

Towards more resilient urban environments

The contribution of complexity theories and complex adaptive systems to strategic planning for redevelopment and transformation areas in cities in the Netherlands



Environmental and Infrastructure Planning
Marc Schultink | July 2016



university of
 groningen

faculty of spatial sciences



BügelHajema
Ruimte voor de leefomgeving

ABC Nova
Passie voor Projecten

Colophon

| | |
|---------------------|--|
| Title | Towards more resilient urban environments |
| Sub-title | The contribution of complexity and complex adaptive system to strategic planning for spatial redevelopment and transformation areas in cities in the Netherlands |
| Kind of publication | Master thesis |
| Author | M.M. Schultink S2322617 |
| Study program | MSc Environmental & Infrastructure Planning Faculty of Spatial Sciences (FRW) |
| Supervisor | Dr. Ward Rauws |
| Version | Final |
| Place and date | Groningen, 15 July 2016 |
| Number of pages | 66 |
| Number of words | 21.548 |

Source image front page: <http://socialearth.org/100-resilient-cities-centennial-challenge-a-100-million-effort-to-build-urban-resilience-around-the-world>

Preface

Presented here is the thesis 'Towards more resilient urban environments- the contribution of complexity theories and complex adaptive system to strategic planning for redevelopment and transformation areas in cities in the Netherlands'. The research is conducted through assessing two different municipalities, namely Nijmegen and Bergen op Zoom. This thesis is written as part of my graduation from the study of Environmental & Infrastructure Planning at the Rijksuniversiteit of Groningen from September 2015 until July 2016. This graduation was in combination with an internship at the company of Bügel-Hajema and ABC Nova.

The research process was sometimes complex and most of the times interesting. After extensive re-search it was possible to answer the research questions. During the research process I was supported by thesis supervisor Ward Rauws and intern supervisor Peter Bügel who always made time when it was necessary. Their support kept me going through the research process.

Herewith I would like to thank my supervisors for the good assistance and support. Besides I want to thank the people of the municipalities, Bügel-Hajema and ABC Nova for their cooperation. Without their cooperation I could not complete this research.

Finally, I would like to thank my family and friends for the good advice. Especially my parents for their wisdom and support.

I hope you enjoy the reading of this thesis.

Marc Schultink

Groningen, 15 July 2016

Abstract

The society we live in is facing major developments, challenges and opportunities that are affecting our cities and regions directly or indirectly. The spatial planners of today are challenged when making strategic redevelopment and transformation plans by this interrelatedness and complexity. Therefore new methods and strategies are needed in order to inform strategic planning for redevelopment and transformation areas in order to contribute to more resilient urban environments.

The goal of this research is the contribution to the resilience of redevelopment and transformation plans. This in order to deal with complexity and the thereby coming uncertainties during the process of planning and development, resulting in a more resilient urban environment. Within this approach, resilience is the ability to adjust to both (uncertain) external and internal factors of change to keep stability in development and at the same time without losing the ability to create a coherent urban environment.

In order to give answers to the research questions literature about complexity, uncertainty, strategic spatial planning, policy documents and cases are studied and analysed. This analyses resulted in various requirements in order for redevelopment and transformation plans to be resilient. Namely, there should be a balance between the robustness and dynamics of a plan for a redevelopment or transformation area. Further specified, an appropriate balance between the complementarity and competitiveness on the dynamic side and between cohesion and compatibility on the robust side.

Based on the results of the case analyses a number of recommendations can be made. During the planning and development of redevelopment or transformation plans is important to have a global and flexible plan which is divided in sub plans in order to anticipate to various development paths. Later when the plan is developed a sub-plan can be worked out in detail. A good risk analyses in combination with scenarios both qualitative and quantitative is necessary in front of the planning process. Continuous monitoring of the plans, planning process and interested parties has to be done appropriate. Besides that transparency about the results of the monitoring is necessary.

Keywords: complexity, uncertainty, complex adaptive systems, robustness and dynamics, resilience

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List of abbreviations

CAS: Complex adaptive systems

VINEX: Vierde Nota Ruimtelijke Ordening Extra (Fourth Note Spatial Planning Extra)

PPP: Public Private Partnership

GEM: Grondexploitatie maatschappij (Land exploitation company)

GREX: Grondexploitatie (ground exploitation)

1. Introduction

1.1 A world full of uncertainties

The society we live in is facing major developments, challenges and opportunities that are affecting our cities and regions directly or indirectly. For example the growing complexity of today's society through the rise of technology, changes in production processes, globalizing economy, climate change, rapid urbanization and a high number of stakeholders (Pahl-Wostl, 2007, Van der Brugge et al., 2005). Other challenges are problems with fragmentation of ethnic groups, the ageing of the population and the environmental degradation (Okediji, 2005, Pimentel et al., 2007, Wale, 2011). All these factors are interrelated and come back in today's cities. The spatial planners of today are challenged when making strategic development plans by this interrelatedness and complexity. Therefore, new methods and strategies are needed in order to help strategic planning to contribute to redevelopment or transformations plans that are resilient in order to shift towards more resilient urban environments.

To understand why a different approach is needed it is necessary to discuss the shift in planning approach. Over the past decades it has become clear that the traditional planning approaches are not the workable perspectives, as it used to be, to deal with complexity and uncertainties for strategic planning of redevelopment and transformation areas. The traditional approaches resulted in what is called functional plans. These functional/technical rational plans can be seen as planning where first data is collected, where after the design is made by experts, the decision making process is top-down and the processes are standardized (Maxwell and Conway, 2000). The plans that were made during this period were based on continuous demographic and economic growth. As result of these certainties spatial planners could make functional plans without taking uncertainties into serious account and therefore thought they could foresee almost everything. In other words the sky was the limit. This line of thought also dominated the planning practice in the Netherlands (de Roo, 2010). In this research the focus will be on the Dutch context. Blauwestad, Meerstad and the Binckhorst show that this traditional functional and technical rational approach is not appropriate anymore for such functional, rigid and big plans (de Zeeuw et al, 2014). This is because in today's network society there is relatively more interrelatedness, uncertainties on future developments have become more dominant and a lot of cases show complexity of non-linear changes, in the urban system and of regulations that cannot be overcome with the traditional functional and technical rational plans. Therefore, spatial planners started to look for different planning approaches.

A different perspective, towards more resilient urban environments, that can be used, is the complexity perspective and the understanding of complex adaptive systems (CAS). As also earlier stated uncertainties are everywhere and it is the spatial planners' task to accept that uncertainties are around and sometimes cannot not be solved through quantitative knowledge. Therefore, these uncertainties are also called fundamental uncertainties (de Roo, 2010). Moreover, the complexity is increasing. This is seen in the daily life of humans with increasing interactions and the blurring lines between public and private, but also especially in the practice of planning. Plans become both more content complex (technical, financial and technical-juridical) and organizationally complex (socially, politically and juridical procedures) (van Vliet, 2015). The complexity perspective is helpful because it tries to understand the different kinds of uncertainties and complexities that are described in this section. Furthermore, in order to understand the different kind of uncertainties and complexities it is necessary to understand cities as CAS. So the complexity perspective helps spatial planners to understand and deal with complexity and uncertainties

on strategic spatial planning for redevelopment and transformation plans in order to go towards more resilient urban environments.

This research analyses how complexity theories and a complex adaptive system perspective on cities can contribute to strategic planning in such a way that plans become more resilient and in that way also the city as a whole becomes resilient. This will be analysed for cities in the Netherlands, more specific Nijmegen and Bergen op Zoom.

In Nijmegen the new neighbourhood the Waalsprong will be studied. This is an area situated at the northern part of Nijmegen at the other side of the Waal. The area consists out of the old town of Lent and lies in between Oosterhout and Ressen. Through the Waalsprong goes the N325 which is connected to the A15. In Bergen Op Zoom the transformation of an industrial are into a neighbourhood is studied. This area is called ScheldeVesting. The ScheldeVesting area is situated at the west side of Bergen op Zoom near the water of the inner Schelde and it contains of several sub areas. Namely, a former industrial area which is now called the Nieuwe Vesting, the old harbour channel, the Waterschans, the Spaensche Scharen, the Geertruidapolder and Kijk in de pot. Most of the area is transformed for housing purposes or restoring the connection between the water and the city of Bergen op Zoom.

