large cities in different parts of the world, including, for instance, in European cities of Amsterdam, London, Vienna, a rough mapping of smart cities in the European Union (EU) was conducted. In 2011, 240 of the 468 EU-28 cities with at least 100,000 inhabitants (51% of the total) had at least one Smart City characteristic (mobility, environment, governance, economy, people and living) and can therefore be classed as Smart Cities. There are smaller Smart Cities than large ones, but there are Smart Cities in all size categories and in most EU-28 countries (Manville et al, 2014).

As we mentioned, the city of Amsterdam in the Netherlands is quite a successful Smart City case. In fact, the whole Netherlands is stepping towards Smart City construction nowadays. According to (Manville, 2014), the majority of cities in the Netherlands can be rated as Smart Cities based on their own Smart City characteristics and initiative works. Amsterdam has won the European Capital of Innovation City 2016 Award (The European Capital of Innovation Award, 2016). Also, The City of Amsterdam won the World Smart Cities Awards for its Open Data Program for transport and mobility at the 2012 World Smart Cities Forum (Collins, 2013). What's more, various Smart City initiatives produced Smart City projects across this city of Amsterdam and there will be more forthcoming. With all the conditions, they make Amsterdam an even more interesting case to study, not only because it is easier for data collection, also can provide substantial meanings of doing this research. The detailed analysis of Smart City development in Amsterdam will be further illustrated in the case study chapter below.

2.3 CURRENT DILEMMA

Still, despite the enthusiasm people holds towards Smart City construction, the rapid influx of new citizens into the urban area presents overwhelming challenges to their governments (Harrison & Donnelly, 2011). To balance the dilemma, the Smart City approach of using open innovation for sharing visions, knowledge, skills, experience and strategies for designing the delivery of services, goods and policies in cities is effective, efficient and sustainable. However, consistent frameworks, principles and strategic agendas are necessary to optimally bind these elements together (Paskaleva, 2011). Especially considering the growing wicked and tangled city problems associated with multiple stakeholders and highly interdependent complexity.

In order to achieve the goals of smart city, there is a need for an increasingly effective government, developing environment friendly applications, increasing mobility, providing better health facility and good policy making (Ghosh & Mahesh, 2015). Since the technology dimension is not my main study area, researches on the human/social dimension focuses on how people's knowledge, values, and behaviors influences will not be my main concerns. The main focus of

this research would stay in the institutional dimension, which pays attention to the governance, regulation policy and stakeholder structure inside the Smart City. Smart Growth, however, as an urban development strategy that mainly focuses on the institutional dimension (including smart governance and policy framework development, etc.), it can be the essential part to help with the improvement of current Smart City institutional structure. More specifically, it will be the key to interconnect dynamically with citizens, communities, and businesses in real time to spark growth, innovation, and progress in the future Smart City context.

3 THEORETICAL CHAPTER

In this theoretical chapter, First, by having an examination of the General question and Sub research questions in the problem statement and research question chapter, key analytical concepts will be given to bring forth the relative research theories. The concepts of “Smart Growth and Smart City” and interrelation between them, “Institutional dimension” and “Achievement of urban agenda” are critical to this study. Therefore, those analytical concepts will be further explained based on the literature review information. As such they are key concepts to define within the theoretical framework. After which, we will go deep into the theoretical model study, where several current institutional theories will be researched. However, due to the inappropriateness of those theories, a particular theoretical framework will be given regarding the research purpose. Detailed reasons for this choice will be explained in the content below. Furthermore, to make the theoretical framework more logical and sound, some assumptions will be made serve as the theoretical proposition. Also, there will be some assumed potential conflicts that can be expected in the theoretical level at the end of this chapter.

3.1 INTERRELATION THEORY OF SMART GROWTH AND SMART CITY (WHY CENTRIC ON INSTITUTIONAL RESEARCH)

The Smart Community seems to be the answer when we try to find the connecting point of Smart Growth and Smart City. A Smart City is a Smart community of people, whereas building and planning a Smart Community seeks for Smart Growth (Manville et al, 2014; Moser, 2001).

Nam & Pardo (2011) also defines the relation between Smart Growth and Smart City as follows: “Smart City resembles some functions of smart growth initiatives as an urban problem solver within or beyond the physical jurisdiction of a community...As urban planning based on governance with multiple stakeholders is pivotal to smart growth, smart city initiatives necessitate governance for their success.” Also, a structured picture has been made to further clarify the inner connection between Smart Growth and Smart City. See Figure 1.

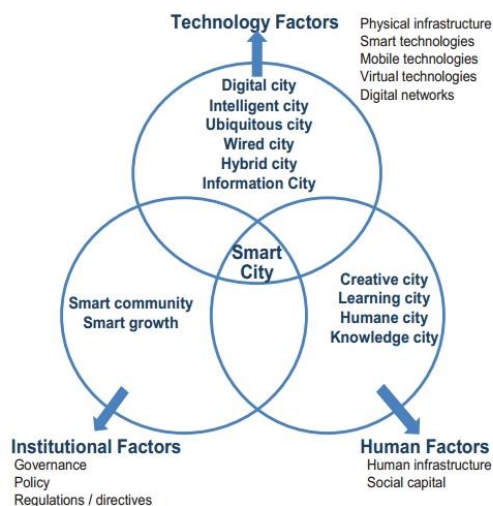


Figure 1. Fundamental factors of Smart City
(Source: Nam & Pardo, 2011)

Therefore, it is proper to conclude that Smart Growth and Smart City share the same institutional dimension from the structure above.

Nam & Pardo's theory has been chosen as the connection point to integrate Smart Growth and Smart City, also to pose as the proposition of research study. The main research track goes with the institutional dimension is not only because the institutional dimension as a cross field (Nam & Pardo, 2011) could offer a valid study outcome in the end, but also less study has been researched before in this area. Smart Growth and Smart City are, as the advanced urban development theories, countless studies have been made respectively, however, literally few research has been done between them. Subsequently, the knowledge produced in the research could be a breakthrough on relationship study between Smart Growth and Smart City.

3.2 INSTITUTIONAL DIMENSION AND RELATED INSTITUTIONAL THEORY

The Institutional dimension concerns about the factors include rules, norms and routines that guide people's behavior. Usually, an institutional factor is more understood as laws, regulations and other legitimated rules that exist in or out of a certain organization. What is most known to others as an institutional factor is regulatory policies. Nevertheless, the institutional dimension contains more than that for most of the time. For instance, the governance style plays a key role in this dimension as well. What kind of role the government takes in the processing stage, the transparency level during the process could cause an essential difference to the outcome in a certain domain. Another factor which is worth taking into consideration is the stakeholder structure. How and at what level is the stakeholder involved shaping their behavior in the urban development process.

Institutional theory has generated a significant volume of work over the past three decades, yet most of the theory is constructed to show how institutional systems affect organizational change within the organization. Theories related to institutional thinking are mainly divided into two main trends, i.e., macro and micro level. At the macro-level, external and environmental characteristics are considered as the main conductors of institutionalized behavior (Pishdad et al, 2012; Zucker 1987; Clegg 1990). For instance, one of the institutional theories that is widely accepted by the society is proposed by W. Richard Scott. He asserted that "It is these values, norms and obligations that originate in the institutional context - regulative, normative, and cognitive - that constrain and support the operation of organizations (Scott, 1995)". At the micro-level, take one example, Lynne Zucker (1977) adopts the micro-level thinking to define three stages of technology institutionalization process, i.e., habituation (the production of shared social meanings), objectivation (the process through which facts become independent as a reality experienced in common with others), and sedimentation (the process by which objectified facts become part of routine behavior).

Those theories and studies are, extremely beneficial to the institutional factor research within a single organization. Because it is already a systematic theory model which concerns both the inner inherent institutional change and the institutional context based change. Nevertheless,

significant attention to the interplay among organizations of different levels and sides has not been as forthcoming. To be more straightforward and descriptive, the current institutional theory describes more on the basic forms that constrain and support the operation of organizations, rather than evaluating the institutional factors that have effects on different organizations. For instance, we know that the environmental policy could pose pressure to a certain organization on its behavior and working system, in order to make the organization live up to the criteria the policy sets. This explains one basic form of institutional isomorphism – regulative isomorphism. And it also makes the institutional theory a great tool to help people understand the how things work in an organization. However, it is too generic and hard to make them measurable indicators to study the influence caused among different organizations. Moreover, considering the research target is the whole Amsterdam and the interplay of various organizations (including government, NGOs, companies and technological initiatives, etc.), instead of taking the original institutional theory as my theoretical model, an adapted way of research framework is required.

By doing the literature research, I find institutional factors differs regarding the specific research study. Take spatial development as an example, there are three institutional factors of spatial development are analyzed in 2011 in the research and study laboratory of urban studies of St. Petersburg branch (head of the laboratory – Dr. Prof. Limonov L.E.

<https://www.hse.ru/en/org/projects/47265538>). Those are:

- Procedures and mechanisms of the cooperation of municipalities and regions in the sphere of spatial development;
- System of territorial planning and urban regulation of land use and construction (compared to foreign examples); such defects in the existing system of urban regulation have been identified as excessive numbers of documents, regulating urban planning and construction, numerous legal collisions in the urban planning and land legislations, complicated procedures of projects consideration, high transaction costs, corruption;
- Procedures and mechanisms of public-private partnership concerning the development of local areas of urban agglomerations.

Also, Decuir-Viruez (2003) explained two institutional factors in the economic growth of Mexico, which are:

- the soft institutional factors that refers to individual habits, routines, customs, traditions, social norms and values, which show some of the characteristics of the networks of interpersonal relations;
- the hard institutional factors are the long-lasting collective forces that shape the economy, such as rules, laws, constitutions, property rights, etc.

From the examples above we can tell that institutional factors are not the fixed elements but more flexible factors depending on the research perspective. Nevertheless, some main focus points remain the same, such as regulations. And some are more or less out of the same meaning, such as partnership and collective forces.

All in all, for the theoretical part of institutional dimension, since the institutional or governance theory from the other research fields are not suitable for this case (e.g. institutional theory for

the organization change study or corruption study in the governance study), I adopted and modified the institutional dimension study based on multiple relative theories (Coe, 2001; Nam & Pardo, 2011; Yigitcanlar & Velibeyoglu, 2008) and some institutional factor studies (Decuir-Viruez, 2003). Further indicators are given to make all the factors measurable for the experimental process.

According to Nam & Pardo (2011), the institutional dimension comprises a variety of factors, not just supportive policies but also the role of government, the relationship between government agencies and non-government parties, and their governance. And it is necessary to establish such administrative environment (initiatives, structure and engagement) supportive for Smart City (Yigitcanlar & Velibeyoglu, 2008). In order to have a clear study track in the institutional dimension study, I divided and adapted the institutional dimension into three main factors and several measurable indicators based on that. They are respectively governance, regulatory policies and stakeholders. Those three factors are also made with reference to institutional factors used in the urban study of St. Petersburg (Cooperation of municipalities, legal regulating and partnership). Based on that, the institutional factors in this research are detailed separated into different independent indicators to make the research measurable. The detail compositions of each institutional factor would be explained below. See Figure 2.

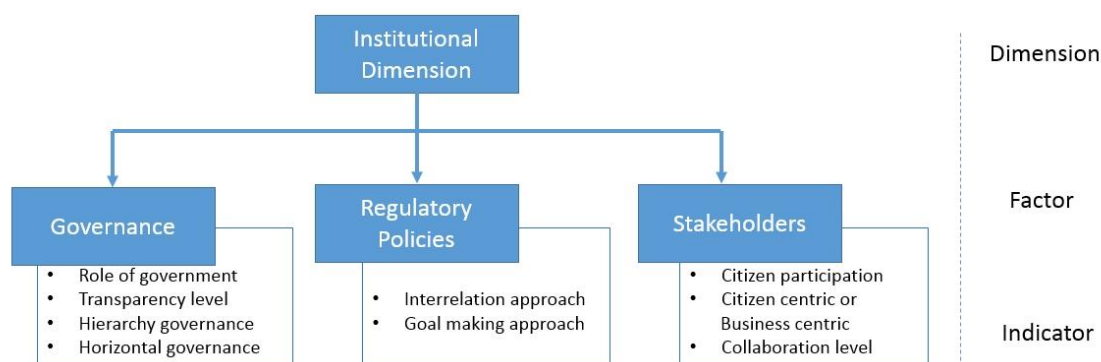


Figure 2. Institutional Dimension Model

This picture shows that institutional dimensions including governance, regulatory policies and stakeholders determine the achievement of urban agenda/urban goals, which also can be understood as the urban performance. The comparison study approach for Smart Growth and Smart City is essential to the research study as they are the reason of changed indicators. It can help us to measure what kind of influence the institutional factors have on the achievement of urban agenda, as well as provide hints for the further improvement of mutual co-ordination.

3.3 INSTITUTIONAL FACTORS AND INDICATORS

In order to have a consistent manner in the institutional dimension description, concise explanations with relative research study will be given for the institutional factors and indicators.

Governance

Urban planning based on governance with multiple stakeholders is pivotal to smart growth, smart city initiatives necessitate governance for their success (Nam & Pardo, 2011). However, while considering the characteristics of urban governance in the urban planning domain, Narang and Reutersward (2006) believe that Public participation and civic engagement, equity and accountability are the normative frameworks of urban governance. However, in order to make the governance indicators measurable and distinctive, I separated them into four main indicators (Role of government, transparency level, hierarchy and horizontal governance) and move the civic engagement into the stakeholder factor column.

Role of government explains the role that government takes in the urban development process. Self-governing, provider, regulator, facilitator or as a partner (Bulkeley & Kern, 2006). The transparency level represents the collection and dissemination of aggregated data. Also, it can be understood as the communication for the data exchange state, or accountability (Narang & Reutersward, 2006). The approach that the urban development took in the hierarchy level is the hierarchy governance structure, which could be either top-down or bottom-up. The partnership in governance level, including public-private partnership and city networks are the characteristics of the horizontal governance structure. All the indicators will be carefully looked into in the case study chapter below. With investigation information from the expert interview, the governance structure in Amsterdam will be examined systematically.

Regulatory Policies

The support of government and policy for governance is fundamental to the design and implementation of Smart City initiatives (Nam & Pardo, 2011). The same reason applies to the Smart Growth condition as well.

De Roo (2000) believe there are two essential approaches while making a regulatory policy, which are also crucial elements of the urban development process. One is the interrelation approach for the policy making, it contains 'hierarchy' and 'consensus' as extremes. The 'hierarchy' approach is synonymous with top-down or central control, whereas the 'consensus' approach is based on participation and the more or less equal interactions between the people involved. Another is the Goal making approach. It concerns whether the policy is made based on single fixed target or multiple interdependent targets. It contains 'standard' and 'objective' during the policy making process. The standards approach is based on single fixed targets, which can be achieved by functional-rational policy. The objectives approach is based on multiple combined and interdependent targets, which can be achieved through the implementation of complex policy and which are linked to on-going policy processes.

Institutional readiness such as removing legal and regulatory barriers is important for smooth implementation of smart city initiatives (Chourabi et al, 2012). And have a clear image towards the current regulatory policy structure would help with the realization of future Smart City. According to De Roo, a shift from the hierarchy - standard quadrant towards the consensus - objectives quadrant is under discussion in the Netherlands. But further investigation is still needed for the research purpose.

Stakeholders

If we look more broadly at governance processes in the city, it is clear that the same thinking which has promoted strategic planning has brought forth an increasing number of related collaborative exercises (Marshall, 2000). While the collaboration among all those stakeholders (i.e., end-users, groups of end-users, IT experts, policy/service domain experts, and public managers) is fundamental to an architecture of a successful urban planning, especially in a complicated social background nowadays.

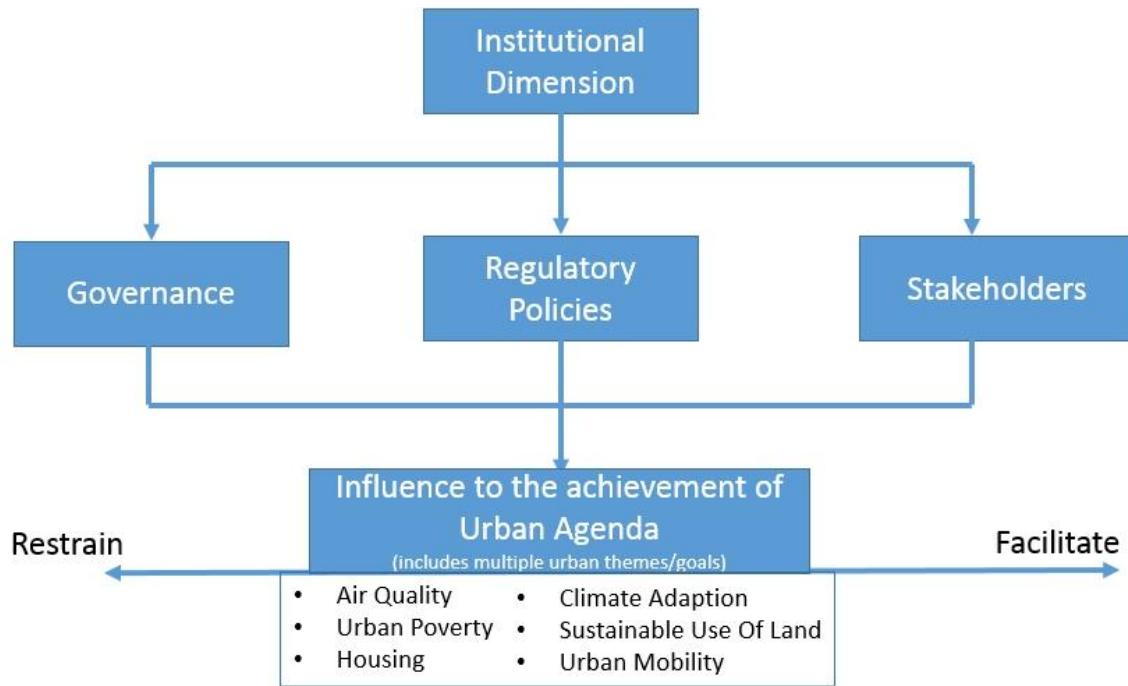
How and at what level is the stakeholder involved shaping their behavior in the urban development process. Therefore, stakeholder factor is furthermore divided into three main indicators for the in-depth analysis. They are, first, citizen participation level. Unlike the project stakeholder or government who have a direct economic interest in urban development, citizens' engagement was less attractive years before, however, governments are searching for more and more alternative ways to incorporate citizens' empowerment now. How things are turning out would be researched and expressed through Citizen Participation Ladder (Arnstein, 1969). Citizen participation ladder is a research tool to measure the citizen engagement level on a certain matter. There are 8 levels in the ladder which represent citizen engagement to a different extent. The second indicator is stakeholders' motivation, whether their interest is citizen centric or business centric would have a profound impact on the implementation of urban development strategy, and it could induce potential conflicts while varied strategies come in. The last but not least, the collaboration level of all the relative stakeholders. This expresses participation of all the stakeholders on the same urban development matter. Networking, cooperation, coordination, coalition, and collaboration (Frey et al, 2006).

3.4 THE ACHIEVEMENT OF URBAN AGENDA (INSTITUTIONAL INFLUENCE)

The urban agenda here posed as the current urban goals for both Smart Growth and Smart City. By having a clear sense of current institutional dimension in mind, we can now assess the performance of those two urban developments based on their contributions to the Urban Agenda. There are originally twelve themes in the Amsterdam Urban Agenda 2016 (Urban Agenda for the EU, 2016). However, considering the relevance it has on two urban development theories, six themes get selected for the institutional influence analysis, they are respectively air quality, urban poverty, housing, climate adaption, sustainable use of land and urban mobility. Those six themes are chosen because they receive primary or secondary impacts from both urban development strategies. For instance, under the Smart Growth policy, it proposes to have a relatively compact urban structure so that unnecessary resource use can be avoided in the urban site. However, environment conflicts such as poor air quality will occur according to de Roo (2000). Meanwhile, in the Smart City vision, people make advantage of the advanced technology to realize the air emission control through a more bottom-up perspective. In that point, organizations of them have their own ways to work things out. Therefore, the shared goals can offer a platform to value the institutional influence they have on the particular matter.

As a matter of fact, both Smart Growth and Smart City are developed aim at realizing the urban goals. However, the institutional structures are more complicated and would cause undesired

outcomes under some circumstance. In this case, we study the possible influence that the institutional factors cause to the achievement of Urban Agenda. It could be either facilitate or restrain the achievement of those goals. By gathering the research data, conclusions will be given in the upcoming chapters. The comparative study thus can be reflected through the institutional influence analysis based on the unified aiming points. Below is the picture describing the pathway of how the varied institutional factors would affect the Urban Agenda goals. See Picture 3.



Picture 3. Institutional Influence Study

3.5 THEORETICAL FRAMEWORK

In order to have a structured recognition of the research direction, also to make clear about the research process, a theoretical framework is needed whereas the grounded theoretical model is not available. The reason why I chose not to use the current institutional theory has been illustrated in the 'Institutional Dimension and Related Institutional Theory' part, here I would only further explain the content of the theoretical framework.

In consequence, the basic theoretical framework of this research will be adapted based on the combination of several relative theories and previous researches. We can identify the main steps in the figure below. See Figure 4.

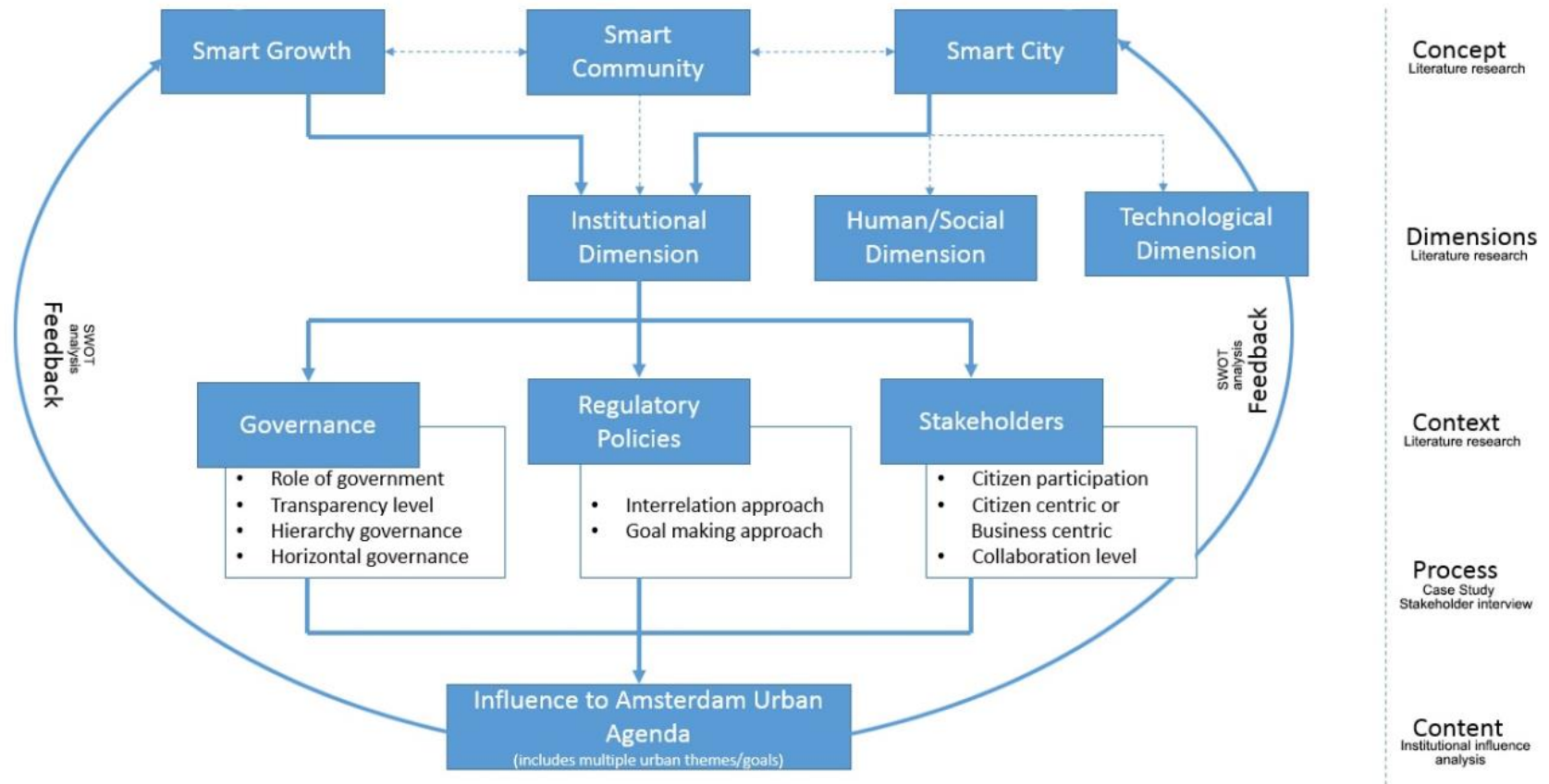


Figure 4. Theoretical Framework Paradigm

This figure shows the theoretical framework that I intend to use for the research study,

From this figure, we can tell that there will be five stages in this research. In the first stage, concept identification. They are mutually connected through Smart Community as they share the attention on Institutional dimension according to Nam & Pardo (2011). In order to have a clear study track in the research study conceptual framework, I divided the institutional dimension into three main factors in the second stage. They are respectively governance, regulatory policies and stakeholders. The detail composition of each institutional factor is described in the content above. However, since Smart Growth and Smart City have different focus points within their own system (context layer), I assume there could be bias exist which can eventually lead to the conflicting outcomes in the process and content stage. Consequently, the fourth stage would be my main content of the research, which is to find out what is the difference between Smart Growth and Smart City in the three aspects (Governance, Regulatory policies and stakeholders, adopted and modified from Coe (2001)) of institutional dimension. And then study the influences they have on the achievement of Amsterdam Urban Agenda 2016, Eventually, study the mutual relationship between those two concepts by answering the research questions following below, aiming to complete the framework circle.

Throughout the whole research, various of concepts and dimensions get involved in. However, rather than doing the social dimension as the central research direction, the main research track goes with the institutional dimension. The decision is made not only because the institutional dimension as a cross field (Nam & Pardo, 2011) could offer a valid study outcome in the end, but also because less study has been researched before in this area, thus the knowledge produced in the research could be a breakthrough on relationship study between Smart Growth and Smart City.

The conceptual framework is constructed on the assumptions that institutional factors would have a profound impact on the process of urban development. All the independent indicators would be qualified and operationalized based on the measurement of documental data, relative regulatory policies and interview feedbacks from stakeholders. Based on the study, I will further discuss the institutional influence on the process of urban development. Ultimately, influence to the six aspects in the achievement of urban agenda.

3.6 THEORY BUILDING ASSUMPTIONS

There will be mainly three assumptions to help with the theoretical framework building. First, Smart Growth and Smart City are mutually connected through institutional dimension. Based on the interrelation study above, the inner bonds between Smart Growth and Smart City is the Institutional factors according to Nam & Pardo (2011). However, for the second presumption, since Smart Growth and Smart City have different focus points within their own system (context layer), I assume there could be bias exist which can eventually lead to the conflicting outcomes in the process and content stage. The third assumption is that due to the conflicts they come across at the institutional level, consequences will occur on the achievement of Urban Agenda.

And all those assumptions can be tested by digging into the literature research and case study of Amsterdam.

3.7 POTENTIAL CONFLICTS BASED ON THE THEORY

By having a clear sense of the background information of Smart Growth and Smart City, also with the help of theoretical framework, there are already some potential conflicts can be identified in the first impression. Those potential conflicts would, furthermore, guide the research direction in the in-depth literature research and interview process. The possible conflicts are as below:

In the institutional perspective, comparing the governance in the Smart City, Smart Growth shows more interests in the control role. Generally speaking, Smart Growth is originally generated due to the concern of undesired life quality and environmental pressure, which is caused by overdevelopment of current resources. That is why the governance level, people who are responsible for that have to take effective measures to narrow down the bad impacts. In this case, the order of 'get controlled' passes over from the top level down to its lower level in order to make sure the outcomes to be achieved. Stakeholders and inner partners are called upon to help with the realization of ultimate goals, projects and projects thus are built up accordingly.

On the contrary, because the Smart City idea arises from the application of technology for an urban problem, it usually takes the path of bottom-up approach (though sometimes top-down path can be identified as well, it is not controllable as Smart Growth after all). See Figure 5. In this situation, universities, research institutions and high-tech companies are the main actors. By using their competencies to plan and implement smart solutions to support a better urban life, detailed regulations are needed, especially if they want to find a proper way to improve logistic, mobility, sustainability, etc. However, often a comprehensive smart city vision completely lacks due to this operation style, plus companies and research institutions pursue their own goals, focused on specific technological areas of interest also makes it difficult to tie the Smart City projects as a whole (Dameri, 2013). It is reasonable to consider that conflicts would occur based on such a difference at the institutional level between Smart Growth and Smart City. Moreover, since Amsterdam Smart City intends to embrace the bottom-up approach base on Smart Growth (Vermast, 2016), potential conflicts need to be identified. For instance, in the scale of Amsterdam City, if we insist on using the bottom-up approach to fix the urban poverty and housing problem, the outcome might turn to be undesired. Sure, collaborate all the relative stakeholders and put them together to discuss a solution out is preferable considering the interests of all parties. However, the thing couldn't work out if private stakeholders defend their own interests against the others, especially when they can't obtain anything from it. Just like we need progression tax rate on excess earning to balance the income of all social levels, such basic social problems like housing and urban poverty should be dealt in a more tough way. This example shows the hierarchy governance can have a fundamental influence on the achievement of Urban Agenda, and the unconformity of hierarchy governance style in Smart City and Smart Growth could cause a conflict on that matter.

What's more, with the development of technology and the prevalent spread of social information, new Smart City refreshed the people's view of getting information. Nowadays, more and more things get traced back and published on the open Internet, and more and more people feel like to involve in the things that are ongoing. In this case, it is more than normal that people pay attention to the transparency level. In Smart Growth, the spatial plan and detailed regulations are inclusive to the professionals, relative stakeholders and city planners. There is where another conflict comes in, those professional works have to adapt themselves to the new system and meet the new requirements, in order to, for example, realize the sustainable use of land in the current background.

From the perspective of a broader lens, Smart Growth is an urban development strategy which is more planning oriented, it gives hints to the city planner that what kind of community is beneficial to local's daily life, what kind of policy would constrain the decentralized urban planning projects from implementing. While the Smart City pays more attention to the technological breakthrough, it is largely dependent on what sort of new application in favors of the market, what can improve broader people's life quality while also facilitate the profits growing. Those two differences, though all mark at increasing the living satisfaction level for the population, critical influence change would occur in terms of how they plan to achieve it. The potential conflicts caused by that would be the unconformity between the planner's intention and the entrepreneur's intention. For instance, the planner intends to increase the city's population and limit the increase in the use of urban space, because they believe this high dense urban development could decrease the footprint per person, which will eventually lower down the unwanted environment impacts. Smart Growth focuses on the development of the mix-use urban region and aims to avoid urban sprawl (Daniels, 2001; Jepson & Edwards, 2010). Whereas in the Smart City scenario, however, with the help of high technology, people get freed from the distance limitation which allows the outward expansion of the urban boundary (Zhao et al, 2014). In this case, it is crucial for us to balance the pros and cons of each side and find out the best urban developing solution considering the detailed situation within the city. Many other potential conflicts and benefits are existing just as this and they all need to be paid attention to, and this is why I find this topic is important to the future urban management and broader groups.

With my research project, I propose to identify the potential conflicts and benefits that exist between Smart Growth and Smart City urban development strategies by weighing the institutional influence of them to the achievement of Amsterdam Urban Agenda. This is a highly societal relevance research which involves some scientific studies to help with the data analysis. Also, societal conclusions which aim to light illuminations for future urban management will be drawn at the end of the research.

4 METHODOLOGY

4.1 INTRODUCTION

The objective of this research is to identify how are Smart Growth and Smart City related in the Amsterdam by implementing the comparative study in the institutional dimension, based on that, reveal the mutual influences between Smart Growth and Smart City in different aspects, and offer a valuable application by lighting new illuminations for future urban management in the end. In order to empirically investigate institutional dimension and its influence, a methodological foundation is needed throughout the research. And in this chapter, the research methodology will be described in a logical order. First, there will be a short description of overall research design intention and research subjects, aiming at clarifying the research character. After which, suitable case selection with its chosen criteria will be justified as well. As the core part of this chapter, methodological choices will follow and extent due to intensive research needs. The determination of research methodology is highly relative to the conceptual framework in the theoretical chapter considering it's the key to combine the decisive concepts and the empirical data together. The research methods contain literature study, stakeholder interview and document research as a whole. For academic literature study, attempts have been made to combine academic theories and thoughts in order to demonstrate the relationship between Smart Growth and Smart City in the institutional dimension. However, as though literature study shows its advantage in the interdisciplinary social study, it does not automatically cover all current issues as it may have not yet been published within academic articles (Kiteley & Stogdon, 2014). As for the implement, the stakeholder interview could concentrate on a more empirical view and focus on the up-to-date information gathering. Document research which includes the regulatory policies and relative governmental publications, in addition, could also serve as a valuable contribution. As for the execution process, operationalization is of importance. Operationalizing the concepts within the conceptual framework into the measurable variables by using the research methods we concluded, we can now make a clear elaboration of the current institutional structure.