1.2 Academic and societal relevance

For the past decades the complexity concept has often been used to define the ability to cope with uncertainties and manage complex cases. Recently, there is much effort to understand the complexity concept and to relate it to practices. However, recent studies and discussions concentrate for the most part on the theoretical part of complexity. Limited attention has been given to implementation in planning practice such as Rauws et al. (2014) try to do with their example of the Blauwe Stad. The gap between theory and practice is an important one to bridge for at least two reasons. Firstly, because large investments are made, in the cases that are discussed, most of the times without knowing if and how these investments will pay off at the end. Secondly, the shift from stakeholders (for example investors, project developers, citizens) who were more passively involved towards stakeholders that have the urge to be more actively involved in both the planning process as well as the development process. These two factors, which are not the only factors as can be read in the introduction, make area redevelopment and transformation both complex and uncertain. The academic relevance is demonstrated by the fact that spatial planners are studying social science and theory and practice are intertwined and cannot be seen apart from each other (Flyvbjerg, 2011). These three reasons give the social and the academic relevance to relate theory to practice when studying complexity theories and uncertainties and how these theories can contribute towards a more resilient urban environment.

1.3 Research focus and goal

This thesis explores the possible contribution of the complexity perspective to deal with (fundamental) uncertainties and complexity in transformation and redevelopment planning processes with the aim to make the urban environments more resilient. The goal of this research will be to aim for directions for strategic spatial planners in order to deal with complexity and the thereby coming uncertainties during the process of planning and development of redevelopment and transformation areas resulting in a plan that can react to different development paths that are (un)foreseen.

1.4 Research questions

In order to achieve this goal the following research question is formulated:

How can CAS-based principles contribute to strategic spatial planning in order to strengthen the resilience of strategic redevelopment and transformation plans in cities in the Netherlands?

This main question will be answered through the following sub questions:

- Which (practical) challenges do Dutch municipalities face in making redevelopment or transformation plans in complex and uncertain situations?
- Which requirements must spatial planners meet to ensure that the redevelopment or transformation process is resilient?
- Which requirements are met in the cases of the Waalsprong and ScheldeVesting and what are the differences between the Waalsprong and ScheldeVesting in their approach for redevelopment or transformation plans?
- What are the lessons for spatial planners that can contribute to redevelopment and transformation plans for a more resilient of urban environment?

1.5 Reading guide

In chapter 2 the focus will be on the role and characteristics of plans in spatial development in the Netherlands over the past 60 years and discuss challenges for the future. In particular the focus will be on urban redevelopment and transformation and how this developed over the past 60 years. Also here the challenges for the future will be discussed. Furthermore strategic spatial plan making and the complexity theory as a viewpoint are analysed to contribute to spatial development and urban redevelopment and transformation plans to become resilient. In combination the result will be multiple tangible requirements for Dutch municipalities to contribute to more resilient urban environments.

Subsequently, chapter three will explain the methodological framework, providing the systematic and theoretical justification for the methods applied in this thesis. Chapter 4 will present the results of the multiple case study. The municipalities of Nijmegen and Bergen op Zoom will be assessed on how the spatial planning for redevelopment or transformation areas has been done and what lessons can be learned for the future in order to give the municipalities and interested parties, who are involved during the plan making process, grips to make plans that contribute to deal with uncertainties and complexity in order to go toward more resilient urban environments. The cases that have been selected are the Waalsprong (Nijmegen) and ScheldeVesting (Bergen op Zoom). Chapter 5 will draw the conclusions based on the findings in this thesis. The different cases will be compared. In this way practical and theoretical lessons will be discussed and recommendations for further research can be made.

2. A theoretical framework that contributes towards redevelopment or transformation plans for a more resilient urban environment

Chapter two includes the theoretical framework of this thesis and aims to answer the first two research questions:

1. Which (practical) challenges do Dutch municipalities face in making redevelopment or transformation plans in complex and uncertain situations?
2. Which requirements must spatial planners meet to ensure that the redevelopment or transformation process is resilient?

Chapter 2.1 describes the development of the Dutch planning system and its shortcomings today. This in order to discuss in what way the urban redevelopment and transformation principles evolved over time and what lessons can be learnt from this development that are useful for redevelopment or transformation plans today.

Chapter 2.2 analyses strategic spatial planning in order to find out to what extent this helps to have redevelopment or transformation plans for a more resilient urban environment.

Chapter 2.3 describes elements of the complexity theory and to what extent these may effect redevelopment or transformation plans. This chapter also describes what the characteristics and the underlying mechanisms of CAS based principles are and in what way CAS may cause planners to see redevelopment or transformation planning in a different light.

Chapter 2.4 discusses the conditions for municipalities that may be needed and presents the theoretical relevance for redevelopment or transformation plans in order to contribute to a more resilient urban environment. These theoretical insights lead to a conceptual model which will be the basis of the empirical part of the research.

2.1 The Dutch planning system and urban redevelopment and -transformation

The spatial planning of the Dutch landscape has dramatically changed over the past few decades (Platform 31). Therefore, chapter 2.1 discusses, on the basis of literature and examples, various phases of the Dutch spatial planning system through time. Furthermore, on the basis of the analysis of the various phases of the Dutch spatial planning system, the advantages and disadvantages for urban redevelopment and transformation will be discussed. Eventually, chapter 2.1 will conclude with (practical) challenges that spatial planners face nowadays. This in order to come up with spatial plans for redevelopment and transformation areas that can cope with the complexity of non-linear changes, urban systems and spatial regulations and the (fundamental) uncertainties of (political) decisions, economic development and market demand for a more resilient urban environment. Within this approach, resilience is the ability to adjust to both (uncertain) external and internal factors of change to keep stability in development and at the same time without losing the ability to create a coherent urban environment. (Savini, 2016).

2.1.1 The principle of social engineering and restrictive planning

From the 1950s to the 1990s the spatial planning of the Netherlands was based on detailed planning and the idea that the landscape can be social engineered (*maakbaar*). The principle of social engineering was most common and can be learnt from for redevelopment and transformation plans. Social engineering includes that the central government set out the main lines for implementation and the provincial and municipal authorities execute the plans (Platform 31). An example of this approach are neighbourhoods that were built during this period (see figure 1). The planning process was not flexible and the building of these neighbourhoods were all casted in the same characteristic mould which resulted in a repeated pattern. The way the planning process was organized, makes that today these neighbourhoods are monotonous and not really attractive to live in (Municipality of Amsterdam, 2015). What mattered most to the government was that the plans were carried out in detail. The government control was very clear.



Figure 1: Example of social engineering, Bijlmer(source: [vk](#))

Today this type of planning has been called restrictive or permitted planning (*toelatingsplanologie*) and at a higher abstraction level technical rationality (De Roo & Rauws, 2010). This type of planning is characterized by the protection of social values such as safety, health and nature. Furthermore, this type of planning is based on the assumption that if development is allowed development can be realized in the way it is allowed (Platform 31; Janssen-Jansen & Woltjer, 2010). Therefore, a lot of regulations were made to guide the spatial development resulting in an exponential increase in spatial development rules (Van Rooy, 2011), which sometimes led to excessive regulations. Restrictive or permitted planning and the associated excessive regulations resulted in little flexibility, thus hardly allowing for area specific solutions.

(Practical) challenges from the principle of social engineering and restrictive planning for urban redevelopment and transformation plans

The limitations of the dominant technical rational planning approach were quickly noticed (Lindblom, 1959, Simon, 1960; in Rauws & de Roo, 2011). The assumption that everything is certain, fixed and that spatial planners could foresee the future was not appropriate over time. As a consequence, these neighbourhoods had fallen into decline amongst other things to the lack of flexibility and excessive regulations. What can be learnt from this period is that excessive regulations hinder the flexibility of redevelopment or transformation plans. Thus, it is important in urban redevelopment or transformation that a balance between flexibility and regulations is found so that planners can respond appropriately to (un)foreseen changes

2.1.2 A shift to development planning

In the 1990s the government saw that the previous dominant perspective did not work anymore. This caused a slow change coming from the state and from social influences resulting in the government to withdraw partly (Platform 31). This withdrawal was characterized by privatization of government tasks in general, partly transfer planning processes to the market and decentralize government tasks to provincial or local authorities. The goals of the withdrawal were to get earlier involvement of the market and to give citizens a greater say, resulting in a decentralisation of national government tasks.

Uncertainties were also common for planners regarding the planning in the 1990s. They tried to deal with uncertainties through open communicative and collaborative approaches (Gerrits, Rauws & de Roo, 2012). Focus was put on the planning process rather than on the goals resulting that focus shifted from 'government' to 'governance'. Shared responsibility became one of the key characteristics (De Roo & Rauws, 2010). Quality of space is one of the other characteristic that gained importance (Rauws et al., 2010). The focus on the planning process and the importance of the quality of space should lead to plans that were better at dealing with uncertainties and complexity in plan making.

A consequence of focussing on the planning process and the importance of space is that the policy of the government became more integral. Various disciplines got together before plans were made instead of each discipline acting separately without little communication between the disciplines (Faludi & van der Valk, 1994; Korthals Altes, 2006). In other words, the integration of the economic, social and environmental disciplines became important. The integration of various disciplines can be linked to the importance of the quality of space. An example is the integral area policy where the focus was on quality of space and the planning process through integrating the disciplines of economy, environment and social affairs.

However, a large part of the planning process was determined on the national or provincial level. The consequence was still a top down approach, which lead to plans that had not the right balance between robustness and flexibility in order for planners to appropriately respond to changes that were (un)foreseen. Therefore, the integral area policy was replaced by development planning. Development planning was introduced by the Scientific Council for Government Policy. The idea was that each spatial task must be addressed at an appropriate scale. The aim was to create opportunities at the area level. Characteristics of this policy were that governments gave more space to market parties and that plans became more integrated (Van Rooy, 2011).

Blauwe Stad as an example of development planning

At the end of the 1980's Haasken and Timmer came with the idea to create a lake of 3.000 ha surrounded by luxurious houses. This idea was supported by the national government through the Vierde Nota Ruimtelijke Ordening Extra (VINEX, 1991). However, the creation of a big lake and luxurious houses was not desired by the citizens and farmers. Nevertheless, different studies were carried out to check the feasibility of the project. The last study, 'from idea to reality' (1997, in Ruimtelijk Planbureau, 2004) was very positive about the potential of Blauwe Stad. This was because they thought that large number of people, including pensioners, moved from the Randstad to Blauwe Stad. In 1999 the plan was presented although there were doubts about the financial and technical feasibility of the project. Furthermore, 50 objections were filed against the plan and some citizens went to



Figure 2 Blauwe Stad area
source: Van den Berg (1997)

the Council of State to object (Ruimtelijk Planbureau, 2004). In 2001 the implementation of the project official started. There was some flexibility built in into the project with regard to housing and size of the lake. However, further flexibility was not built in the planning process. Furthermore, what stayed unclear was the long-term perspective for the Blauwe Stad. Originally the plans was to build 1480 houses. However, after the reseccions and because there was not enough interest the number of houses was brought back to 1250 and the completion date was postponed from 2016 to 2051. This has a large influence on the financial part of the plan but also on the political side. The postponement will give flexibility because there is more time. However, it will also come with more complexity and uncertainties because of the deadline that now is in 2051.

(Practical) challenges from development planning for redevelopment and transformation plans

Three (practical) challenges for urban redevelopment and transformation plans can be taken into account from this particular project and from development planning in general. Firstly, before realisation too much was invested in the infrastructure of the lake and the water management. What is more appropriate for big redevelopment or transformation areas is to ensure some revenues in the beginning and divide the investments over time. Secondly, in that time robustness and flexibility were not appropriately balanced. Through more incremental ways flexibility could be better ascertained (Rauws et al., 2014). This means that the plan, for example, can be divided in sub-plans in a more global and flexible plan. A long-term vision helps in order to guide in dealing with complexity, uncertainties and for creating a complementary area when sub-plans are realised. Thirdly, involvement of the citizens who live in the area and know the qualities and characteristics of the area is necessary in order to create support through communication. This was not done in an appropriate way during the planning and development process of the Blauwe stad and during the development planning period in general. Not only is communication good to obtain support but also to create certainties resulting in less complex cases. Moreover, (political) decisions, economic development, market development and behaviour of citizens, that are

often uncertain, are better manageable. This will appear from the next paragraph which discusses more about public private partnership (PPP) and also gives an example which was indicated by the government as a PPP example project.

2.1.3 Public-private partnership (PPP)

As a method development planning became important around the 1990's. This caused that the political field dramatically shifted. At that time development planning was a method to answer the questions of citizens in the areas of housing and employment (Platform 31). Stimulation of private entrepreneurship and demand driven approaches were dominant. The Sfink-C ramique area in Maastricht was indicated by the national government as PPP example project. In 1987 the municipality bought this area. The municipality found a financing partner in the ABP (pension fund). After the area was purchased a market vision and an urban master plan were made (see figure 3) (Boon, 2010).

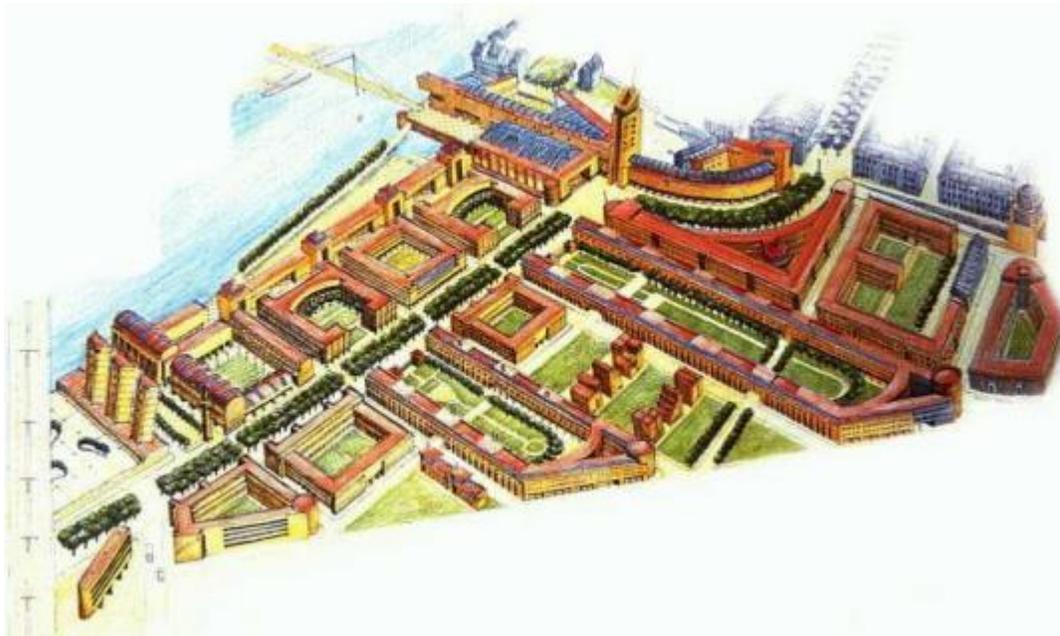


Figure 3 Master plan Sfink-C ramique area (source: [blogspot](#))

On the basis of research the financial feasibility was made through a land exploitation. The area was divided in sub-plans. For the sub-plans the municipality contracted three different developers. The land-use plan included locations for housing and/or offices depending on the market situation. The flexibility in the land-use plan contributed to anticipation to ((un)foreseen) changes. For example, an investor of a large hotel withdrew. Due to the flexibility of the zoning plan the ability to adapt to this change was possible (Boon, 2010). The contract, besides the flexibility of the land use plan, where responsibilities and risks were divided between the parties, was an important mechanism to cope with complexity and uncertainties. Moreover, the support from the municipality and the citizens was substantial because this area had the ability to connect two living areas.