4.2 RESEARCH DESIGN AND SUBJECTS

This research is conducted because the current study on the interrelationship between Smart Growth and Smart City is rare, especially from the institutional perspective. Therefore, in order to develop the proper strategies to solve the research questions, it is important to get the valid materials and evaluate them in an effective data analysis method. An explorative research thus is needed under this circumstance. However, Exploratory research often relies on the information that is derived from secondary research, and sometimes this information proves not enough to come out with a decisive conclusion as it is generally associated with insights (Labaree, 2016). For this research design approach, aside from doing the desk research from the former theses, municipality documents, current policies and regulations, getting the information from existing stakeholders are also keys to make an essential difference in the conclusion drawing process. The combined views towards the current application of Smart Growth and Smart City of different stakeholders are strong determinants of the research outcome. The

stakeholder choice is, however, determined by the study case. The chosen case that focuses specifically on the mutual influences between Smart Growth and Smart City will be analyzed after in the case study chapter as well. All of these approaches for exploratory research aim to provide more vivid examples by combining it with the research content.

Still, a possible problem can be identified in the case study. One of the criticisms of the case study method is that the case under study may not be representative of a wider social setting and therefore it is argued that the results of the research cannot be used to make generalizations (University of Leicester, n.d.). Therefore, it would be hard to make a generalized conclusion based on the data analysis from the case. Besides, gap analysis would exist between data from different sources or different types of sources. Although multiple case studies could give the possibility to provide a more accurate source base for investigating a particular topic (Darke, 1998). There are limitations for implementing the case studies we chose which we will elaborate in the 'case study paragraph below. In order to partly address this limitation, also to empirically investigate experts' responsiveness, multiple stakeholders (ideally twenty stakeholders including experts of a broad domain) will be interviewed throughout this research.

As for the research subject, the entire focus is not on the simple comparative study between Smart Growth and Smart City, but the study of what kind of institutional structure is more desired for future Smart City, based on the knowledge we gained by performing comparative explorative research.

4.3 CASE SELECTION

In order to minimize the risk that the chosen case might not be representative for the problem, various considerations according to the choices of cases have been taken into account, as well as the choices of stakeholders. The requirements for the chosen case are as below:

- Has a Smart Growth (Compact City) background and it is now devoting itself to the Smart City development as well.
- Has initiatives of both Smart Growth and Smart City involved
- Has a relatively abundant information that could be useful for the research analysis
- Research cost is within the personal financial capacity

There are various Smart City projects here and there in the Netherlands, such as the Eindhoven Traffic Flow System, Enschede Vehicle Inductive Profile, ICT-enabled citizen participation platforms in Amsterdam, etc. According to (Manville, 2014), the majority of cities in the Netherlands can be rated as Smart Cities based on their own Smart City characteristics and initiative works. Amsterdam, however, is more suitable for the in-depth case study analysis not only because it is the administrative capital of the Netherlands, but also is one of the most successful cities in the Europe. Amsterdam as a city perfectly conforms with this research topic considering its urban planning history as well, plus, limited by the financial capacity, it is proper to make the City of Amsterdam as the case study field. During this case study, the institutional system in Amsterdam will be examined as a whole, aiming at having a comparatively general review on the current situation.

Subsequently, the city of Amsterdam can be described as a case throughout this study.

4.4 RESEARCH METHODS--DATA COLLECTION

Literature Study

The first step of our approach is performing literature study, into the overall background of Smart Growth and Smart City development. The main focus of this literature research is about the information gathering in current policy, governance and participatory style of each pattern. This will be based on scientific literature that is retrieved from search engines such as the Social Science Research Network (SSRN), PubMed, Open Access Journals Search Engine (OAJSE), and other research engines with their main focus towards urban management, Smart Growth and Smart City. As the first stage of research, it is important to gather sufficient background information and set a fundamental knowledge base for further study.

Stakeholder interview

I will not only search for each characteristic of Smart Growth and Smart City, but also aim to gather a list of twenty prominent stakeholders from different categories for the further interviews. Those stakeholders on the interview list will be selected by a set of inclusion and exclusion criteria, for instance, whether this stakeholder is from the municipality or, is this stakeholder from a public-private company or not. After the completion of the list, interviews will be conducted in a semi-structure way. This semi-structured interview approach can be used when the interviewer and respondent engage in a formal interview (Cohen & Crabtree, 2006). It allows them to discuss the issues and concerns most relevant to those likely to use the research. I hope the interviews could provide a representative overview of the current relationship of Smart Growth and Smart City development. Preferably, also in different types of aspects and in a profound way of thinking. By doing this, a database of the interviews could be formulated, all the interviews will be recorded and transcribed to the appendix if there is no other constraint from the stakeholder side. This overview table will serve as a tool to summarize and organize all the findings throughout the research process.

Naturally, as I've already said, there should be a set of rules for inclusion and exclusion of the stakeholders in order to obtain the expected information that is relevant to the research topic.

The inclusion criteria for stakeholder choose are:

- Stakeholders from broad backgrounds. Four public organizations, four private companies, four Utilities, four NGOs and four knowledge institutions
- Stakeholder relative to at least one urban development vision (Smart City or Smart Growth), preferably both
- Currently active

The exclusion criteria for stakeholder choose are

- Stakeholders in relatively new started initiatives

- Low availability to interviews
- Stakeholder which involves in the urban development in a technology or social dimension

The chosen stakeholder and its interview outcome will be presented in the data collection chapter.

Document research

The next approach that is requisite to my research is the document research, examination of relative regulatory policies and project records will be conducted specifically for the case of Amsterdam. I will take the City of Amsterdam as the research case and focus on the mutual influences between Smart Growth and Smart City within Amsterdam. Case study research is a methodology which can take either a qualitative or quantitative approach, and it aims to offer a richness and depth of information by capturing as many variables as possible to identify how a complex set of circumstances come together to produce a particular manifestation (University of Leicester, n.d.). The case study data will be collected through related documents such as policies and reports, what's more, those data should also be proven to be valid/historically true by relative authorities.

Table 1. Data collection methods for each research question

Key research questions	Literature Study	Stakeholder interview (semi-structured interview)	Document research (Policy, project records)
Structure in Institutional dimension (SRQ 1 and 2)	✓	✓	✓
Institutional influence (SRQ 3)		✓	✓
Future potential analysis (SWOT) (SRQ 4 and 5)		✓	

Table 1. shows the specific data collection methods that would be applied to answer the key research questions. Throughout the data collection process, this is the research which mainly pays attention to the social study aspect, and experimental research is hard to be applied considering the content of urban management study. Therefore, there will be no complex techniques and apparatus required for the further data collection.

4.5 RESEARCH METHODS --DATA PROCESSING AND ANALYSIS

Since most of the data that get collected in the literature and document research are not quantitative data, the data process and analysis mainly follow the logical analysis. What's more, because the qualitative analysis relies heavily on researchers' impressions, it is vital that qualitative analysis is systematic and that researchers report on their impression in a structured and transparent form. Therefore, to decrease the research bias, we will have the comparison of Smart Growth and Smart City under the same conceptual framework boundary. This approach is called 'framework analysis', which is relatively easy and is closely aligned with policy and programmatic research which has pre-determined interests (Pope et al, 2000). I prefer to use this data processing method in the literature and document study stage because it allows me to focus on particular answers that I am interested in.

Among various forms of qualitative data, interview data could be considered to be extremely time-consuming. To process the interview data from all the stakeholders, the Iterative analysis approach will be applied according to Miles and Huberman's theory (1994). There are three main steps in the process of analysis:

- Data reduction- This is the first step to make subjects selection and coding of the interview content
- Data display- In this step, the researcher should seek meanings from the selected content and make summaries of it
- Conclusion- Outcomes of the comparing, contrasting of the data should be made

This data analysis method can be very effective to make conclusions out of this large amount of data collection, especially when the interviewees are in a large number while time is limited in a quiet short period. As I intend to apply the semi-structured interview with the stakeholder, besides the descriptive information, some quantitative data would get collected in the meanwhile. In order to analyze this part of the data source, I will introduce Atlas.ti and EXCEL into the data analysis process. Atlas.ti provides some very useful tools in academic research, particularly for social science disciplines which concern to qualitative data management such as interview transcripts (Hwang, 2008). While EXCEL is a wide-use software for survey data management, it also able to compare different data outcomes by utilizing its visualization function.

The information will be coded and presented based on my research questions and theoretical framework, coding will be categorized into three main parts to in line with the data collection methods in the last session. See the coding network relationship in Figure 5.

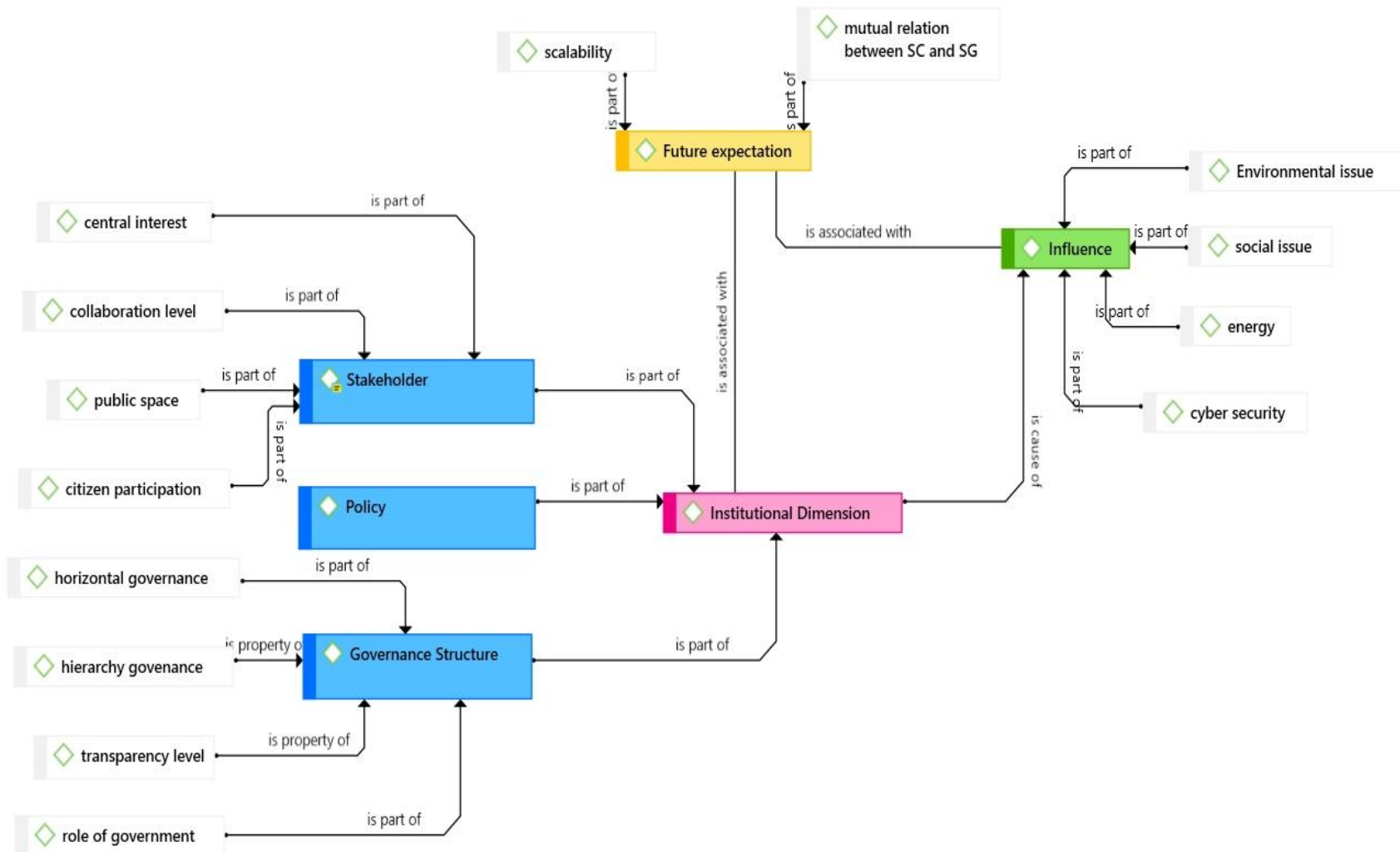


Figure 5. Atlas.ti coding network

4.6 OPERATIONALIZATION

Operationalization of institutional factor analysis

The research entails several steps to complete the mutual comparative study between Smart Growth and Smart City at the institutional level. The indicators that represent the institution level will be measured in three aspects according to the research framework: governance, regulatory policies and stakeholders. The first step is to form an assessment framework which incorporating the key institutional characteristics within the urban development theory. This indicates the need for data collection from relative stakeholders and documental research concerns about the city regulatory policies. In order to have a consistent manner in the data collection, some main questions for all the stakeholders will be prepared first in the literature research stage. The rough structure of the institutional investigation form is shown below (See Table 2).

Table 2. Operationalization of institutional Factor Analysis

Concepts	Indicators	Indicator definition	Measurement
Governance	Roles of government	The role that government takes in the urban development process. Self-governing, provider, regulator, facilitator or as a partner. (Bulkeley & Kern, 2006)	Measurement based on the documental data, relative regulatory policies and interview feedbacks from stakeholders
	Transparency level	Collection and dissemination of aggregated data.	
	Hierarchical governance	The approach that the urban development took in the hierarchy level. Top-down or Bottom-up.	
	Horizontal governance	The partnership in governance level, including public-private partnership and city networks	
Regulatory Policies	Interrelation approach	It is concerned with the institutional framework of decision making. It contains 'hierarchy' and 'consensus' as extremes. (de Roo & Miller, 2000)	
	Goal making approach	The policy is made based on single fixed target or multiple interdependent targets. It contains 'standard' and 'objective' during the policy making process. (de Roo & Miller, 2000)	
Stakeholders	Citizen participation	The level of citizen engagement in the urban development matter, expressed through Citizen Participation Ladder (Arnstein, 1969). Citizen participation ladder is a research tool to measure the citizen engagement level on a certain matter. There are 8 levels in the ladder.	
	Citizen/ Business Centric	The project is lead out of the citizen concerns or business concerns.	
	Collaboration level	The participation of all the stakeholders on the same urban development matter. Networking, cooperation, coordination, coalition, and collaboration (Frey et al, 2006)	

As I've already mentioned in the conceptual framework paragraph, making a clear sense of the Intuitiional factors and measure the characteristics of them in both Smart City and Smart Growth

situation will be the key content of this research. In order to obtain valid data on all those different indicators, documental data and relative regulatory policies will be examined during the research process. What's more, semi-structured stakeholder interviews will be executed as well for the up-to-date information gathering. The detailed data collection methods can be found in the "RESEARCH METHODS" session.

Operationalization of influential factor analysis

By having a clear sense of current institutional situations in mind, we can now assess the performance of those two urban developments based on their contributions to Amsterdam Urban Agenda. There are originally twelve themes in the Amsterdam Urban Agenda 2016 (Urban Agenda for the EU, 2016). However, considering the relevance it has on the institutional dimension of those two urban development theories, six themes get selected for the institutional influence analysis (See Table 3). Those six themes are chosen because they have primary or secondary impacts on both urban development strategies. For instance, in Smart Growth, it proposes to have a relatively compact urban structure so that unnecessary resource use can be reduced in the urban site. However, environment conflicts such as poor air quality will occur according to de Roo (2000). Meanwhile, in the Smart City vision, people make advantage of the advanced technology to realize the air emission control. In that point, those strategies have their own ways to work things out. Therefore, the shared goals can offer a platform to value the institutional influence they have on the particular matter. Furthermore, to analyze the restrained or facilitated effects on the achievement of those urban goals.