(Practical) challenges from PPP for redevelopment and transformation areas

Lessons that can be learnt from this example are threefold. Firstly, a master plan that creates a vision for the area is necessary to be used as a basis for the sub-plans which can be further developed. Appropriate in this is that these sub-plans have the flexibility, for example in the land use plan, to anticipate to

changes that are (un)foreseen. Secondly, the redevelopment or transformation area should add value to the larger area as the Sfinx-C eramique area did for the surrounding neighbourhoods. This means not only that the area itself must have a good quality but also that the area adds value within the existing surrounding. Thirdly, there should be a contract where the responsibilities and risks are appropriately divided. These three factors all can contribute to cope with complexity and uncertainties and thereby to anticipate to changes that are (un)foreseen.

2.1.4 A shift to area development

As a response to development planning, during the drafting of the National spatial strategy (2004), the term area development was invented. If development planning is a spatial interpretation of an area invented by relative 'outsiders', area development is a co-production of interested parties with a numerous group of interested parties (investors, project developers, non-profit organizations and citizens) (Platform 31).

Furthermore, the realization that the basic principle should be that area challenges are by definition plural, in other words are felt on different scales, and should not be approached from a government perspective only. Area development is therefore a search for solutions to a combination of policy urgencies and urgencies concerning a certain field, such as urban redevelopment or transformation. Multiple urgencies together form the driving force for a new dynamic in the region (Platform 31). De Zeeuw (2011, p. 406) describes area development as *"the art of connection of functions, parties, interests and financial flows, with the view towards redevelopment of areas"*. Risk and return are divided between the parties who are involved in the planning and development process. In other words, a certain amount of equalization will take place. This equalization is always a negotiation between the interested parties and will be dependent on the context in which sharing values and interest are important factors.

(Practical) challenges from area development for urban redevelopment and transformation

Connecting different functions, parties, interests, and financial flows helps to get certainties about agreements, decisions and for plans of urban redevelopment and transformation areas. To gain these certainties appropriate communication with the interested parties is necessary. Also in order to better the complexity of non-linear changes, urban systems and (juridical) procedures and uncertainties about (political) decisions, economic development and demand from the market. However, some change will stay (fundamental) uncertain because these kind of changes cannot be foreseen and also it cannot be predicted in what direction the change will go, such as the economic crisis, which directly changed the way how area development planning is done today. The following paragraph shows how area development reacted to an unforeseen change (read economic crisis) and what can be learnt for urban redevelopment and transformation.

2.1.5 Area development of today

In everyday planning practice of urban redevelopment and transformation much has changed after the recent crisis. All parties active in urban redevelopment and transformation planning are in the middle of this reality. Rigid plans stagnated because of not enough flexibility in terms of having different alternatives for the future, in other words anticipation to changes. Moreover, a large number of the municipalities had established land exploitation companies in which binding agreements are made that hindered the flexibility of the plans. Therefore and because of the recent crisis, the ambitions were frozen resulting in developments that were firmly phased, regulations eased or became more flexible and interested parties who dealt more pragmatically with cooperation agreements. This in order to be more flexible and

better cope with uncertainties and complexity of large-scale developments. However, this firmly phasing, easing of regulations and a pragmatic approach were just a part of the solution, because it eases the complexity and uncertainty of regulations, sub-plans and stakeholders for the plan. In other words, it still does not fully embrace the way how planners have to deal with complexity and uncertainties. Namely the more fundamental things of complexity and uncertainty, such as the understanding of the city as a complex adaptive system and how an appropriate balance can be arranged between the flexible and robust aspects in an urban redevelopment or transformation plan.

To come to a solution that will work there is not one clear answer. This is because there are multiple ways that lead to an appropriate solution and also multiple viewpoints from which one can look at complex area development planning. One of the viewpoints in theory is the actor-relational approach from Boelens (2009). His approach states that it is necessary for strategic spatial plan makers to make a switch from a viewpoint which is directed from the inside to the outside. A viewpoint to the outside means that the municipality has to pay the appropriate amount of attention to all actors, profit organisations, non-profit organizations, citizens etc., with their knowledge and ideas. However, this theory does not explicitly explain how to understand complexity and uncertainties and how to deal with them. It also suggest that from going towards a viewpoint that is directed towards the outside is the solution. Furthermore, it differs not much from the communicative planning approach which also is not always the appropriate solution for the complex and uncertain cases that are discussed in this thesis.

For this research another viewpoint will therefore be discussed, namely the complexity perspective, which has his backgrounds in the complexity theory. The reason is that the main characteristics of this theory are that the world is (fundamentally) uncertain and that we have to accept that the world is (fundamentally) uncertain. This is helpful for planners with regard to planning because the complexity perspective gives directions how to deal with complexity and uncertainties and it gives not only one (technical) solution that has to be followed. Rather, complexity theory gives guidance how to react during different development paths. In this way the viewpoint of de Roo on complexity and uncertainty helps us to understand a way of looking at planning, especially for this research urban redevelopment and transformation. The complexity perspective will be further discussed in chapter 2.3.

2.1.6 Concluding remarks

The challenges for spatial planners to plan for urban redevelopment and transformation and to deal with complexity and uncertainties are fourfold. Firstly, from the period of restrictive or permitted planning can be learned that a balance between the flexibility of plans and the regulations that are made is necessary for a more appropriate response to changes that are (un)foreseen. Secondly, from the period of development planning can be learned that market involvement at an earlier stage and the decentralization of tasks helped to gain certainties through collective communications and to deal better with the complexity and uncertainties through collective communication. The third thing that can be learned is that a strong vision is helpful for redevelopment and transformation plans which guides the development of the sub-plans. As a consequence the flexibility can be ascertained through the sub-plans and through mixed use of the land use plan in order to react to changes within and outside the plan that are (un)foreseen. Fourthly, from the period after the crisis it has become clear that a different approach, for example the complexity perspective, is needed to deal with the complexity and uncertainties for redevelopment and transformation plans of today. There are multiple viewpoints from which lessons can be learned. The actor-relational approach and the complexity theory are examples. The complexity perspective is the most helpful for planners because this theory accepts the presence of complexity and uncer-

tainties and tries to give guidance how to deal with this and argues that there is not one solution which is the best.

2.2 Strategic spatial planning for resilient urban environments

In the previous section has become clear that there is a need for a different approach in order to deal better with the complexity of non-linear changes, urban systems and regulations and uncertainties of economic development, (political) decisions and citizens' behaviour. Therefore, it is important to identify the characteristics of strategic spatial plans are and how strategic spatial plans can contribute to urban redevelopment or transformation plans that are able to adapt to change and are able to deal better with complexity and uncertainties.

2.2.1 Strategic spatial planning

The characteristics of strategic spatial plans are necessary to discuss in order to understand dealing with complexity and uncertainties for urban redevelopment and transformation plans. In the literature there are good examples of how strategic spatial planning could be understood (Abbot, 2009, Albrechts, 2010 & 2013, Albrechts & Balducci, 2013, Moroni, 2014). According to Albrechts (2010) spatial planning is a method for creating and steering a (range of) better future(s) for a place on the basis of shared values. The focus of strategic spatial plans are on becoming. With these plans arises quite a different picture, namely; *“in terms of plans (strategic plans vs. master plans or land use plans), type of planning (providing a framework vs. technical or legal regulation), type of governance (government led vs. a negotiated form of governance) and content (visions and concrete actions that accept complexity of a place focusing on local assets and networks in a global context, social-spatial quality, a fair distribution of the joys and burdens).”* (Albrechts, 2010, p 118). Albrechts (2010) is also clear about the motivations for the use of strategic spatial planning. In his view it is about constructing challenging, coherent and coordinated visions. In the view of this research there can be some other or more motivations, especially for urban redevelopment and transformation areas, which will be discussed in chapter 2.3. In order to frame an integrated long-term spatial logic other and more motivations should be kept in mind than Albrechts discussed. This is important because the motivations that Albrechts discusses, stress action orientation and it promotes a more open multilevel type of governance. Albrechts (2010) further defers strategical planning into three questions: what, how and why. By distinguishing between these three the necessity of a plan can be understood and it can also become clear what actions need to be taken and what kind of governance is needed. Therefore the division in what, how and why can help in dealing with the complexity and uncertainties of strategic spatial plans for redevelopment and transformation areas.