Table 3. Operationalization of institutional influence analysis

Amsterdam Urban Agenda	Description	Smart Growth		Smart City	
		characteristics	Institutional Influence	characteristics	Institutional Influence
Air Quality	Realize systems and policies to ensure a good air quality for human health	Compact development	Measurement based on the documental data, relative regulatory policies and interview feedbacks from stakeholders	Smart environment	Measurement based on the documental data, relative regulatory policies and interview feedbacks from stakeholders
Urban Poverty	Reduce poverty and improve the inclusion of people in poverty or at risk of poverty in deprived neighborhoods, involves of urban regeneration	Mixed-use development (higher degree of urbanization leads to higher economic productivity and a stronger growth in jobs (Raspe et al., 2010)); Intensifying and directing development		smart economy, By Smart Economy we mean e-business and e-commerce, increased productivity, ICT-enabled and advanced manufacturing and delivery of services.	
Housing	Have affordable housing of good quality. The focus will be on public affordable housing, state aid rules and general housing policy	Affordable housing; Range of housing choices and opportunities		Smart living, incorporates good quality housing and accommodation.	
Climate adaptation	Anticipate the adverse effects of climate change and take appropriate action to prevent or minimize the damage it can cause to Urban Areas	Green infrastructure		Smart environment	
Sustainable use of land	Ensure that the changes in Urban Areas (growing, shrinking and regeneration) are respectful of the environment, improving quality of life	Transferable development right; The preservation of farmlands, open spaces, natural beauty and important environmental areas		Smart environment, green urban planning, as well as resource use efficiency, re-use and resource substitution	
Urban mobility	Have a sustainable and efficient urban mobility	Creation of neighborhoods that are walkable; Provision of a variety of transportation options		Smart mobility, ICT supported and integrated transport and logistics systems.	

The characteristics of Smart Growth are based on the Smart Principle modified by Mohammed et al (2016). And the characteristics of Smart City are based on the interpretation in 'Mapping smart cities in the EU' (Manville et al, 2014), the detail description of Smart City characteristics can be found in the official publication.

Operationalization of SWOT analysis

To finalize the analyses we come out in the above processes, also to fulfill the feedback session in the research conceptual framework, there will be SWOT analysis at the end of the research. This stage aims at performing a comparatively comprehensive review on the current situation in Amsterdam. However, unlike the above stage which pays more attention to the objective data collection and analysis, there will be more subjective value analysis out of institutional dimension. The goal of doing a comparative study between those two urban strategies are to

- Identify the existing gaps within the various components of Smart Growth and Smart City in the institutional perspective
- Assess the inner connections inside those two strategies
- Evaluate the benefits from complementing and making use of each other find out the potential improvement room

All the comparative finding and outcomes from the research will be emphasized in the form (See Table 4). The SWOT analysis step follows the logic reasoning way of thinking and will be conducted in a main qualitative approach.

Table 4. Operationalization of SWOT analysis

SWOT Analysis			
Smart Growth		Smart City	
Strengths	Weaknesses	Strengths	Weaknesses
Opportunities	Threats	Opportunities	Threats

Overall, although it takes quite a long time to perform the data collection and interview preparation, the central research content is in the last part of SWOT analysis. Therefore, extra attention would be paid to this part.

4.7 CONCLUSION

This chapter mainly introduces the methods for data collection and analysis, also the detail operationalization for research implementation. For the data analysis methods, the research would focus on the literature study, stakeholder interviews and document research. The data that get collected would be analyzed in a mainly qualitative data analysis approach, though SPSS would be applied for part of the interview information. By utilizing the deductive approach, the

propositions will be logically deduced based on theories and theoretical concepts. As the outcome of the data analysis and result presentation, first of all, the overview analysis will follow up and serve as a tool to summarize and organize all findings throughout the research process, including the stakeholder analysis with information that is derived from interviews. Then, I will have a SWOT analysis of the research findings for each urban development strategy according to the data collected from the case study. The main purpose of the SWOT analysis is to find out how is the current situation going on and where are the potential opportunities and gaps between each other (Chevalier & Buckles, 2013). Naturally, in order to have a positive effect on the future urban management, several recommendations will be given in the result presentation as well. This would be a short summary at the end of the research based on all the analyses that I have concluded during the research, and the outcome will in return, help to build a stronger theoretical framework for the future study.

5 CASE STUDY

5.1 SMART GROWTH IN AMSTERDAM

Since long time ago, settlements along the rivers and in the low-lying parts of the country typically took the form of walled cities with an internal transport and drainage system: canals. Urban planning was invented in these cities, forming a prelude to the compact city policy of the last two decades (Van Der Burg & Dieleman, 2004). After the wars with England and France, the economic growth started again between 1813 and 1940, followed by a great expansion after 1870 when the Industrial Revolution brought the increase of the wealth and a rapid population growth. During the population expansion, urban redevelopment project such as Zuid Plan (1917-1940) has been created from the idea of a Compact City, and implemented by the design of many public and symbolic places for the citizens (Morbelli, 1997). Later on came along with another breakout. Shortage of unskilled workers during the 1960s and early 1970s in the Netherlands made it necessary to attract 'guest workers' from the Mediterranean countries. In most cases these Spanish, Italian, Turkish, Moroccan and Yugoslavian immigrants settled in the big cities (Tesser et al, 1995). Immigration waves and increased asylum migrations since then provoked the urban development in the Netherlands, especially in the big cities. Those accelerated the population expansion and urban development made urban planner in the Netherlands to build up and change the urban form in an even more compact style. Since the 1960s, the Dutch authorities have pursued a policy of compact urbanization in various forms, even though its benefits have not been well understood (Dieleman, 1999). However, Amsterdam can be defined a Compact City both for its dense urban form and for the compact policies that have been implemented since the seventies. The Second and Third National Policy Document on Spatial Planning (1966 and 1973) introduced the concept of 'clustered dispersal' and 'growth centers', and Amsterdam's municipality started working towards a Compact City since 1978, when the citizens contested the transformation of the city core in a central business district and the relocation of the inhabitants of the city center in the periphery (Nabielek, 2012; Morbelli, 1997). The breakthrough of the Compact City concept has been confirmed with the emission of the report "De compacte stad gewogen" (The Compact City Evaluated) in 1985, which motto was 'the city in the center' (De Roo, 2004).

The leading principles claimed by the report are: (De Roo, 1996)

- to increase the city's population and limit the increase in the use of urban space;
- to emphasize city and landscape, build by adding to the existing structure;
- to emphasize public transport and low traffic speeds in the city;
- to strengthen spatial and functional cohesion;
- to distribute facilities to limit necessary traffic and improve accessibility for inhabitants;
- to utilize investments already made.

These leading principles aim at the change in traffic patterns as a result of compact building, which should lead to a reduction in mobility. What made this urban planning strategy even more official is the emission of the Forth National Policy Document on Spatial Planning (1988). This document was based on the concept of the 'compact city', which also stressing out the harmonization of housing provision, physical planning, environment and mobility issues. The

VINEX policy covered the period between 1990-2005, and it has been extended to 2010 (Cereda, 2009).

The compact city policy has created some very large sites for urban expansion, these are small cities in themselves, within or close to the major cities. One example is Leidsche Rijn, adjacent to the city of Utrecht (Van Der Burg & Dieleman, 2004). In the meanwhile, Compact City also shows its value in the densification of current big cities and metropolitans such as the AMA (Amsterdam Metropolitan Area).

The urban network, the new concept for urbanization, was introduced in the Fifth National Policy Document. Despite the change of national spatial planning framework, the document still provides for cities that are sustainable, more compact building and less urban sprawl and restructuring the brownfield rather than creating new ones (Matsumoto & Ostry, 2012). Still, the main focus got shifted with the changing trends and circumstances. There were various reasons to switch from the compact city to the urban network concept. According to Van Der Burg & Dieleman (2004), most 'metropolitan regions' are too small as planning units, and global competition favors larger area rather than the smaller ones. Besides, society is developing in the direction of 'network-based' rather than 'area-based' relations, etc. The governance structure and urban development policies should have followed up with these changes, whereas the translation process has been cumbersome.

Below is the detailed institutional structure information of Smart Growth (Compact City) in Amsterdam, gathered and separated based on different institutional factor types.

Governance

The spatial planning system in the Netherlands can be briefly explained in the picture below. See Figure 6.

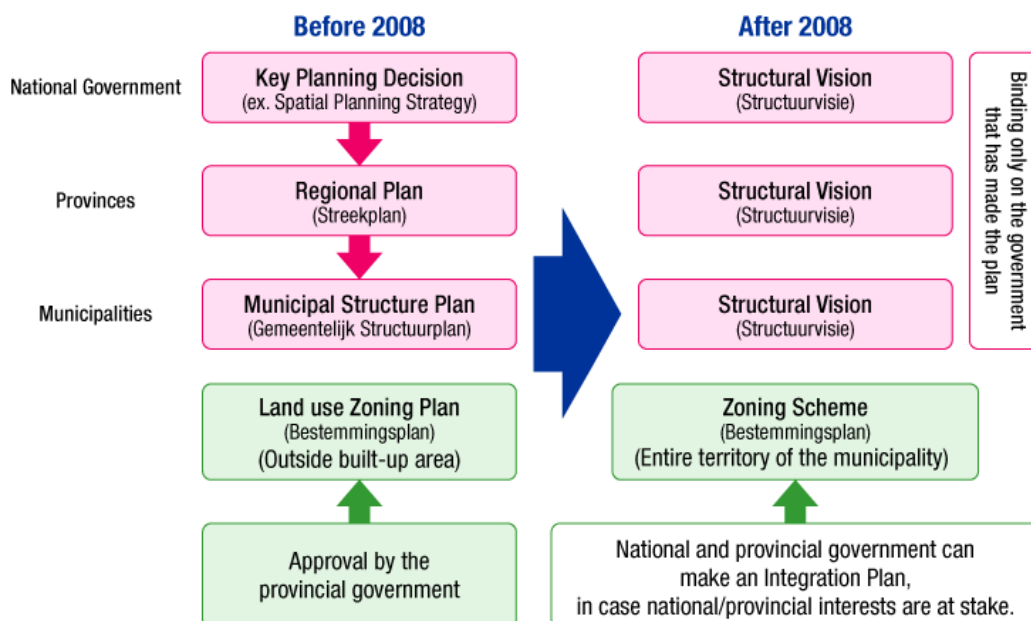


Figure 6. Dutch Spatial Planning System (Source: MLIT, 2015)

In the traditional spatial planning system, there was a clear **top-down** structure in the Dutch spatial planning system. At least, in the national scale. The national government was to make the key planning decisions, the provinces were to devise provincial regional plans covering broad regions, the municipalities were to devise structural plans, and lower level governments were to abide by the national key planning decisions and the provincial regional plans. The Dutch government has a nationwide policy which indicates, in general terms, where housing, employment, public transport facilities and the like should be located. This represents the core of Dutch national planning (Faludi & Van der Valk, 1991; Faludi, 1992; Faludi & Van der Valk, 1994). Distinctively different when compared to the “controlled growth ideology” in Florida (US), whose controlled growth ideology was closely affiliated with private development interests and politics, Dutch-style spatial planning, on the other hand, had a strong professional scope towards future urban development (Evers, 2000). Whereas in the new system, regulations by the national government are reduced and local discretion is given weight in the strategy.

The **hierarchy governance** structure also can be reflected from the financial line. This is the tax system in the Netherlands. **Major funding for the budgets of municipal and provincial governments is drawn from state tax revenues, not from the local tax base.** Their main source of income (63%) is special grants from the national government. These are devoted to social security outlays, education, the construction of social housing, etc. Only 16% (1997) (on average for the various municipalities) comes from local taxes (Ministry of Finance, 1997).

The Dutch policy of **mass construction of social housing** is extraordinary even by west European standards (Dieleman, 1994). Social housing now makes up 40% of the total housing stock across the country and 55% of the stock in Amsterdam and Rotterdam. Construction of high-rise **estates** in the social rented stock was **heavily subsidized by the State**. These **subsidies** also helped private house builders to operate profitably, on infill sites in cities.

The Dutch planning bureaucracy can **operate fairly independently of the political arena**. This facilitates the development of a planning doctrine based on professional norms (Daalder, 1989). As a matter of fact, the Green Heart, ABC location policy which are representative policies driven from Compact City idea came about less from a public outcry than from a convergence of government interests (when implemented, it was met with suspicion from the general public, especially the business community). This actually reflects the exclusiveness of **horizontal governance** to some extent because public ideas, though important, don't have a final say to counter the decision-making process. And the planning bureaucracy, on the other hand, due to its professional characteristic, can make decisive moves in the urban planning process.

However, as time passing by, there is a change in the horizontal governance called '**Polder model**', whose core of planning relies on reaching consensus through formal and informal personal networks, negotiations and exchange of knowledge within relevant governmental institutions, leading the idea of “centralized where necessary and rather than decentralized where possible” (Alpkpkin et al, 2004). Especially later on with the introduction of **Key Planning Decisions Procedures** (Planologische kernbeslissing, PKB) and Koers 2025 Plan, the structural visions were fully practiced through the involvement of citizens, NGO, NPO and different level of

government authorities, experts, researchers, etc. Through the aim of **transparency**, the relative document was publicized to inform the public on specific issues (Alpkpkin et al, 2003).

Policies

The **centrally oriented system** is a strict framework for other policy sectors such as spatial or physical planning (Miller & De Roo, 1996). In the traditional system, the spatial plan focuses on the national plan, whereas regional governments and municipality are concentrating on the concrete formulation and implementation. For instance, the government authority lists certain requirement (or making key planning decisions) according to compact city principles, such as where housing, employment, public transport facilities and the like should be located. Then the lower levels are responsible for making it comply with the national guidance. Lower level governments were to abide by the national key planning decisions and the provincial regional plans. This **hierarchy approach** functions well so long as there is not too much difficulty at the local level implementing the standards in order to get an acceptable distance between intrusive and sensitive urban functions (De Roo, 2000). Although with the change of policies and spatial planning system, there are fewer rules and regulations dictated by central government, more scope for local and regional considerations, more development planning and less development control planning were among the more frequent suggestions (VROM, 2004). Still, the interrelation approach that they took for spatial planning is still in a hierarchy style consider the key role of higher planning agencies.

Although each time the Compact City changed into a different form, all of these strategies for compaction and densification were guided by the same aims: the protection of the surrounding landscape, the limitation of private car use and the ambition to sustain vital urban facilities and public transport (Nabielek, 2012). The shared aims become the guideline of policy-making and the lower level is obliged to make concrete moves to fulfill those goals. This actually shows the traits of **standard approach** policy structure, which is the functional – rational policy based on single fixed targets.

Stakeholders

In the government declaration of 1973 it sounded as a proclamation:

‘The plan is a moveable plan and spatial planning is a process.’

For the first time, citizens and interested parties were given the opportunity to make their contributions to the content of national plans, through a decision-making procedure especially developed for this, the so-called National Spatial Planning Key Decision (van der Cammen, 2012). Since then, many spatial plans were subject to the **wide-range of social discussions** before they can be processed into the implementation. For instance, the “National Spatial Structure Outline on Urbanisation (1976)” Plan and current active national flood protection project “Room for the river”. During the development of the Draft Structural Vision 2040, the stakeholders, adjacent municipalities and borough councils were invited to provide input.

Amsterdam's citizens were consulted via within 30 minutes', a public campaign using the web and social media.

Until now private parties have expressed their willingness to participate in several ways. However, not unconditionally. Most prominently, a limited number of private developers have bought land for development in the so-called VINEX areas. As **compact building not always represents the markets' preferences**, in some areas the principle of compact building is fought (and sometimes amended). However, although **public-private cooperation has been extensively tried in the Netherlands, the results have not lived up to expectations** (ABN-AMRO Bank, 1997). This is also the reason why, said by Nabielek (2012), urban regeneration projects have been supported by national funds throughout the past decennia in order to promote the urban densification in Dutch cities.

Dutch planning mirrors Dutch society in general where **disputes are usually resolved through consultation and consensus forming**. Private interests and political forces - be it environmental organizations, trade unions or social groups - are often incorporated into the official political and planning processes and thus have a stake in the ongoing implementation (Evers, 2000). Still, private-interest and politics in the Netherlands exert relatively little influence over planning style compared to the situation in the US (underlying purpose of these documents is the regulation of economic activity and private interests rather than physical spatial activities). In fact, **planning doctrine is independent and exerts a significant amount of influence** - through the bureaucracy, consensus tactics and metaphors - on political and economic interests which are embedded in a culture of consensus and late-welfare-state capitalism (Evers, 2000).

5.2 SMART CITY IN AMSTERDAM

From the above information, we've already known Smart Growth (Compact City) played an important role in the Netherlands' construction history, and it is still affecting the urban structure in its own ways nowadays. However, with the alarming daily change of technology, urban planners and social scientists in the Netherlands now are paying more and more attention to the upcoming urban development strategy—— Smart City.

Amsterdam has a long tradition of innovation, it is known for freedom, ideas, and entrepreneurship, science, and arts, but it is also a city that nurtures social innovation and diversity in the public space (Windén, 2016). As the capital of the Netherlands and the innovation hub in the world, Amsterdam has become a smart city innovator since 2009. The city of Amsterdam also won the World Smart Cities Awards for its Open Data Program for transport and mobility at the 2012 World Smart Cities Forum (Collins, 2013). What's more, nowadays Amsterdam has transformed the main focus into Smart City Plan and become the European Capital of Innovation City 2016, various Smart City initiatives produced Smart City projects across this city of Amsterdam and there will be more forthcoming. The Data integration inhibits great opportunities, as well as challenges towards the construction of improved social services. However, the spatial growth achieved by leaving out basic values and over-relying on technologies is not a smart city (Zhao et al, 2014). What would be considered in the first place other than the technological innovation is the collaboration work in a diverse group of stakeholders, including both public and private sectors. And this part, as well, is the main focus during the implementation of Smart Growth.

Smart City scope in Amsterdam can be roughly divided into three directions, energy, mobility and open data. Whereas Amsterdam Smart City (ASC) is a unique collaboration between the inhabitants of Amsterdam, businesses and governments in order to illustrate how energy can be saved, now and in the future. City administrations have set up institutional arrangements (platforms, specialized agencies) to promote experimentation, partnership formation, and knowledge sharing. Whereas Smart City platforms and projects are fascinating new arenas where urban stakeholders, public, private and civic, engage in coalitions and innovate together (Windén et al, 2016).

Speaking of this aspect, Smart City working system is significantly varied from how the Compact City strategy works in Amsterdam. In the sense of process flow, how citizens engage in the project, what's the central concern of stakeholders' interests, etc. To make an intact description in the institutional dimension, I will discuss about Smart City as below.

Governance

The smart city idea arises from the application of technology to urban problems (Dameri, 2013). One of the foundations of the Smart City approach is that today we have access to real-time information at the level of individual citizen's choices and actions. Harrison & Donnelly (2011) refer to this change as '**making the invisible visible**', and it is an even more '*open*' approach which involves people from the outset when drawing up the future Smart City vision. In cater to

this change, a path figure has been created for better explanation according to the characteristic. See Figure 7.



Figure 7. Bottom-up Smart City development path (Source: Dameri, 2013)

As the main driver of Smart City, technology breakthrough, especially in the ICT domain plays a significant role for this new type of urban development strategy. It provides and permits mass data on the Internet can be utilized through wired link between different actors (stakeholders), and thus facilitate the growth of relative projects and initiatives in the urban region for the achievement of shared goals. The shows **bottom-up development** path for current Smart City development. However, as part of the drawbacks of this system, it often neglects two main aspects: the smart city governance and the citizens (Dameri, 2013).

For the horizontal governance concern, city protocol has been conducted as a new form of city governance. It is a network and/or platform for education and knowledge sharing among all members. This protocol also aims to foster city-centric solutions and eventually, benefit citizens and their quality of life. This protocol also facilitates the internet of cities by providing common solutions and platforms within and between different cities. In this sense, has a **high level of transparency** towards its counterparts, as well as **multi-level horizontal governance** based on its working rational.

Policies

Unlike regular regulatory policies that put limits and/or stimulus on a specific urban development planning domain, technology, as a new approach that facilitating the urban growth and adjusting the urban structure, changes sometimes even faster than the context operates it. It is hard to set a single fixed target and strict strategy for all the initiatives involved in the Smart City construction. On the contrary, the higher level of policy-making authorities makes policy adjustment for the project process. Take one example, regulation on solar energy net-metering limit the possibilities for homeowners to invest in solar panels. This is why the municipality of Amsterdam is investigating the possibility in cooperation with Amsterdam Smart City and the 'Centrum voor Energievraagstukken' to develop a policy free-zone for sustainability in Amsterdam South-East. And the adjustment form complies with the **objective approach**, which means the current structure is based on multiple combined and interdependent targets, those targets can be achieved through the implementation of complex policy and which are linked to on-going policy processes (De Roo, 2000).

That is also why the local policy framework in Amsterdam is not about how to control the Smart City development, but as a driver for Smart City initiatives and overall sustainable goals for the future scenario. Policy plan such as 'sustainable Amsterdam', Urban Agenda 'Pact of Amsterdam' are all made out of that concern. These ambitions have taken shape in many projects and measures, acting as a catalyst for a large number of green projects in the city (Windén, 2016), projects such as Smart Grids, Smart Living, Ecomap 2.0, Citynet, Current City, etc. However, there is an overall future smart city master plan for the City of Amsterdam: "Structural Vision Amsterdam 2040" made by Amsterdam City Council. More than ever before in Amsterdam's long tradition of structural planning, the City Council wanted this Structural Vision to take shape in an open process. Citizens, businesses, organizations and other government bodies had to be given the opportunity to share their thoughts and provide input throughout the process. This can be regarded as '**consensus' approach** which means the plan is made based on participation and the more or less equal interactions between the people involved in the process and implementation procedure.

Stakeholders

As for the citizen participation, although high level of openness has been stressed out in the former paragraph, according to the 'governance and citizen participation in Amsterdam Smart City' study conducted by Carlo Capra (2016), **different typologies of citizen participation exist concerning the specific Smart City projects**, also the same outcome shows itself in terms of the governance model in Amsterdam. For instance, citizen participation level in the Serious Gaming project is at the information level, which basically shows a mono-direction flow of information. Whereas in the Ring-Ring project, as it is originated by citizens, it achieves social innovation in terms of the citizen participation level. This situation enormously enhances the complexity in the Smart City urban development background and thus, requires a new institutional structure in cater to this change.

Smart City pays particular attention to the smart governance and e-governance, still, it requires the active role of citizens in participating in the city governance and to exercise a democratic role in the city choices. Through the report from Windén et al (2016), it says in addition to value

creation for partners, ASC puts more emphasis on the involvement of citizens, communities, or end users. What's more, they evaluated the six types of partnership they distinguished in the smart city projects, which are partners: public organizations (e.g. the city administration), private companies, utilities, non-governmental organizations (e.g. associations), knowledge institutions and citizens. However, it turns out that **citizens were never really central and seldom an official part of the project partnership**. On the other hand, **private companies and public organizations show extraordinary leadership within the projects**.

Compared to the past, more focus is put on the *economic viability* and sustainability of projects, it is said according to the 'Organising Smart City Projects: Lessons from Amsterdam' (Windén et al, 2016), pilot projects are supported only when there is a business case and/or when there is sufficient scope for upscaling.

5.3 CONCLUSION

In Amsterdam, this land contains both the history of Compact City construction and future vision of an advanced Smart City. Here come the questions, despite the dissimilarities in the focus points and differences in the containing contents when comparing Smart Growth and Smart City, what would be the shared part of Smart Growth and Smart City that they can have mutual effects on each other? So How would the Smart Growth structure affect the Smart City Plan development? What would be the possible gap between them in the shared area concerning the achievement of their mutual goal?

What we know currently is that there are potential weaknesses and debatable critics inside both of them. For instance, nowadays, Smart growth has generated considerable controversy because stakeholders affected by urban planning policies have conflicting interests and divergent moral and political viewpoints (Resnik, 2010). This is because how usually Smart Growth strategy works is in a more or less top-down approach compared to Smart City's technology-based approach. On the one hand, the top-down approach is more efficient while the achieving goal is clear and measurable. On the other hand, due to the lack of appropriate mutual communication and feedback session, this approach tends to miss the links among different parties. Those are all mismatches between Smart Growth and Smart City, also the parts where urban planner in Amsterdam should pay extra attention to while the city is transforming from one to another.

Therefore, it is important for us to find out the relationship between those two, based on that, finding a right way to bridge the connection of two urban development strategies. Faludi and Van der Valk (1990) emphasize the importance of promoting consensus for the policy of compact urban growth, as a prerequisite for its implementation. Even more important was probably the wide consensus in policy circles and among the population on the (perceived) merits of compact urban growth. And the Netherlands has developed itself in cater to this demand for future urban development. It is said since the end of the 1980s a shift from the hierarchy - standard quadrant towards the consensus - objectives quadrant is under discussion in the Netherlands (De Roo, 2000). However, the implementation of compact urban development is no easy task even if there were broad consensus on its merits (Breheny, 1996;

Jenks et al, 1996). A major stumbling block of this problem could be the administrative fragmentation of urban regions. Considerations such as those, however, would be the paid extra attention to in the research study.

6 DATA COLLECTION

6.1 LITERATURE STUDY

From the literature study in the case study above, institutional dimension pattern of Smart Growth and Smart City in Amsterdam shows its rough shape.

Institutional dimension structure of Smart Growth

A **top-down governance** process arises from a well-constructed strategic urban development vision, and try to realize these shared goals by applying the government rules and regulatory policies. This process also may involve some essential stakeholders and relative citizen engagement along the implementation of such strategy. However, the flow goes from top level authorities to the lower part and less the other way around. By comparing the case in the US, the Dutch way is less stringent in the hierarchy control level (state legislation and local planning rules have a more administrative - legalistic emphasis which seeks to establish standards that will assure that development progresses responsibly). Considering all the information and instruction flows gathered above, the Smart Growth governance in Amsterdam still could be concerned taking more or less the top-down approach in the hierarchy governance. However, the **horizontal governance is growing rich and collaborated** with the wide implementation of KPD and Polder model, along with the gradually **improved transparency level**.

Judging from the subsidy for infill sites and housing in cities, Amsterdam government plays the **facilitator** role out of it. The **regulator** role can be seen from the insistent issued compact city related policies. By engaging compact city project around the city such as building compact community, the government also involves in the procedure as the **partner**. In this sense, the Amsterdam municipality has a quite strong character of leadership during the implementation of Compact City in the urban development process.

The **interrelation approach** is concerned with the institutional framework of decision making, and the **goal making approach** is concerned with the urban development goals people attempt to achieve in the end. Although based on the current characteristics, Amsterdam carries the hierarchy – standard approach for the Compact City policy making, it is said that a **shift** from the hierarchy - standard towards the consensus - objectives quadrant is under discussion in the Netherlands (De Roo, 2000).

As Compact policy is **not that market centric**, there are some conflicts exist between the Compact city strategy and the actual implementation. For the **citizen participation and stakeholder horizontal collaboration**, despite this has been tried extensively through consultation and consensus forming, the outcome remains insignificant.

Institutional dimension structure of Smart City

What is apparent in the Smart City governance structure is that **bottom-up hierarchy governance** takes a substantial role while initiating a Smart City related projects. Amsterdam

municipality as the central game player, conducted several important roles to push this urban development strategy forward. The leading character is **facilitator** since Amsterdam Smart City (ASC), the major platform where urban stakeholders, public, private and civic, engage in coalitions and innovate together is organized by the Amsterdam Municipality. Besides, it also shows itself as a powerful **partner** (by sharing Public-private partnership on a specific project such as Energy Atlas, Smart Light, etc.), **regulator** (making the structural vision and urban agenda) and **provider** (funding the Smart City projects). It is because the multiple functioning roles of the Amsterdam municipality, a balanced horizontal structure can be realized in the city. Also, thanks to the open approach initiatives took during the whole process and the highly ICT developed system, the **transparency level is pretty high** compared to the traditional method.

Determined by the operational way in this particular urban development strategy, the traditional single fixed goal making policy appears not apply to the current circumstance. On the contrary, it seems **objective approach** is quite suitable for the processing purpose. It indicates the current structure is based on multiple combined and interdependent targets. The interrelation approach for the regulatory policy, however, based on the literature research, fits the **consensus approach** because citizens, businesses, organizations and other government bodies had to be given the opportunity to share their thoughts and provide input throughout the process. The actual involving level still remains to be investigated through the stakeholder interview.

For the citizen participation study, actually Capra et al (2016) has conducted a relative comprehensive research in this aspect. The report points out that **different typologies of citizen participation exist concerning the specific Smart City projects**, also the same outcome shows itself in terms of the governance model in Amsterdam. The outcomes show a high variety of citizen engagement in a specific Smart City project, which is completely reasonable, but it also says citizens have never been the central part of the project leadership which reveals a problem of certain kind.

However, the study is still primitive and not update to the current changes. Subsequently, in order to have a comprehensive and correct view of the situation in the Amsterdam. Stakeholder interviews and document research will be conducted for the accurate latest information.

6.2 STAKEHOLDER INTERVIEW

By following the stakeholder inclusion and exclusion criteria presented in the Methodology chapter (operationalization), stakeholders for interviews get selected, as a result, the name list of chosen stakeholders is decided (Appendix A.). The stakeholder interview is conducted in a semi-structure approach. For the closed question part, in total, twelve statements have been created in order to obtain the quantitative data for this research. Whereas in the open question section, another eight questions are prepared for open discussions with all the stakeholders. To be noted, there will be three extra questions for stakeholders from knowledge institutions, those questions are specifically focusing on the mutual connections between Smart Growth and Smart City in Amsterdam (Appendix B).

Below is the information gets collected from the stakeholder interview. The result from closed questions is arranged and presented in Excel. See average score in Figure. 8. Details of the result of closed questions are attached in Appendix C.

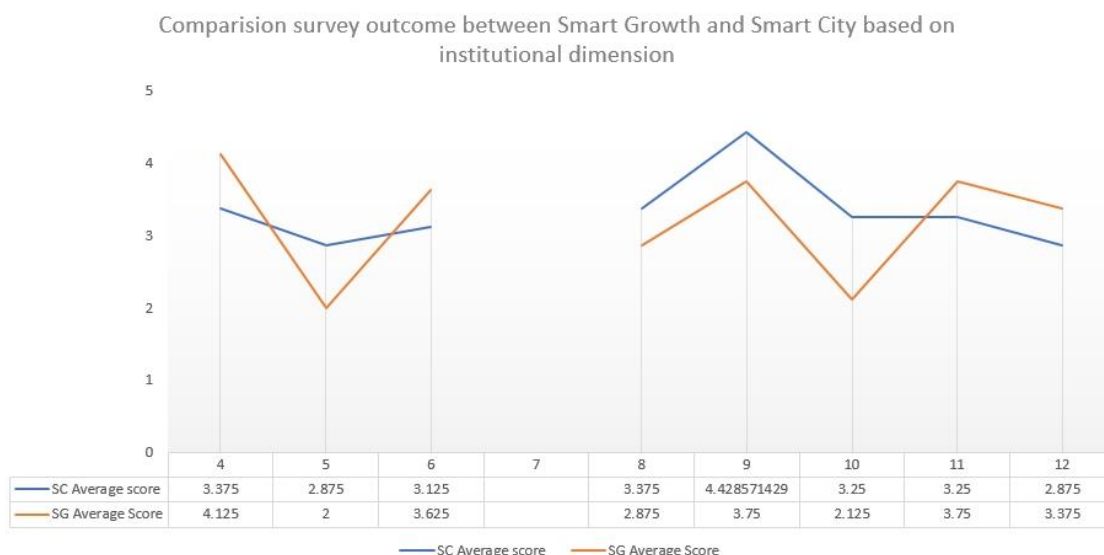


Figure 8. Comparison survey outcome of Smart Growth and Smart City based on institutional dimension

The horizontal axis represents the question number from the closed question (See semi-structured questionnaire is in Appendix B), number seven is a multiple choice thus not calculated in the table. The vertical axis represents the average score from all the interviewed stakeholders, it is rate from 1 to 5 levels. From the chart, we can see on the one hand, Smart Growth is more top-down, citizen-centric and well collaborated than Smart City. On the other hand, Smart City has more openness, multileveled engagement and consensus-based strategy than Smart Growth.

Conversation transcripts on interview open question are listed in the Appendix D. To process the interview data from all the stakeholders and apply Miles and Huberman's theory (1994) to do Iterative analysis, all the interview transcripts data need to be reduced through coding process based on the data processing methods in chapter 4. Atlas.ti is used for the data processing. The reduced coding data is presented in Appendix E based on the coding query of Institutional dimension (Governance, policy and stakeholder), influence and future expectation.

See Code Cooccurrence result in Table 5 and 6, it presented that stakeholders from Smart City have a strong expectation of improvement on the role of government and policy making, an extra concern is also being paid on the project scalability. Whereas stakeholders from Smart Growth are paying more attention to the policy-making, roles of government and collaboration between stakeholders.

	Future expectation	Governance Structure	Influence	Policy	Stakeholder
central interest	2				2
citizen participation	3				4
collaboration level	3	1			2
cyber security			1		
energy			1		
Environmental issue			2		
Future expectation				7	
hierarchy governance	1	2			
horizontal governance	3				
mutual relation bet...	2				
Policy	7				
public space			1		1
role of government	8				
scalability	3				
social issue			2		
transparency level		4			

Table 5. Code Cooccurrence result for Smart City

	Future expectation	Governance Structure	Influence	Policy	Stakeholder
central interest	1			1	4
citizen participation	2				4
collaboration level	4				3
cyber security					
energy	2		1	2	
Environmental issue	1		4	2	
hierarchy governance	2	5			
horizontal governance		3			
mutual relation betwe...	2			1	
Policy	8				1
public space					
role of government	4	4		1	
scalability					
social issue	2		6	1	
transparency level		4			

Table 6. Code Cooccurrence result for Smart Growth

6.3 DOCUMENT RESEARCH

The document research pays attention to the current applying institutional structure. In this session, by combing those policies and documents published by the public authorities as a whole, relative regulatory policies and project records will be examined in a comprehensive approach.