The what of strategic spatial planning

Beginning with the what of strategic spatial planning. Planning is understood as a transformative and integrative public-sector-led socio-spatial process. The process is *“the guidance and basis for creating visions or frames of reference, a justification for coherent actions and the means for implementation”* (Albrechts, 2010, p. 1119). The focus on the spatial part is important because the where of the plan becomes clear and also allows in a more effective way to integrate different agendas. Think about economic, environmental, cultural, social and policy agendas. The combining of the different agendas may be very helpful because of the knowledge that results from this different sectors when these are put together. Through the knowledge from the various disciplines the complexity and uncertainties of spatial plans may be better managed. Rather than various disciplines acting sectorial and do not take each other's agenda into account. This will lead to uncertainties regarding the other sectors and towards the future and will make plans on the long run more complex than it would be if from the start the various disciplines integrate and thus communicate with each other.

The how of strategic spatial planning

The how of strategic spatial planning is about the focus on a limited number of strategic key issues. Important aspects of these key issues are that it is a collective critical view of the (urban) environment. Strengths and weaknesses are determined in the context of opportunities and threats (Albrechts, 2010). Also known as the SWOT-analyses. Furthermore, focuses on place-specific assets and qualities in a global context. Strategic spatial planning is about studying the external trends, forces and resources available and identifies the major actors. Moreover, *“strategic planning allows for a broad (multilevel governance) and diverse (public, economic, civil society) involvement during the planning, decision-making, and implementation processes. It creates solid, workable, long-term visions or frames of reference (a geography of the unknown) and strategies at different levels, taking into account the power structures (political, economic, gender, cultural), uncertainties, and competing values.”* (Albrechts, 2010, p. 1120). Strategic spatial planning is focusing on results on both the short and the long term. This is important because to keep the stakeholders satisfied and committed, results on the short term are necessary. Also in order to reach the long term goals. Therefore, when taking a perspective of multilevel governance, different stakeholders, power relations and uncertainties has to be taken into account in order to create long-term visions which also set goals for the short-term. In this way dealing with complex urban redevelopment or transformation plans becomes manageable and also uncertainties both on the short- and long term can be more appropriately understood and partly banned out.

The why of strategic spatial planning

Why do we need strategic spatial planning? We need strategic spatial planning because it enables change. It is impossible to do everything that needs to be done. For example ascertain that every sector is 100% addressed. Therefore choices have to be made. That is why it is important to make strategic spatial plans because it makes the tough decisions about what is the most important and appropriate to do (Albrechts, 2010). By doing this some things are excluded. This kind of decision making is justified otherwise it is like random shooting in the hope something will be hit. That is why it is important to make strategic spatial plans. Strategic spatial planning symbolises some good, some qualities and some virtues. Think about diversity, sustainability, equity, spatial quality, inclusiveness and accountability. So, choosing for a certain future development direction will also help strategic spatial planners of redevelopment and transformation areas to get some certainty and to better handle the existing uncertainties of the plan. This is because a spatial planner then knows what actions are necessary or appropriate for the short- and long term and with these actions in mind will be able to make a more appropriate decision when dealing with uncertainty, than if no choice is made for a certain future development direction. Furthermore, the guidance will help to better anticipate on change in a complex system.

Concluding remarks

So strategic spatial plans ideally are a product with a critical analyses of the main processes and structural constraints shaping our places. This results in a *“realistic, dynamic, integrated and indicative long-term vision, a plan for short-term and long-term actions, a budget, and a flexible strategy for implementation”* (Albrechts, 2010, p. 1120). Strategic spatial planning is thus a set of concepts, procedures and tools that are tailored carefully recording to its context. This is important because the vision must be placed in a specific context (economic, social, cultural, political and power structures), place, time and scale. Therefore this context provides the setting for the process. The challenge with this is to shift from ‘what’s in it for me’ to a collective commitment to the vision. This in order to get both some certainties, for example what the short- and long term actions are, what is the budget and what is the (flexible) strategy, in the planning for the future and also to better manage the uncertainties such as (political) decision making, economic development and market demand. Furthermore, a flexible strategy helps to better adapt on changes that are (un)foreseen.

2.2.2 Teleocracy and nomocracy

In the previous section became clear that a strategic spatial planning is needed for urban redevelopment and transformation plans in order to better deal with uncertainties and to adapt to changes that are or are not foreseen. However, the challenge then still remains which instruments are appropriate to manage a complex system in order to guide urban redevelopment or transformation plans. Academics have tried to tackle this challenge (Portugali, 2012, Marshall, 2012, Moroni, 2015). To better understand this challenge Moroni (2015) makes a distinction between teleocracy and nomocracy.

Teleocracy

Teleocracy is a form of government in which patterning-instruments are the main tools used by the state to regulate the actions of private parties (Moroni, 2015). Patterning-instruments try to define the role of the diverse parts of components of the urban structure. The aim of this instruments is to obtain a certain correspondence between the rules introduced and the emerging socio-spatial order (Moroni, 2015). Characteristics of patterning-instruments are that they are ‘shaping-devices’ and future-oriented, focusing strongly on forecasts and on specific predictions in particular. The traditional land-use plan is an example of a patterning-instrument. To get a better view of the of the traditional land-use plans Faludi (1986, p. 75) uses a generalized example, namely: *“site Z can be developed within 2015 by building three-storey residential blocks for Y number of people and so on; site W can be developed by constructing an office building X meters high and so on”*. Because of the robust characteristics of patterning instruments, teleocracy and thereby the patterning instruments can be helpful as guiding frameworks during the process of strategic spatial planning for resilient urban environments. The stress is on guiding, because patterning instruments should not be seen to predict the future. Rather as an appliance to guide the plan making because of the shaping devices and the orientation on the future. A disadvantage is that this type of instruments are time consuming because every new plan needs new forecasts (Moroni, 2015). Furthermore, teleocracy is sometimes inadequate for the challenges of the post-modern society (Alexander et. al., 2012).

Nomocracy

Nomocracy is a form of government in which only framework-instruments are used to regulate private actions. Patterning-instruments are used to discipline and guide public actions (Moroni, 2015). Framework-instruments only introduce a form of 'abstract coordination'. In contrast to patterning-instruments, framework-instruments do not obtain a certain correspondence between the rules introduced and the emerging socio-spatial order. This only happens indirect. (Moroni, 2015). The characteristics of framework-instruments are that they are present-oriented filter devices. These filter devices avoid negative effects and leave all the other possible outcomes free. An example of framework instruments are urban codes which are impersonal and impartial of social activities (Moroni, 2010). The codes aim to give a pattern-coordination. The urban codes should be based on a set of abstract and general relational rules that enable society itself to be highly flexible that leaves options open for society and to 'permit the flow' (Moroni, 2015). These relational rules are few, simple, generic, end-state-independent, long-run oriented and prevalently 'negative'. Local governments should regulate actions of the private actors and plan their own actions for the urban environment. This is a very noncommittal view and should be further refined. When only taking nomocracy as a viewpoint which is present-oriented, avoid negative effects and leave all the possible other outcomes free, a plan for urban redevelopment will be too flexible in order to come to a plan that is resilient and adapts to shocks or changes that are (un)foreseen. This leads to insufficient adaptive capacity because the focus is too much on the spur of the moment which will lead to decision making and plan making in which indecisions, lack of vision and lack of collective commitment are key characteristics.