Main Smart Growth Policies/programs and the influences

The Netherlands is a 'self-made' country where spatial planning played its role in a significant way a century ago. The national efforts towards spatial planning can date back to 1901 when the National Housing Act (Woningwet) was issued. Before that, the local authorities took the overall control on the housing issues (Hobma & Schutte-Postma, 2012). After the first two formative document which led to the formal parliament request for national spatial planning in 1956 and 1958, the First National Policy Document for Spatial Plan was formalized, followed by the Second, Third, the Supplement of Fourth and Fifth (Nota Rumite) document. Unlike all the traditional policies before, the Nota Rumite strategy leveraged power in the local municipality and reduced the overall control at the national government level. What's more, because of the political party changes and the financial reasons, **a new minority cabinet turned towards a radical decentralization and deregulation approach of governing**. The Spatial Planning Act was completely revised by the year of 2010 as a result from that (IenM, 2013). However, specific for the housing issue, control is increasingly handed over to central bodies such as the Housing Corporation, the National Housing Council (NWR) and the Central Housing Fund (CFV) (Van de Graaf, 2009). In March 2012, Structural Vision on Infrastructure and Space (Structuurvisie Infrastructuur en Ruimte (SVIR)) has come into force and became the national spatial policy. This policy proposes a long-term achievement in a diverse domain including economic, social security, environment sustainability at a national level. At a smaller local scale in Amsterdam, the Municipality of Amsterdam has published Smart Growth related policies such as Koers 2025 and Structural Vision Amsterdam 2040 to concrete the future vision and project planning details. Despite there are many policies/projects that are related to Smart Growth (e.g. MRA agenda at the regional level, Agenda groen en stadsecologie in Amsterdam Oost, etc.), only those two will be introduced considering their significant influence and public popularity in Amsterdam.

Koers 2025 is conducted in the aim at filling the gap between the ever-increasing inhabitant growth in Amsterdam and its housing shortage. This integral policy also plans to add its extra value by increasing new opportunities for facilities, businesses and quality of life. In detail, there are several housing programs introduced in the official document, along with its potential effects concerning about social, financial, and field aspects.

In particular, for the housing issue, the municipality has made agreements with the landlords and Tenants Association Amsterdam. It is agreed in Coalition Agreement 2014-2018 that in Amsterdam, the city should be providing enough room for people from all incomes, part of the agreement is that **social housing in Amsterdam will be guaranteed**. Therefore, a huge amount of social housing can be expected and built in the following years.

The analysis of the social impact of the building blocks by Decisio shows that the proposed measures in Koers 2025 have a generally beneficial impact to **accessibility, sustainability, air quality and relationship with green areas** in Amsterdam (GGD, 2016).

In general, the Structural Vision Amsterdam 2040 outlines how the construction sites will be formed in the Amsterdam region. The keywords toward the policy are 'compaction and

'transformation'. The 'compaction' refers to the better utilization or intensification of current existing urban areas, and the 'transformation' refers to the transforming the existing (vacant) building and residential complexes into a more energetic and frequently used space. There are four major thrusts can be identified in the policy according to the information on the municipal website. See as following:

1. Rolling out the city center, which means the densification within the current city boundaries
2. Interweaving metropolitan landscape and city. It requires the improvements of interplay between green spaces in urban areas and the outer areas
3. The rediscovery of the waterfront
4. Internationalization of southern flank. This refers to the Intensive development in the Schiphol-Zuidas-Southeast area, around the economic core of Zuidas.

For the future tasks and expected working influence, the Structural Vision Amsterdam 2040 places its emphasis on six spatial tasks. All those tasks are considered as decisive for the Dutch capital's developmental direction, those tasks are respectively **aiming at city densification, transformation, high quality of public transportation and quality layout, recreational use of land and sustainable use of energy.**

What's more, in order to formulate this policy in an open manner, varied stakeholders from citizen, organization and private business bodies took part in the process. A public campaign was held as well in which people from Amsterdam are able to give their own personal ideas and opinions towards it.

Main Smart City policies/programs and the influences

Unlike regular regulatory policies that put limits and/or stimulus on a specific urban development planning domain, technology, as a new approach that facilitating the urban growth and adjusting the urban structure, innovation changes in the city sometimes even faster than the context operates it. It is hard to set a single fixed target and strict strategy for all the initiatives involved in the Smart City construction, that's why policy or vision specific for the Smart City development in Amsterdam is not available yet.

Still, there are many other policies for Smart City relevant issues from all kinds of perspectives, for instance, the privacy policy for security management, the Sustainable Amsterdam agenda for social and environment control, etc. Because of the broad involvement of basically every domain in the urban region, the Smart City influences can be also considered broad as well from this point of view. In order to have a closer look at some effective influences, several projects will be brought into this session. Tables will be conducted base on the Rotterdam Smart City Architecture Model devised by Frank Vieveen, the Program Manager of Smart City in Rotterdam. There are mainly seven layers including users, application, data, communication, sensors and objects. Together they build an integrated smart city hardware to support its goals. I furthermore separate the application layer into six different divisions in corresponding to the

data with the Urban Agenda goals. The project information in the table is collected from multiple sources, including the report of 'Organising Smart City Projects: Lessons learned from Amsterdam' produced by Amsterdam University of Applied Sciences, the information from Amsterdam Smart City website and other relative documents. From the gathered information in Table 7, it's obvious that there is a significant amount of projects cover each of the Smart City domain, especially in the issues connected to climate change, sustainable use of land and urban mobility.

ICT links and strengthens networks of people, businesses, infrastructures, resources, energy and spaces, as well as providing intelligent organizational and governance tools (Manville, 2014). In order to manage those extremely complicated themes together, Smart City Amsterdam has been established as a new way of Smart City governance. It is a network and platform for education and knowledge sharing among all members. Also, it aims to foster city-centric solutions and eventually, benefit citizens and their quality of life. Another project which called city protocol facilitates the internet of cities by providing common solutions and platforms within and between different cities. In this sense, the city of Amsterdam has a high level of transparency towards its counterparts

The report of 'Organising Smart City Projects: Lessons from Amsterdam' from Winden et al. (2016) says in addition to value creation for partners, ASC furthermore puts more emphasis on the involvement of citizens, communities, or end users. They evaluated the six types of partnership the smart city projects to identify the current situation, those partners are public organizations (e.g. the city administration), private companies, utilities, non-governmental organizations (e.g. associations), knowledge institutions and citizens. The detail composition of stakeholders is different in Amsterdam Smart City web page, see Figure 9. Though stakeholders that engaged in the project are differed by the specific project, generally speaking, stakeholder involvement is quite high and satisfied by most of the Smart City stakeholders.

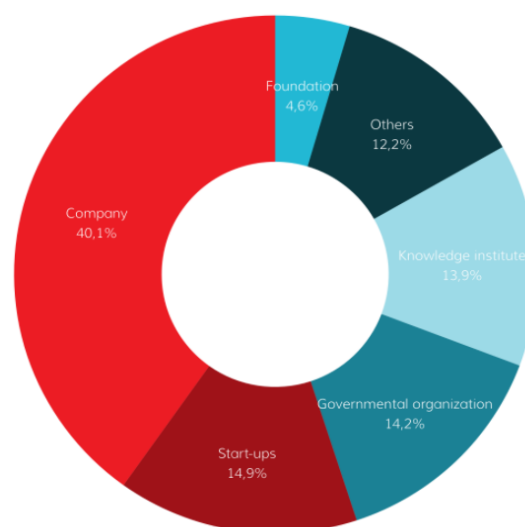


Figure 9. Stakeholder composition percentage in the Amsterdam Smart City
(<https://amsterdamsmartcity.com/p/about>)

Table 7. Smart City projects in Smart City Architecture divided by goals from Urban Agenda

City Level	Air quality	Urban Poverty	Housing	Climate adaption	Sustainable use of land	Urban Mobility
Users	Companies, citizens, government, visitors, researchers					
Application (system)	-Smart Citizen Kit-monitor parameters in the air - PostNL project 'Smart Society' to help improve environment	-PostNL project 'Smart Society' to help improve social welfare -Voucher for low income, self-employed people	-NEXT-BUILDINGS: Next Zero Energy Buildings with ICT - based inhabitant energy feedback systems -Sustainable Neighborhoods	-City-zen: Energy -Smart Grids, Ecomap 2.0, Citynet, Current City, etc. -Energy Atlas: data sharing on energy, waste and sewage which enables new sustainable solutions -Smart Light -Circular economy projects like De Ceuvel, WASTED, Fair Meter, etc.	-Clean city networks Citibrain's Smart Waste Management System -Circular Amsterdam -Circular waste bags, introduce a 100% recyclable content waste bag for the WASTED program -Energy Atlas: data sharing on energy, waste and sewage which enables new sustainable solutions -Circular economy projects like De Ceuvel, WASTED, Fair Meter, etc.	-Ridesharing platform -WEGO car sharing technology -Smart flow-parking system -Advanced SCM module of TrafficLink improves the regional traffic flow, and help with the traffic management -Travel time saving system Rundle -Sustainable mobility projects such as MOKUM MARITEAM, RELOADIT, using electric car and cargo ships reducing city traffic by using canal as an alternative transportation approach -Smart Flow to optimize traffic -etc.
Intelligence	Sharing (local network platform), fusion (Energy Altas, sharing data of energy, waste and sewage information from different parties), statistics(real time information), export(Butterfly app for tourists and visitors with local information), interpretation(streaming analytic insights)					
Data	The City of Amsterdam won the World Smart Cities Awards for its Open Data Program for transport and mobility at the 2012 World Smart Cities Forum, which shows its broad data availability in mobility domain, besides of it, environmental parameters data is also quite open thanks to Energy Altas, PostNL and other Amsterdam Smart City projects.					
Communication	No data available					
Sensors	Air quality		Air quality, temperature, humidity, light, sound	Air quality, temperature, humidity, light, sound, electricity	Solid or liquid waste	Movement, visual, traffic flow, location
Objects	Sensor		-Building -Smart meter	-Clean cube and cap -Sol chip-solar battery -Sensor in the Lamppost - Light Electric Freight Vehicles (LEFVs) -Fast charging stations -Smart meter		-Monitor -Sensor -Vehicles

7 KEY FACTOR ANALYSIS

The data analysis is based on the measurement of the documental data, relative regulatory policies and interview feedbacks from stakeholders.

One of the distinct characteristics of Smart City in the Amsterdam is the innovative bottom-up approach the city took to develop the Smart City projects. Unlike the traditional spatial planning approach in Smart Growth strategy, the Municipality of Amsterdam played a minor role in the Smart City development. However, because of the wish to motivate Smart City as an innovative breakthrough which differs from other traditional urban development strategy, the city will face its challenge in finding the balance between government's leadership and initiatives' enthusiasms. As Theo Veltman from the Municipality of Amsterdam said in the interview (Interview, March 2017), 'the Smart City in Amsterdam now is more at the end of an innovative and chaotic environment, and the traditional approach is more rigid and structured. We need new ways to combine those things together in order to make the Smart City work..... we ask them to try to be more organic and chaotic, in their way of working and way of changing, which is a big different change.'

The Smart City of Amsterdam also made a significant achievement in the involvement of citizen engagement as well especially compared to what happened in the Smart Growth process. Although the citizen participation level in Smart City project differs depending on the particular working project (for instance, the electric vehicle development project has less but smart citizen kit project has much more connections direct to the citizens in the city.), the fact is that almost every stakeholder I interviewed are being very positive about the importance of citizen engagement for their project. To be noticed, Rene Post from De Waag Society has quite critical views on the citizen engagement in Amsterdam. He introduced the noise project (Geluidsnet) along with several other vivid examples to elaborate what and why the citizens should be involved in the start phase of a regular project which concerns to citizens in the daily life. In the meanwhile, he is critical about the current data openness and citizen's saying weights in Amsterdam as well. Therefore, he said 'So that's why I'm a little bit critical about the smart city things. So, the first step is to have the citizens on the big board, and then the data should be open, the algorithm should be open, because otherwise how can we make sure it's right' (Interview, April 2017). Still, he believes the municipality is getting open and moving in the right direction now, and I also believe that it is this kind of open and diverse thoughts of arguing openness that keeps Amsterdam on the right track.

7.1 INSTITUTIONAL FACTOR ANALYSIS

Based on the data collected in the last chapter, we can now identify the institutional factor of Smart Growth and Smart City in Amsterdam in a more accurate way. See details in Table 8.

Table 8. Institutional Factor Analysis

Concepts	Indicators	Smart Growth	Smart City
Governance	Roles of government	Regulator, facilitator and provider	Partner, facilitator, provider and regulator
	Transparency level	Collection and dissemination of aggregated data. Private	the transparency level is pretty high compared to the traditional method.

		companies are well informed, but less sound to the planning process	
	Hierarchical governance	More or less top-down. Hierarchical governance gets decentralized from national to local city level.	Bottom-up. National government does not carry an overall vision or plan. The Smart City projects are initiated from the bottom level
	Horizontal governance	The partnership in governance level, including public-private partnership and city networks	A comprehensive smart city vision completely lacks. Companies and research institutions pursue their own goals, focused on specific technological areas of interest. Even if they link their own project to a broader idea of smart city, these goals are generic and not well defined, nor quantified in advance and therefore not measurable and valuable.
Regulatory Policies	Interrelation approach	More hierarchy approach from the interview feedbacks.	More consensus based approach from the interview feedbacks.
	Goal making approach	'Standard' approach during the policy making process because clear and relative fixed goals can be identified in the policy contents.	'objective' during the policy making process, there is no fixed policy yet specific for the Smart City issue. More policies are expected to come that is close connected to the ongoing Smart City projects.
Stakeholders	Citizen participation	For the citizen participation and stakeholder horizontal collaboration, despite this has been tried extensively through consultation and consensus forming, outcome remains insignificant.	Different typologies of citizen participation exist concerning the specific Smart City projects. ASC puts more emphasis on the involvement of citizens, communities, or end users. Overall, the level is quite high, there are more than 90 platforms for citizens to get data collection.
	Citizen/Business Centric	Compact building not always represents the markets' preferences, and because of the strict requirements in the urban planning from the public parties, private companies are restricted to develop enough business opportunities.	Smart City strategy pays attention to both citizen and business interests. However, citizens were never really central and seldom an official part of the project partnership. On the other hand, private companies and public organizations show extraordinary leadership within the projects.
	Collaboration level	Although public-private cooperation has been extensively tried in the Netherlands, the results have not lived up to expectations. Still, most of the stakeholders got interviewed are satisfied with the collaboration work.	Collaborative Level depends on the project, overall there are 6 parts, refer to government, utilities, private company, knowledge institutes, NGOs. Generally speaking, all the stakeholder got interviewed are satisfied with the collaboration.

As there is an inherent difference between how those two strategies work in the urban environment, institutional factors are also varied distinctively. In Smart Growth, the local government reacts more as a regulator, a more top-down approach is identified in its process, policies and regulations are made in a more 'standard' way. Whereas in Smart City, local government plays more as a partner role, bottom-up initiated approach is performed in the project management process. There is no fixed policy yet specific for the Smart City issue

because of the technology blank. Consequently, more policies are expected to come that is closely connected to the ongoing Smart City projects.

Still, there is a similar structure in the stakeholder involvement. Both parts have a strong focus on improving the collaboration level and citizen involvement, at least the intentions are quite clear from the interviewed information.

7.2 INFLUENTIAL FACTOR ANALYSIS

In the current view of preference domain for Smart City in Amsterdam, Amsterdam Smart City developed better and more condensed in the Smart Mobility, Smart Environment and Smart Living domain (Windén et al. 2016). Therefore, based on the specific six goals/Key factors from Urban Agenda, Amsterdam Smart City is doing quite well on monitoring and improving air quality, enhancing housing quality and mobility, handling climate adaptation and sustainable use of land. Smart Growth, however, due to its compact development style and close relation towards real estate and housing domain, it performs substantial influences on all the factors, though some negative effect can be identified regarding air quality. Compact urban development will most likely have a negative effect on the quality of the 'grey' environment, which means in this 'grey' area, environment quality still can receive undesired effects on noise, odor, dust, toxic pollutants, calamities, and so on (Hoeflaak & Zinger, 1992). The simple fact is that the air quality in Amsterdam broke the EU standards, and became the third cause of death for people in the Netherlands. As for other factors, see the detailed information in Table 9.

Figure 9. Influential factor analysis

Amsterdam Urban Agenda	Description	Smart Growth Influence	Smart City Influence
Air Quality	Realize systems and policies to ensure a good air quality for human health	<ul style="list-style-type: none"> - Compact development - Compact urban development will most likely have a negative effect on the quality of the 'grey' environment 	<ul style="list-style-type: none"> - Smart Mobility and environment help with the hazard air emission reduction - Monitor and facilitate the improvement of air quality
Urban Poverty	Reduce poverty and improve the inclusion of people in poverty or at risk of poverty in deprived neighborhoods, involves of urban regeneration	<ul style="list-style-type: none"> - Mixed-use development, Intensifying and directing development - higher degree of urbanization leads to higher economic productivity and a stronger growth in jobs (Raspe et al., 2010) - Try to make an economical mix city for people from all the social class 	<ul style="list-style-type: none"> - Smart economy, by Smart Economy we mean e-business and e-commerce, increased productivity, ICT-enabled and advanced manufacturing and delivery of services. - Voucher for low income, self-employed people
Housing	Have affordable housing of good quality. The focus will be on public affordable housing, state aid rules and general housing policy	<ul style="list-style-type: none"> - Affordable housing; Range of housing choices and opportunities - housing for people from different level, social housing percentage as development guideline - housing isolation and utilize the renewable energies, also aware of living quality that involves with air quality, traffic noise 	<ul style="list-style-type: none"> - Smart living - incorporates good quality housing and accommodation by implementing smart technologies and devices inside the house.

Climate adaptation	Anticipate the adverse effects of climate change and take appropriate action to prevent or minimize the damage it can cause to Urban Areas	<ul style="list-style-type: none"> - Green infrastructure, enough green space of green when the city is growing - Creation of high quality green space accessibility (Structure vision Amsterdam 2040) -Rain proof housing and streets 	<ul style="list-style-type: none"> - ICT solutions can contribute to both climate adaptation and mitigation, for instance, geographic information systems can be used in local hazard mapping and analysis to locate vulnerable housing and solution making. But there is no project like that inside ASC. -Smart environment
Sustainable use of land	Ensure that the changes in Urban Areas (growing, shrinking and regeneration) are respectful of the environment, improving quality of life	<ul style="list-style-type: none"> -Transferable development right -The preservation of farmlands, open spaces, natural beauty and important environmental areas - recreational use of land and sustainable use of energy. -housing isolation and utilize the renewable energies 	<ul style="list-style-type: none"> -Smart environment, green urban planning, as well as resource use efficiency, re-use and resource substitution
Urban mobility	Have a sustainable and efficient urban mobility	<ul style="list-style-type: none"> - Creation of neighborhoods that are walkable - Provision of a variety of transportation options - beneficial impact to accessibility, high quality of public transportation 	<ul style="list-style-type: none"> - Smart mobility, ICT supported and integrated transport and logistics systems. It also facilitates the optimized traffic and caring sharing system

Consequently, there are parts where one strategy can help with each other in the aim at achieving goals listed on the Urban Agenda. In the case of the air quality, the air quality monitoring devices and electronic vehicles can help a lot in improving the Smart Growth strategy, regarding change the urban housing and greening planning which can eventually reduce the hazard air exhalation. While the compact structure in Smart Growth is enabling the condensed data collection and high-efficiency resource utilization, and this can eventually, make Smart Growth workable in a long-term point of view. Just like Rick Vermeulen mentioned in his interview, about how the traditional trash containers don't work in an area full of skyscrapers, he said 'Traditional way might not be the right way. The new way is costlier in terms of investment but you still need specific density to make sure it pays off.' So, this shows one potential area that Smart City and Smart Growth can be actually linked.

7.3 SWOT ANALYSIS

Smart Growth and Smart City are significantly different from each other in terms of institutional dimension, how it is organized and how it is managed in its daily process. For my perspective, one approach alone can be sometimes, limited by its own structure.

For Smart City situation in the Netherlands, there is a 'contradiction' between the free will of innovation and the needs for normative management. For Smart Growth, the municipality can be very dominant which decrease the bottom initiatives. A synergized governance approach for the Netherlands might sound hard to achieve. However, it might be not as hard as we expected

as long as we make a distinct role of the public party at a different level of process in need. Before doing that, a general SWOT analysis will be beneficial to form an overview. See Table 10.

Table 10. Institutional dimension SWOT analysis on Smart Growth and Smart City

SWOT Analysis			
Smart Growth		Smart City	
<ul style="list-style-type: none"> • General interests • Financial and policy support • Trusted part leads, clear leadership • United framework • Efficient in implementation 	<ul style="list-style-type: none"> • Lack of social involvement • Local initiatives • Fixed framework and maybe too much regulations • Less market insights 	<ul style="list-style-type: none"> • Strength in the market • More citizen engagement • Innovative of thinking • Well-connected network • Full initiatives 	<ul style="list-style-type: none"> • Fragmented aims and projects • No framework and general control • Time-consuming process • Less financial and policy support
<ul style="list-style-type: none"> • Involvement with Smart City projects and new technologies 	<ul style="list-style-type: none"> • Fixed and less flexible government structure • Red tapes and political interests 	<ul style="list-style-type: none"> • Amsterdam is growing more compact and diverse • Smart City concept is growing virus across the world • More open and connected networks in the international level 	<ul style="list-style-type: none"> • Wolf of Wall Street (more self-interest) • Lack of urgency to push it forward

On the one hand, the strengths of the institutional structure of Smart Growth are, for instance, get a vision, determine a framework or take a clear leadership in the process. They could be beneficial for the execution and implementation of projects. The projects get lesser but bigger so it would be easier to move into next stage. What's more, the centralized role of standard making and policy formatting is good for a support system to facilitate Smart City ideas and projects consistently. On the other hand, by implementing this 'top-down' approach, citizens' engagement willingness and the sense of achievement would be decreased, which naturally, will weaken the innovative thinking from broader potential initiative groups. To overcome those weaknesses, we need to seek opportunities from the innovative technologies breakthroughs or another management style.

For the pros of Smart City institutional structure, public parties are able to support the Smart City projects as a partner and facilitator, in which way they can put the enabling work first instead of taking control of the broad map. By continuing the process, the enthusiasm towards Smart City development will be activated. Citizens will feel they are more involved and connected to the social network than ever before. Still, the downside of this approach can be also painful. It can be less time and resource efficient to make an accomplishment, especially for projects and stakeholders that hold different aims. Therefore, a top-down method is again more or less necessary to counter those defects. The opportunities to improve this situation hides behind the open and connected international networks where we can find potential solutions. Also, optimize the working paradigm can be effective as well.

8 DISCUSSION AND CONCLUSION

8.1 RESEARCH REFLECTION

In general, I think this research is a success because it gives a clearer view on the mutual relationship and structure examination between Smart City and Smart Growth, specifically in the case of Amsterdam. Since there is too little research has been done in this area before, it's great to combine the Smart Growth and Smart City research together based on the same criteria and same theoretical framework. The result is also rewardable in this sense.

For the theoretical framework, it works well to connect all the elements together by keeping them all in the same map. The whole workflow is first, to access the institutional dimension of Smart Growth and Smart City, then measure their own urban influences based on those indicators and make a systematic analysis out of those outcomes. However, it is much harder to carry it out during the implementation because of the lack of previous references to those parts. Things such as their influences are often mentioned but not measured in the official documents, partly because those influences are still in a moving process, partly because there is less measurement mentioned in the first place when those strategies or projects started. The problem I've also come across in the way of procuring information has something to do with the language barrier. As you could imagine, it's difficult for a non-Dutch speaker to acquire official Dutch program/policy information (e.g. Koers 2025, Smart City projects) without the help of google translate. The software is very helpful indeed, but still, misunderstandings and missed information will exist under this situation.

As for the reflection on interviews, I find it's very hard to put all the interviewees on the same page even if I'm asking the same questions every time. The opinions from the interviewee group are highly mixed and varied because of their differed interests and perspectives. The bright side about it is that ideas would join together in a well-covered way, which gives me a broad overview of the current situation inside of Amsterdam rather than a one-side story. The downside is that not everyone is clear about what I was asking. Some may have less experience with the word like 'bottom-up' and 'top-down' approach that I mentioned in the interview which sometimes leads to some ambiguous discussions eventually. Still, their opinions towards what is happening in their domain are very informative and inspiring for me to construct a general view of Smart Growth and Smart City in Amsterdam.

Before jumping into the part of final conclusion, it is better to look back at the research questions we set at the beginning of the research and perform the reflections on those questions accordingly.

- How are Smart Growth and Smart City related to each other?
- What is the institutional dimension in the urban development background?
- How do those aspects influence the achievement of Amsterdam Urban Agenda 2016?
- What are the mutual effects they have on each other?
- How can we manage to collaborate the mutual beneficial part and coordinate the conflicts?

As we mentioned in the data collection and key factor analysis chapter, Smart Growth and Smart City are related to each other regarding their influences towards the urban development. They all share some close goals to make the urban area a better place for people to live, to grow. What's more, they have potential effects towards each other which people pay less attention nowadays. For instance, the compact urban area pays off of high investment of Smart City expense, and Smart City provides possibilities to make the city even denser. With all those shared goals they hold in the process, there is a great chance that they can facilitate each other by continuing its work, especially when it comes to the aspects of air quality, urban poverty, sustainable use of land, climate change and urban mobility. However, in order achieve those goals from Urban Agenda, it is extremely important for them to open up with each other, and sometimes learn from each other at the institutional level. The institutional structure of Smart Growth and Smart City varies a lot and they have reasons to be like that, but some change in the management structure can be the catalyst of working efficiency in the urban development domain.

What can we learn from this research, so to speak, the research conclusion that may collaborate the mutual beneficial part and coordinate the conflicts in Smart Growth and Smart City management process is presented in the next session.

8.2 RESEARCH CONCLUSION

On the one hand, Smart Growth and Smart City strategy are very different, considering they are significantly varied in its institutional dimension. Elements like the way how the strategies are organized to get things done, how they manage the relationships with other organizations at the vertical and horizontal level, how all stakeholders have their interests during the process, and how the legislations and frameworks get formed and implemented.

On the other hand, the strategies are not so different in terms of working goals, which provides an opportunity for combining the strategies and getting benefits from each other. Therefore, in this session, several suggestions will be given for those two strategies, with the aim of collaborating the mutual beneficial part and coordinating the potential conflicts inside of their institutional structure. To summarize the research, four conclusions are made as follows.

A proposal for a synergized urban management approach

The overall aim of this analysis is to propose a synergized system for the ultimate leveraged goal – a well-functioned urban management ecosystem. In order to achieve this goal, the system should be inclusive enough for 'top-down' and 'bottom-up' to be complementary to each other, instead of being two competitive parts that people usually think that is. The system needs to be inclusive enough to allow public parties and private companies take their distinctive roles in the process of urban development.

Still, we need to realize that it's not going to work if we try to apply both 'top-down' and 'bottom-up' approach at the same time and at the same level. Consequently, the methodology

should be altered with the changed situation. In a broader scale, it is good for both public and private sides if the public party could take a clear leadership on what kind of Smart City or Compact City they intend to develop, make a definition and vision could be a great start. Because in this way they can know which part they can count on the public party, which part they need to work on and to collaborate with appropriate stakeholders. Also, the technology-based regulations and policies could provide a well-functioned procedure for initiatives to follow and scale up. Then, to motivate the creativity of common citizens and small sized initiatives, the tight can be loosened in the local and community level accordingly. More citizen engagement and stakeholder initiatives can be encouraged through wide connection and well-functioned management system. In any case, this synergized system requires a multi-layered and ongoing process to tryout in the future.

Stick on its own strength: citizen focused approach

In a word, before we are getting into details of all those suggestions, it is essential to keep in mind that the city should make full realization and put high values on its own strength that differs it from the others. For Amsterdam, I would consider the bottom-up approach is its distinct characteristic and strength, people here value the innovation idea from the bottom level, they cherish the broad engagement of citizen and multiple stakeholders, and those factors make the city more contently rich in its way of achieving goals in Urban Agenda.

Limited access to information, transparency and comprehensive communication strategies have presented a major challenge to participation and equity. Consequently, in order to make improvement in those parts, more helps will be needed on Bottom-up and citizen focused research from knowledge sharing with other cities and projects. There are several citizen focus action clusters at the European level, including Citizen City and Citizen Centric Approach to Data. The Citizen City aims at citizen empowerment and citizen engagement integration from the outset in smart cities projects and policies. Citizen Centric Approach to Data aims mainly the protection of citizens' privacy. Several formal successful cases have been studied and recommendations have been delivered based on best practices and success stories they researched. Therefore, it can provide functional insights in that perspective for cities in the Netherlands.

Multiple roles for public parties

According to the information from the interviews, the local municipalities are expected to be involved more as a partner. The first step to start with this is to make clear role about the public parties themselves. The public parties have various and complicated involvements in the Smart City development, but sometimes those roles are entangled, which makes it difficult to identify the function of themselves when it comes to the need, sometimes it would be hard even for the public parties themselves to position their roles as well. Just as Paul Voskuilen from Alliander suggested in the interview (Interview, April 2017). *'In short, it is very nice if public parties make a clarification of its roles and visions. Things like what the government foresees, how to combine*

technologies into the cities: what can you do when and how? It's pretty hard, but it helps all the parties' best if they know why they want to do what and when.' Therefore, a mutual understanding towards the difficulty of government role identification is essential to make things work.

In other words, Smart City project leaders and stakeholders in Amsterdam want more and active roles from the public parties. On the one hand, they want more partner role and prefer the public parties to be more actively engaged with stakeholders. *'What I want is something different, I want them to partner with us, to do stuff together. We are the biggest sustainability project in the area, in time, in money, in what we're delivering, we need the municipality for some things for permission to do in public space.'* Rick Vermin (Interview, April 2017) from the Amsterdam Smart City suggested their needs from the municipality. Moreover, Rene Post (Interview, April 2017) from the Waag Society wants the public parties to be the facilitator. *'It would be nice if the municipality would do something to facilitate the project, but someone has to start with it. Maybe we as the Waag Society could come up with a framework for city councils, things like how can you work with citizens, who want stuff in the environmental arena. It could be a nice idea, and then they will adopt it, but you can't expect them to start the initiatives because they won't, it's not their things.'* Theo Vermin from the municipality (Interview, March 2017), on the other hand, expecting the municipalities and local governments to initiate and regulate, said *'maybe a launching partner for some part with all the other companies to build together as a Smart City, and keep developing.'*

For Smart Growth in Amsterdam, people expect more role as a partner like what is currently occurring in Smart City rather than the strong regulatory role it is presented right now. *'I think sometimes they should be letting it freer, don't go too far and sometimes more market oriented.'* Said by Jan Fokkema (Interview, April 2017), director of NEPROM.

It's important to mention that I'm not suggesting the Smart City in Netherlands should transfer to a top-down approach like China or Japan because personally speaking, I do believe innovation initiated Smart City projects can be very positive and suitable for the background in the Netherlands. But in some respects, supportive standards and more public led future focus could be more beneficial for the citizen interests, and it could be also easier to scale up some center concerned Smart City projects.

Capacity building by adjusting regulations and policies

The capacity we mentioned here is related to transparency improvement, performance monitoring, process accessing and public management that all has things to do with regulations and policies. It is vital for public parties to build a trusted leadership in making decisions on those parts. Marije Poel (Interview, April 2017) from the Amsterdam University of Applied Sciences suggested *'Municipality or the government should give their insights on their ambitions, what is important and where do we work on, what has priority.'* And for Smart City, there is no vision settled from this point of view. It is understandable because at this early stage, it is extremely hard for someone to decide like whether we should develop a Smart City in the traditional way such as making a vision, or just embrace and support the innovative idea all the

initiatives come up in the process. But Still, I have to point out some facts here to make the statement more or less justified, to support that some directive visions can and should exist for the future Smart City development concern. To begin with, here are many overlapped and fragmented projects in the Amsterdam Smart City that regards to the circular, sustainable use of waste, energy, etc. Although the platform showed its value in connecting and networking of all the bottom-up initiatives, it is not compulsory for them to engage in the projects and try to make those projects work in a collaborative way. It is great to have initiatives being open to their idea of Smart City, and it motivates those people to work hard on their own interests, but if they don't share future expectation, it would be hard to make them work in a real collaborative way. Besides, there are also many regulation/policy blanks in Smart City (e.g. sensor installation). Because the innovative approach is something new, and it almost develops ahead of the regulation all the time, consequently, the relevant regulations and standards which ensure the interoperability and standardizability of Smart City solutions can be a little bit behind schedule.