Complementarity of teleocracy and nomocracy

In the previous sections about teleocracy and nomocracy has become clear that both approaches have strong aspects that can be helpful for urban redevelopment and transformation in order to make spatial plans that can react to changes that are (un)foreseen. The following statement supports this: "Nomocracy is associated with institutions and teleocracy with organisations. A planning subject should act like an institution in situations of high complexity and low interdependence (when "planning for others"), using nomocratic tools to promote common values; when "planning for itself" it should use teleocratic tools acting as an organization to realize its goals" (Alexander et. al., 2012, p 44). Because in both Nijmegen and Bergen op Zoom the complexity is high, interdependence low and both municipalities want to realize their goals. Therefore, when making a plan for a redevelopment or transformation area an appropriate balance between teleocracy and nomocracy is necessary in order to deal with the complexity of non-linear changes, urban systems and spatial regulations and the uncertainties of economic development, market demand and (political) decisions.

Concluding remarks

As can be read above the combination between the key and strong characteristics of patterning instruments and framework instruments is appropriate and necessary in order for a redevelopment or transformation plan to become resilient. This should be done in order on the one side to not only look at the future but also at the present and the short-term and on the other side being too flexible. The approaches of teleocracy and nomocracy can strengthen each other and should therefore be in a balance that is appropriate to the specific situation.

2.2.3 Concluding remarks

From this chapter the lessons for resilient urban redevelopment and transformation planning are two-fold. Firstly, it is important to have a broad and diverse involvement during the planning, decision making and implementation processes. Broad in terms of multilevel governance, which will be further explained in chapter 2.3. Diverse in terms of public, economic and civil society. This is necessary in order to come up with a long-term vision or frames of references. This long-term vision can be a guidance in terms of long-term and short-term goals for resilient urban redevelopment and transformation plans. Thereby are the specific context (economic, social cultural, political and power structures), place, time and scale important. Secondly, In order to come with a long-term vision where long-term and short-term goals are formulated two approaches can be helpful to keep in mind. These are teleocracy and nomocracy. The key and strong characteristics should therefore be in balance that is appropriate for the specific context, place, time and scale. For teleocracy the shaping devices which are future oriented are important to take into account. For nomocracy present oriented filter devices are important to take into account in order to guide the short-term goals. The balance between the robustness and flexibility is thereby important for the resilience of urban redevelopment and transformation plans and will be further explained in chapter 2.3

2.3 Planning theory vs. Complexity theory

In the previous section was concluded that for redevelopment and transformation plans there should be an appropriate balance between teleocracy and nomocracy in order to make plans that are able to cope with complexity and uncertainties for a more resilient urban environment. To further narrow the scope of this research and to further going to help to find this balance, this chapter discusses important theories considered for this research. First, a description of why critically study complexity is important. Secondly, there will be an outline of the key characteristics of complexity theory. Thirdly, the key characteristics of and mechanisms behind cities as complex adaptive systems (CAS) are discussed and how they can help to improve spatial development and strategic planning of redevelopment and transformation areas for a more resilient urban environment. This section will thus further contribute to find the balance between robustness and flexibility of redevelopment and transformation plans that was also discussed in chapter 2.2.

2.3.1 Adaption of planning approach to planning issue

More and more it becomes clear that the world is becoming highly complicated and (fundamental) uncertain with a lot of interested parties and various influences (De Roo, 2012). This has also implications for the planning practice. Planning theorists and practitioners have to accept both the complexity of non-linear changes, urban systems and spatial regulations and uncertainties such as economic development, (political) decisions and citizen behaviour. This in order to analyse specific for every case how the situation can most appropriate managed for that context and situation. The adaptation of the planning approach to the planning issue is becoming highly relevant.

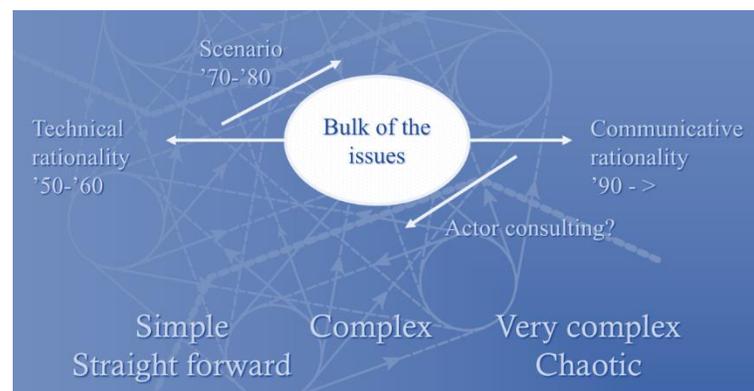


Figure 4: The technical rationale approach from the 1960s versus the communicative approach from the 1990s (source: de Roo)

This shift does not mean that the technical rational is not useful anymore. Rather, technical rationality is still very useful in situations that are simple and where predictability is high. These issues are also called management tasks (*beheersmatige opgaven*) (Van Vliet, 2015). Examples include management of public space, carrying out maintenance to roads and parks, renewing a road or bicycle lane or replacement of a building in the existing spatial context. On the other side, there are also situations where communicative rationality is more appropriate. These include tasks where complexity and uncertainties are high. Mostly called integral area specific tasks. Examples include restructuring of a neighbourhood, big new housing developments in or nearby a city, new road or rail infrastructure through or nearby an existing city (Van Vliet, 2015). These two rationales that are described here are ideal situations (de Roo, 2012). However, in the planning arena a large number of the cases are in the middle of this spectrum (see figure 2) which makes it hard to decide what kind of method to use and in which way to go. Van Vliet (2015) comes with a model that can help to indicate with what kind of tasks spatial planners have to deal with (see figure 3). The issues that are discussed in this thesis are situated in the box of number four and where the complexity is high and the predictability low. Besides that there are a lot of dynamics involved on these issues. This also applies to cities as CAS, which are further discussed in sections 2.3.2 and 2.3.3.



Figure 5: Complexity field, substantive complexity versus organizational complexity (source: Van Vliet, 2015)

Concluding remarks

Which kind issue spatial planners have to deal with (see figure 3) is necessary to determine in order to find both the appropriate balance between nomocracy and teleocracy and in response to complexity and uncertainties. The issues of Nijmegen and Bergen op Zoom, that are studied and analysed in this thesis, are situated at number four, integral area development, and five, strategic vision development. Furthermore, cities as CAS, which are discussed from paragraph 2.3.2 onwards, are also positioned at number 5 of the complexity field (see figure 5). Therefore, integral area development and strategic vision development will be further analysed and discussed because the complexity, both organizationally and substantively, and uncertainties of economic development, (political) decisions and citizen behaviour are high. Moreover, by analysing these tasks it will contribute to answer the research questions.

2.3.2 From static to dynamic complexity

The first step in the process to come to strategic planning for redevelopment and transformation plans that are more resilient for the urban environment is the awareness that complexity and uncertainties are part of the conditions when dealing with planning issues. To gain better understanding on the complexity of spatial development plans de Roo (2000, 2002 and 2012) made a distinction between three different classes.

The first class systems are closed systems, where predictability is high and complexity low. An example of planning in this class system is blueprint planning. The second class systems are half open systems. Within these systems outlining alternatives is important. A good way to do this is through scenarios. The third class systems are open systems with a complex network of relationships. Characteristics are a high degree of complexity and uncertainties.

Hence the good division between the three systems there were still problems with this approach. This is because time is neglected in these three class systems. However, time is an important factor when complexity and uncertainties are high. De Roo (2013) also saw this as a problem and came up with a fourth class system. In this way the approach shifted from “being” to “becoming” which is directed towards dynamic systems. The factor of time plays an important role. De Roo (2015, p. 163) himself states this about dynamic complexity; *“The contingency which dictates the holy spectrum of planning relates to degrees of complexity. It is a static kind of complexity, qualifying a situation as it ‘is’ in the here and now.”* This is distinct from a dynamic kind of complexity, central to the complexity sciences and making reference to situations as ‘becoming’. This static complexity considers a situation as fixed or as frozen in time and considers a situation by its degree of certainty and a compliant mix of facts and values. Considering reality as ‘a matter of degree’ qualifies situations as specific within a generic frame. In other words, situations are seen as part of a differentiated world.

Dynamic complexity has become a new element in the mind set of theorists and practitioners and is highly relevant for spatial redevelopment and transformation plans. That is why it is important to have a critical look at how complexity theory can contribute to planning, especially complex adaptive systems. This will be analysed in 2.3.3

2.3.3 Characteristics of Cities as Complex Adaptive Systems

Complexity theory is a relatively young science, without static frameworks or theories. Scientists who study complexity study and analyze the behavior and interventions in systems that are difficult to predict (Verhees, 2013). The basis of complexity theory lies in the “three body’s issue” of Poincare (1854-1912), who stressed non-linearity. Another example which also justifies to use complexity theory in planning is the “Lorenz-butterfly”. Lorenz discovered a pattern in the weather models he made. He sensed that from two identical start points, paths could develop in a completely different way. The impossibility of predictability is a characteristic which all chaotic systems have (de Roo, 2013). When considering this questions that are relevant are; how control (influencing) is possible in a system which is really hard to predict, where uncertainty and difference play a major role and where the technical rational approach is most of the time not the appropriate approach. Complexity theory does not give the planning theory the solution, however it gives guidance in which way to go. De Roo (2015) distinguishes three key characteristics for (cities as) complex adaptive systems: situatedness, emergence and transitions.

Situatedness in terms of de Roo (2015) is described as situations that occur in a non-linear environment in which we have to accept that situations are fuzzy, fluid and vague in relation with their environment.

For example, when a redevelopment plan is made for the part of the city of Rotterdam other things are of importance than when a redevelopment plan is made for a part of the city of Groningen. So, the place where the urban redevelopment or transformation occurs is of importance, because every place has its specific characteristics that are of importance when planning for redevelopment and transformation areas. Furthermore, the time in which the specific issue takes place is also worth of consideration. For example is it a stable period or an unstable period, what is considered important and what not during that time. In other words, context matters. So, when making a strategic plan for a certain area, place and time are considered important to take into account.

Emergence occurs between the edge order and chaos (de Roo, 2013). Between the edge of order and chaos it is possible to see the chances for development because that is the moment when there is a lot of dynamics and development paths that are starting to become visible. Development stands also for instability and allows therefore for creativity of the people who have to deal with the situation. Examples of emergence of areas are the industrial areas of the earlier days in the middle of the city. All the industrial uses are gone nowadays and these sites are often empty because it is hard to decide what kind of development is wanted. At this site spontaneous or self-organising initiatives emerge. Krugmann (1996, p. 9-29) stated it this way: "Emergent self-organization appears frequently in cities where no planning or zoning entity predetermines the layout of the city". The recognition by the municipality but also market parties of the early emergence of the availability of space in the middle of the centre is important in order to assure that such an industrial areas can be resilient so that planning practitioners are able to give the site another value and quality again.

Transitions are "gradual, continues processes of change where the structural character of society transforms" (Rotmans et al., 2001, p. 16). Transitions occur in situations that are simple and uncluttered and in situations that are complex and chaotic. Both the simple and complex situations are open to transitions (de Roo, 2010). An example of a transition in an urban area is when an industrial area transforms to a residential or leisure area, which for example is at this moment happening at the Ebbing Kwartier or the Suikerunie Terrein in the centre of Groningen. Thereby, it is important to know in which phase the transition is because each phase of transitions needs different actions. For example, in the predevelopment-phase it is more necessary to understand in which way the transition is going. When the transition is taking off it is important to have a clear vision in which way to go because this phase is much faster and dynamic and the attention must be paid on how to manage the transition. Therefore, and because of the interlinkage between complexity and transitions, transitions are amongst other things important for strategic planning for redevelopment and transformation plans in order to strive for resilient urban environments.

Concluding remarks

To understand how change occurs it is necessary to understand the characteristics of cities as complex adaptive systems. Three characteristics come forward when cities as CAS are discussed, namely emergence, situatedness and transitions. The three characteristics should be seen in consistency and not as separate entities. So at the edge of order a chaos a lot of development happens, for example self-organization and co-evolution. Such emergences can trigger a transition at the area of redevelopment or transformation, for example from an industrial function to a residential or leisure function. Thereby, the situatedness of the area should be taken in account. This means that the context, place and time should be taken into account at the level of redevelopment and transformation. Besides the characteristics of

cities as CAS also the mechanisms behind cities as CAS has to be taken into consideration. The mechanisms should be seen linked to the characteristics of cities as CAS. This discusses section 2.3.4.

2.3.4 Mechanisms behind Cities as Complex Adaptive Systems

Because of the discontinuous and unexpected changes that are described above, it is important to know how these changes occur and to understand what the mechanisms behind cities as complex adaptive systems are (Rauws et. al., 2014). The complex adaptive system is able to handle with these kind of discontinuous and unexpected changes and thus can become resilient to these changes. In this kind of systems the predictability is low and uncertainty is high. This is important for spatial planners when making strategic plans for more resilient urban environments to accept or anticipate for. The previous part discussed characteristics of complex adaptive system and how change may occur. This part discusses the key mechanisms behind the functioning of cities as complex adaptive systems and subsequently how cities as complex adaptive systems can contribute to strategic planning for redevelopment and transformation plans that are possible to contribute towards more resilient urban environments.

Multi-layered interactions

As earlier discussed in this thesis, complex adaptive systems are open and nested systems in which the interdependence between processes at different levels of scale and moments in time are important. Together they produce unexpected outcomes (Byrne, 2005). Therefore, a multi-layered view on governance and scale (macro, meso and micro) is desirable for planners during the process of strategic planning. In other words, to keep in mind the contextual aspects. Another important aspect in this is that different stakeholders (profit- and non-profit organizations, (national, provincial or local) government, citizens, investors, project developers) should be addressed in order to come to a multi-layered view. In order to strengthen the relationship between the different stakeholders it is important to determine who are important stakeholders and make a network out of these stakeholders (de Zeeuw et al., 2015). This is because enough capacity is necessary for an urban system to reorganize the processes after a change and at the same time the ability of spatial planners to anticipate on the change. For example with likely paths of development. Spatial planners can do this with the help of analyses of which trends play an important role in various areas (De Roo & Rauws, 2010).

Self-organization

In the previous part is stated that the planners have to anticipate on the changes that occur in the complex adaptive systems. However these systems have an internal mechanism of adaption (Rauws et. al., 2014). This means that *“a self-organizing system is one in which there is no central locus of information and control. Information and control are both intensively distributed and collective behaviour is emergent from the individualistic dynamics of components in a manner that produces the illusion of coordinated effort”* (Ismael, 2011, p. 332). In such a system individual actors change their behaviour and try to change the framework in which their behaviour is situated. Examples of self-organization are initiatives from autonomous networks of citizens that exists without government interference (Boonstra & Boelens, 2011). This is because there is no external coordination (Heylighen, 2008) and because these actors act according to the end user. As Rauws et al. (2014) rightly point out these complex adaptive systems are able to self-stabilize and self-innovate. Therefore the task for planners is for urban redevelopment and transformation plans to understand and analyse the urban system, which is partly able to develop and redevelop itself and at the same time can still be managed and guided by planners. What is thus im-

portant for the urban redevelopment and transformation process is that there should be a dot on the horizon which gives guidelines, but at the same time is able to adapt to self-organizing processes.

Co-evolution

Coevolution is a necessary aspect because of the demonstration on *“how macroscopic properties of resource utilization and population distribution can be related to the behaviours of individual agents”* (Levin, 2002, p. 16). The roots of this concept lay in evolutionary biology (Ehrlich & Raven, 1964). This concept is also applicable in the social sciences, because of the idea that the biological and sociological intertwine and therefore have a co-evolutionary relationship (Gerrits, 2008). Elements of structure (complex adaptive systems and agency) and elements of process (positive and negative feedback, patch dependence, lock in etc.) are of importance when co-evolution is discussed. An example of this is the introduction of motorization. This led to a decline in railway use and many cities got rid of the tramway in order to facilitate the car (Yamu et al., 2015). So, the roads in the city changed because of the increasing use of the car. What thereby is of critical importance in this situation is that human agency are able to act accordingly in its interactions with physical systems (Gerrits, 2008). In other words, spatial planners are able to act in an appropriate way to the change that the car was going to play a more important role in society.