On the contrary, Smart Growth strategies sometimes can be too complicated and strict in its requirements in terms of some occasions. Regulations and vision are all out there waiting for being implemented by all the stakeholders, there is less room for argument and initiatives if the municipality already made its mind.

Therefore, you can see they both have room for improvement and adjustment, and it seems they can make a great complementary to each other regarding the policy making. By taking what is strong in another strategy, the urban development management process would become more widely accepted.

Those suggestions are made specifically for the future urban management at the institutional dimension. To some extent, it seems to be contradictory between choosing one approach and another totally different one, but if we take a close look, they don't necessarily need to be opposed to each other, sometimes they can be even complementary to each other and cover the other's shortcomings at various levels. By combining approaches for those two strategies together, from the structure level, Smart Growth can be more open to the collaboration work, there will be an essential amount of policies and visions for Smart City development. Plus, Smart Growth can make use of the advanced technologies from Smart City to increase its system feasibility and reliability (e.g. smart governance can improve the data open process and increase the transparency level, also helps to enable stakeholders into the early phase of urban planning). Smart City will benefit from the compact information and resource management inside a Smart Growth city.

8.3 PROBLEM AND LIMITATION

As I started the research, the prime research objective is soon turning into the case study in the city of Amsterdam. One of the criticisms of the case study method is that the case under study may not be representative of a wider social setting and therefore it is argued that the results of the research cannot be used to make generalizations (University of Leicester, n.d.). Needless to say, there is only one case due to the case choosing criteria I mentioned before. Therefore, it

would be hard to make a 100% credible conclusion based on the data analysis from it. Besides, it would also be a challenge for me to figure out the generalized conclusion since the gap analysis would be performed between data from different sources or different types of sources.

Overall speaking, the type of data to be collected in the research is mostly qualitative data as it is the type of data contains non-numerical, covering images, videos, text and people's written or spoken words (Lacey & Luff. 2001). One of the advantages of qualitative data collection is that we can get rich and well-described data from the process. Although the qualitative data can have a vivid demonstration to others, there still are some inherent characters such as inadequacies in the quality and completeness. In which way means some unexpected data will get inside and some desired data will get missed during the process, it is almost unavoidable especially in a research which requires vast qualitative data collection. Data collection of stakeholder interviews could be a challenge as well, there is a causality between different interviews, and sometimes even for a slight change of the attitude can lead to a different and non-consistent respond from the interviewee.

Potential problems exist in result presentation level as well because outcomes could be biased out of personal feeling. For the social research, people easily have first impression effect on the materials he/she read or the conversations he/she had with someone else. Most of the time, it is still logical thinking moves the discussion, but sometimes, the conclusion could be affected by the emotional feeling or so-called first impression.

In order to get a valid conclusion of the research, or at least partly address the research limitations, various of data sources and different analysis methods are being applied. Credibility is often related to feasibility. Triangulation is being used in order to enhance credibility as it requires the use of more than one method (Bryman, 2008, pp.390, 392). However, even by doing this, things still could go unwell sometimes. But generally speaking, the whole improved approach I took in the methodology helps a lot in providing a more robust understanding on what is currently going on in Amsterdam. As a result, the findings give insights in untangling the mutual relationship between Smart Growth and Smart City which enables the research moving into the next level.

8.4 FUTURE RESEARCH

In general, the research itself is still a successful try to connect the Smart Growth and Smart City, the next move from that is to enrich the structural content and examine the theoretical framework. Because future research suggestions usually arise out of the current research limitations. Therefore, for this research, the future research is expected to be followed from those angles accordingly.

In the case of the insufficient research analysis which might be caused by the inherent flaws from one single case and less quantitative data research, further research with more abundant case studies and quantitative data sources is desired. The conclusion will be more valid with information from different physical and social context. For instance, additional research is

necessary from the perspective of different cities in the Netherlands or even different national backgrounds, by examining them under the same theoretical framework and analyzing system.

Besides, a broader spectrum of initiatives should also be included in the research as well to add the reliability and ubiquity of the interview information. Actually, the original plan for the interview is to collect data from twenty stakeholders in total, the number got reduced in the process because of the low accessibility to those stakeholders. I also intend to interview some stakeholders from private companies that have more things to do with environment or mobility issues in Smart Growth domain, but it also didn't work out since most of the stakeholders get involved are real estate developers or housing organizations. Consequently, there are definitely more inspirations could be drawn from broader successful and diverse stakeholder groups. In addition, the position of the inhabitants in Amsterdam which connect to Smart Growth and Smart City are not taken into consideration for this research. Citizen is an important stakeholder group especially considering its significant meaning in the Netherlands. So, more citizen research should be covered in future research by doing quantitative data collection, for example by conducting an online survey.

Future improvement is also needed to re-evaluate and expand the theoretical framework. Although so far, the framework works well in managing all the elements together, more detailed and measurable quantitative indicators will be even better for the comparison study, in terms of for example, precise influence factor measurement to answer the research question in a more accurate way.

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Appendix A. STAKEHOLDER LIST FOR INTERVIEW

Organization	Smart Growth (Compact city)	Interviewee	Smart City	Interviewee
Public organization 1	Grond en Ontwikkeling Gemeente Amsterdam	Jurgen Hoogenhoorn	Ministry of Infrastructure and the Environment	Daniel de Groot
Public organization 2	municipality	Rick vermeulen	Amsterdam Municipality	Theo Veltman
Private company 1	de Key	Leandra Fels	Alliander	Paul Voskuilen
Private company 2	BPD office	Harm Jassan	PostNL	Rogier Havelaar
NGOs 1	NEPROM (Association of Dutch Project Development Companies)	Jan Fokkema	Smart Citizen Lab-Waag Society	René Post
NGOs 2	Amsterdam Federatie van Woningcorporaties	Jeroen van der Veer	Amsterdam Smart City	Rick Vermin
Knowledge Institute 1	Wageningen University	Kleinrensink Gerrit	Amsterdam University	Marije Poel
Knowledge Institute 2	UvA	San Verschuuren	UvA	San Verschuuren

Appendix B. SEMI-STRUCTURE INTERVIEW (for Smart Growth stakeholders)

Close Questions:

- 1) What kind of association are you attributed to?
1. Public organization 2. Private company 3. Utilities 4. NGOs 5. Knowledge institutions
- 2) What's the name of the association? _____
How many years have you worked here? _____
- 3) Would you qualify your work as spatial planning (Smart Growth), Smart City or both?
1. Spatial planning (Smart Growth) 2. Smart City 3. Both

The questions below is based on the running of Smart Growth strategy, e.g. '*Koers 2025*'¹. Please pick the option that you think is fit for the case.

Governance relevant:

- 4) What do you think of the openness/accountability of information from the government part?
1 (Low) 2 3 4 5 (High) 6. Don't know
- 5) What would you rank the flow of key planning decisions making concerns to Smart Growth?
1 (Top-down) 2 3 4 5 (Bottom-up) 6. Don't know
- 6) What's the stakeholder engagement level while making the key planning decisions? For instance, municipality, NGOs, citizens, private companies, institutions, etc.
1 (Single, low) 2 3 4 5 (Multiple, high) 6. Don't know
- 7) Role of Municipality of Amsterdam in your perspective (multiple choice)
1. self-governance 2. facilitator 3. Partner 4. provider 5. Regulator 6. Don't know

Regulatory Policy Relevant:

- 8) Based on your knowledge, the Smart Growth policy is made on the consensus of a wide stakeholder group or a hierarchy way?
1 (hierarchy) 2 3 4 5 (consensus) 6. Don't know
- 9) The Smart Growth policy is made based on the standards approach² or objectives approach³?
1 (standard) 2 3 4 5 (objectives) 6. Don't know

Stakeholder Relevant:

- 10) What's your opinion of citizen engagement level in the process?
1 (Low) 2 3 4 5 (High) 6. Don't know
- 11) What's the primary driver for the stakeholders (e.g. your association) to get involved in?
1 (Citizen centric) 2 3 4 5 (Business centric) 6. Don't know
- 12) What do you think the current collaboration level of all different stakeholders?
1 (Low) 2 3 4 5 (High) 6. Don't know

¹ 'Koers 2025' operationalizes the ambition for the construction of 50,000 homes in a development strategy for the city until 2025. It is an urban plan which focuses on the question whether and under what conditions area development is feasible and desirable, in terms of building a compact and sustainable metropolitan area in the city of Amsterdam. Based on its recognition, twelve projects are labelled as promising housing location since 2016.

² The standards approach is based on single fixed targets, which can be achieved by functional-rational policy.

³ The objectives approach is based on multiple combined and interdependent targets, which can be achieved through the implementation of complex policy and which are linked to on-going policy processes.

Open Questions:

-----Governance Structure-----

1. Can you give your opinion on the current governance manner for Smart Growth strategy? (e.g. openness, hierarchy or horizontal governance)
2. What's the role you expect from the municipality and local government in the future?

-----Regulatory Policies-----

3. What do you think of the current Smart Growth policy/strategy? Is there any compulsive pressure or stimuli from the regulatory policy or strategy, in the sense of achieving air quality, climate adaption, urban poverty, housing, sustainable use of land and mobility goals in Urban Agenda?
4. What kind of regulatory policy do you think is extra needed for the implementation of Smart Growth strategy?

-----Stakeholders-----

5. How do you think the citizen engagement in the 'Koers 2025' plan? Is further improvement needed?
6. Which do you think should be the center concern for the urban development, citizen interest or business interest? Please give a short explanation.
7. Are you satisfied with the collaboration work with other stakeholders? if not, what do you want to improve?

8. Can you give an overall conclusion on the successful part of Smart Growth practice? And how about the part which needs further improvement.

Extra questions for Knowledge Institutions

- What do you think should be the right relationship between smart growth and smart city development?
- What is the positive effect does Smart Growth have on Smart City construction in your view? Negative effect?
- Is there any effect from Smart City technology to Smart Growth application? Like a break through to make a mutual win.

Appendix B. SEMI-STRUCTURE INTERVIEW (for Smart City stakeholders)

Closed Questions:

- 1) What kind of association are you attributed to?
1. Public organization 2. Private company 3. Utilities 4. NGOs 5. Knowledge institutions
- 2) What's the name of the association? _____
How many years have you worked here? _____
- 3) Would you qualify your work as spatial planning (Smart Growth), Smart City or both?
1. Spatial planning (Smart Growth) 2. Smart City 3. Both

The questions below is based on the running of Smart City strategy and project, e.g. Amsterdam Smart City program⁴. Please pick the option that you think is fit for the case.

Governance relevant:

- 4) What do you think of the openness/accountability of information from the government perspective?
1 (Low) 2 3 4 5 (High) 6. Don't know
- 5) What's the usual flow of key decisions making process?
1 (Top-down) 2 3 4 5 (Bottom-up) 6. Don't know
- 6) What's the engagement level while making the key planning decisions? For instance, NGOs, citizens, private companies, institutions, etc.
1 (Single, low) 2 3 4 5 (Multiple, high) 6. Don't know
- 7) Role of Municipality of Amsterdam in your perspective (multiple choice)
1. self-governance 2. facilitator 3. Partner 4. provider 5. Regulator 6. Don't know

Regulatory Policy Relevant:

- 8) Based on your knowledge, the Smart City strategy is made on the consensus of a wide stakeholder group or a usual hierarchy way.
1 (hierarchy) 2 3 4 5 (consensus) 6. Don't know
- 9) The Smart City strategy is made based on the standards approach⁵ or objectives approach⁶?
1 (standard) 2 3 4 5 (objectives) 6. Don't know

Stakeholder Relevant:

- 10) What's your opinion of citizen engagement level in the process?
1 (Low) 2 3 4 5 (High) 6. Don't know
- 11) What could be the primary driver for the stakeholders to get involved in?
1 (Citizen centric) 2 3 4 5 (Business centric) 6. Don't know
- 12) What do you think the current collaboration level of all different stakeholders?
1 (Low) 2 3 4 5 (High) 6. Don't know

⁴ Amsterdam Smart City (ASC) is the innovation platform of the Amsterdam Metropolitan Area. It challenges businesses, residents, the municipality and knowledge institutions to suggest and apply innovative ideas & solutions for urban issues. Since 2009 Amsterdam Smart City has grown into a platform comprising of in excess of 100 partners.

⁵ The standards approach is based on single fixed targets, which can be achieved by functional-rational policy.

⁶ The objectives approach is based on multiple combined and interdependent targets, which can be achieved through the implementation of complex policy and which are linked to on-going policy processes.

Open Questions:

-----Governance Structure-----

1. Can you give your opinion on the current governance manner for Smart City? (e.g. openness, hierarchy or horizontal governance)
2. What's the role you expect from the municipality and local government in the future?

-----Regulatory Policies-----

3. What do you think of the current Smart City policy/strategy? Is there any compulsive pressure or stimuli from the regulatory policy, in the sense of achieving air quality, climate adaption, urban poverty, housing, sustainable use of land and mobility goals in Urban Agenda?
4. What kind of regulatory policy do you think is extra needed for the implementation of Smart City strategy?

-----Stakeholders-----

5. How do you think the citizen engagement in the Smart City Amsterdam program? Is further improvement needed?
6. Which do you think should be the center concern for the urban development, citizen interest or business interest? Please give a short explanation.
7. Are you satisfied with the collaboration work with other stakeholders? if not, what do you want to improve?

8. Can you give an overall conclusion on the successful part of Smart City practice? And how about the part which needs further improvement.

Extra questions for Knowledge Institutions

- What do you think should be the right relationship between smart growth and smart city development?
- What is the positive effect does Smart Growth have on Smart City construction in your view? Negative effect?
- Is there any effect from Smart City technology to Smart Growth application? Like a break through to make a mutual win.

Appendix C. OUTCOME FOR CLOSED QUESTIONS

Smart Growth Stakeholder	1) What kind of association are you attributed to	2) What's the name of the association	3) Would you qualify your work as spatial planning (Smart Growth), Smart City or both?	4) What do you think of the openness /account ability of information from the government part?	5) What would you rank the flow of key planning decisions making concerns to Smart Growth?	6) What's the stakeholder engagement level while making the key planning decisions? For instance, municipality, NGOs, citizens, private companies, institutions, etc.	7) Role of Municipality of Amsterdam in your perspective (multiple choice)	8) Based on your knowledge, the Smart Growth policy is made on the consensus of a wide stakeholder group or a hierarchy way?	9) The Smart Growth policy is made based on the standards approach or objectives approach?	10) What's your opinion of citizen engagement level in the process?	11) What's the primary driver for the stakeholders (e.g. your association) to get involved in?	12) What do you think the current collaboration level of all different stakeholders?
1	private company	BPD	Smart Growth	5	2	3	1, 4, 5	3	4	3	4	4
2	Public organization	Municipality of Amsterdam	Smart Growth	4	2	4	2, 4, 5	3	5	2	3	4
3	Knowledge institution	WUR	Both	3	2	2	2, 5	2	2	1	5	2
4	NGOs	Neprom	Smart Growth	4	1	5	4, 5	3	4	4	4	4
5	NGOs	AFWC	Smart Growth	4	3	3	2, 5	3	5	2	3	3
6	Knowledge institution, public organization	UvA, City of Amsterdam	Both	4	2	4	2, 5	3	1	2	3	3

	7	Public organization	Grond & ONTWIKKELING-Municipality of Amsterdam	Smart Growth	2	1	5	5	3	5	1	4	4
	8	Semi-public (combination of private company and public organization)	De Key	Smart Growth	5	3	3	4, 5	3	4	2	4	3
Smart City Stakeholder													
	1	Knowledge institution, public organization	UvA, City of Amsterdam	Both	5	3	5	3	4	5	3	4	4
	2	NGOs	Waag society	Smart City	4	2	1	2, 3, 4	3	5	3	1	2
	3	NGOs	Amsterdam Smart City	Smart City	2	2	2	5	4	3	5	3	2
	4	Public organization	Municipality of Amsterdam	Smart City	3	3	3	2, 3, 5	3	4	3	3	3
	5	Private company or Utilities	Alliander	Smart City	3	2	2	1, 2, 3	3	N/A	2	4	2
	6	Public organization	Ministry of Infrastruc	Both	4	3	3	1, 2, 3, 4, 5	4	4	3	3	3

ture and Environm ent												
7	Private company or Utilities	PostNL	Smart City	2	4	4	3	2	5	3	4	2
8	Knowledge institution	HvA	Both	4	4	5	3, 4	4	5	4	4	5

Appendix D. INTERVIEW TRANSCRIPTS (for Smart Growth stakeholders)

See attached document

Appendix D. INTERVIEW TRANSCRIPTS (for Smart City stakeholders)

See attached document

Appendix E. INTERVIEW CODING DATA (for Smart Growth stakeholders)

See attached document

Appendix E. INTERVIEW CODING DATA (for Smart City stakeholders)

See attached document