In a further study Gerrits (2012) mentioned that the changes that occur in a complex adaptive system are interdependent. This should also be taken into consideration when dealing with urban redevelopment and transformation plans, because if something is changed in the system other things may change in the system as well, as can be seen with the motorization. In other words, when redeveloping or transforming an area other things which are not directly related to the site may co-evolve due to the change. This asks for planning the ability of the plan and the spatial planners to understand how things co-evolve and to adapt to co-evolution in order to contribute to a resilient urban environment.

Concluding remarks

Lessons that can be learned from the characteristics of and the mechanisms behind complex adaptive systems are how change takes place and what the consequences are to act for strategic spatial planners. The changes will take places because of the interactions between the mechanisms of multi-layered interactions, co-evolution and self-organization. How these changes are triggered can be found in the characteristics of these complex adaptive systems. It is important to know in which face the transition(s) are, in what place and time that change takes place and in what condition that change is, order, chaos or at the edge of order and chaos. Often change occurs on the edge of order and chaos. The consequences for acting are therefore twofold. Firstly, there should be a determination by strategic spatial plan makers if a change is happening and in what context, time and phase the change is. Secondly, it should be determined by strategic spatial planners in what way the three different mechanisms interact and what the possibilities and chances are to guide the change through the mechanisms of multi-layered interactions, co-evolution and self-organization.

2.3.5 The balance between dynamics and robustness

Because of the unpredictability, uncontrollability and discontinuity of uncertainties in complex adaptive systems it is important to be flexible and robust at the same time. The problem however is that strategic planning can become too flexible. That is when all the options are kept open and because of that nothing will happen. In other words you will end up in an impasse. Furthermore, it creates a kind of tractability which provides less clearness and can lead to undesired spatial developments. In other words, spatial planners go with the delusion of the day. Complex adaptive systems need flexibility but also robustness (de Roo, 2012). So when changing something in this system, for example by urban redevelopment or transformation it is important that the urban redevelopment or transformation has the right balance between flexibility and robustness. Also on the level of cities as complex adaptive systems it is important to have the right balance between these two because of the influence of cities as complex adaptive systems on spatial development.

What is also a problem is when a plan or system is too rigid. This often occurs because spatial planners design plans or systems that are based on knowledge of 'being' instead of 'becoming'. Therefore most of these plans are insufficient when being responsive (Rauws et. al., 2014). Example of this insufficient responsiveness is the case of Blauwe Stad that was earlier discussed. Other drawbacks are that sometimes innovation and opposition from the citizens are not taken into a way that makes sense (Alfasi, 2006, Staley & Claeys, 2005). Also it can become bureaucratic and therefore time consuming (Van der Valk, 2002). In other words, important for a plan or system is to be both flexible and robust to be successful. Again the right balance is rather crucial as well on the level of the complex systems as on the level of plans for urban redevelopment and transformation.

De Roo (2010, 2012) came with a helpful model that tries to understand how this balance can be achieved. The first step he makes is to make a division between order and chaos. This is because changes occur on the edge of order and chaos. The next step is the division between the dynamic and the robust part. Because of these two divisions a model with four characters has been formed (see figure 6).

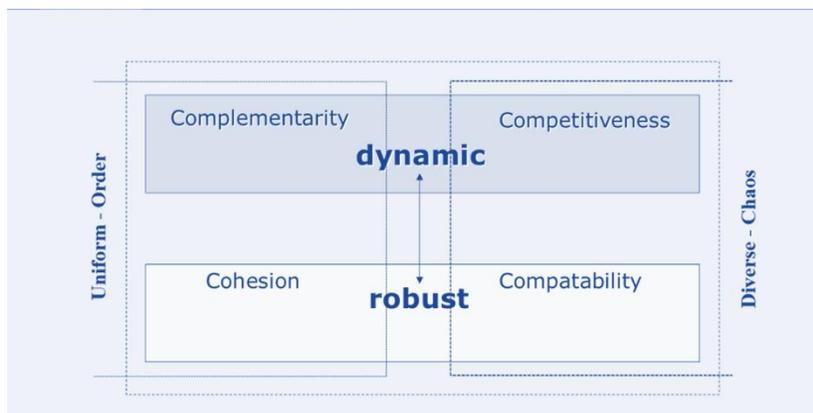


Figure 6: Indicators of spatial (economic) development conditions framing the complex adaptive system. (Source: de Roo, 2012).

On the dynamic side complementarity and competitiveness are important characters. Competitiveness is a well-known concept. It is about how competitive, in the sense of innovativeness of the plan, diversity in housing and differentiation to other plans (Yamu et al., 2015), is a plan/system to other plans/systems. This is important in times of diversity/chaos, because in that situation competitiveness is an indicator to take into account (see figure 6) (de Roo, 2012). In order to get the right balance it is important that plans or systems are complementary to each other. In terms of urban redevelopment and transformation plans that are studied in this thesis it is therefore important that the plan is not an isolated plan, rather the plan should be integrated in the system. This means that plans do relate to widely accepted qualities and also add value to the neighbouring plans and systems (Yamu et al., 2015). This is important in times of uniformity/order (de Roo, 2012). Also the interaction between competitiveness and complementarity are important in order for plans/systems to be dynamic. This is because a system cannot be solely competitive, unique or specific. Then the dynamic side will be out of balance.

On the robust side cohesion and compatibility are important characters. Cohesion refers to “the strength of internal relationships of the various parts, components or subsystems of the region” (de Roo, 2012, p. 167). This can be divided between social and territorial cohesion. Social cohesion is often used by spatial planning and urban renewal, which consist of shared values, quality of life, well-being and social coherence (Yamu et al., 2015). While territorial cohesion is used by the European commission in order to lead to a robust and unified conglomerate of nations (Faludi, 2007). Cohesion is needed in moments of uniformness/order, because it represents the robust link between sub-systems. In the case of urban redevelopment and transformation that means that the redevelopment or transformation site should fit in the existing system of the city in order to function appropriate within this system. Compatibility of a special economic region refers to “the interchangeability of economic functions” (de Roo, 2012, p. 167). That means that when an economic function disappears, other economic functions replace this. Only then a plan or system is robust. To make this more concrete, when an industrial area in the inner city disappears as was the case with de ScheldeVesting in Bergen op Zoom the plan or the system should be able to cope with this and find other uses for this area.

These four characters that are described above should be seen as interdepend and therefore it is important to search for the balance between the dynamics and robustness of in this case urban redevelopment and transformation plans. As the de Roo (2012, p. 169) stated it; “the model (see figure 6) tells us that a plan cannot compete and cooperate properly if there is no robustness in terms of cohesion”. This is also applicable to the situation of an urban redevelopment or transformation process. Over time these four characteristic should be in balance in order to have a redevelopment or transformation plan towards more resilient urban environments.

2.4 Conceptual model

The approach in planning practice is changing from a view where everything was makeable to a view where uncertainty and complexity are the major indicators which must be taken into account and be accepted. The complexity perspective could help us to guide during redevelopment or transformation plans for a more resilient urban environments. This is because complexity theory accepts that complexity and uncertainties are high and gives guidelines how to cope with the complexity and uncertainties. In this chapter we have seen that there are a few concepts, models and definitions which are being used within the complexity theory. One of these models is the spectrum where technical rationality and communicative rationality are presented as the two ideals of approach for spatial planning. A further development of this approach is the class system which is developed by the de Roo (2012). One of the things that is important is that time is considered in this model. Another model is the model in which indicators of spatial economic development are considered. Out of the theoretical insights, models and definitions a conceptual model is constructed, which can be seen below. In this conceptual model shows (see figure 7) how strategic (spatial) plans can contribute through adaptive capacity towards more resilient urban environments. The adaptive capacity can be divided into three categories which are of course interconnected. The first category is about teleocracy and nomocracy and how the right balance can be created. The second category are principles of the complex adaptive system perspective on cities. This will result in the third category, namely, how the right balance between dynamics and robustness is achieved. Together these three categories form the adaptive capacity than can help towards more resilient urban environments.

Urban redevelopment or transformation

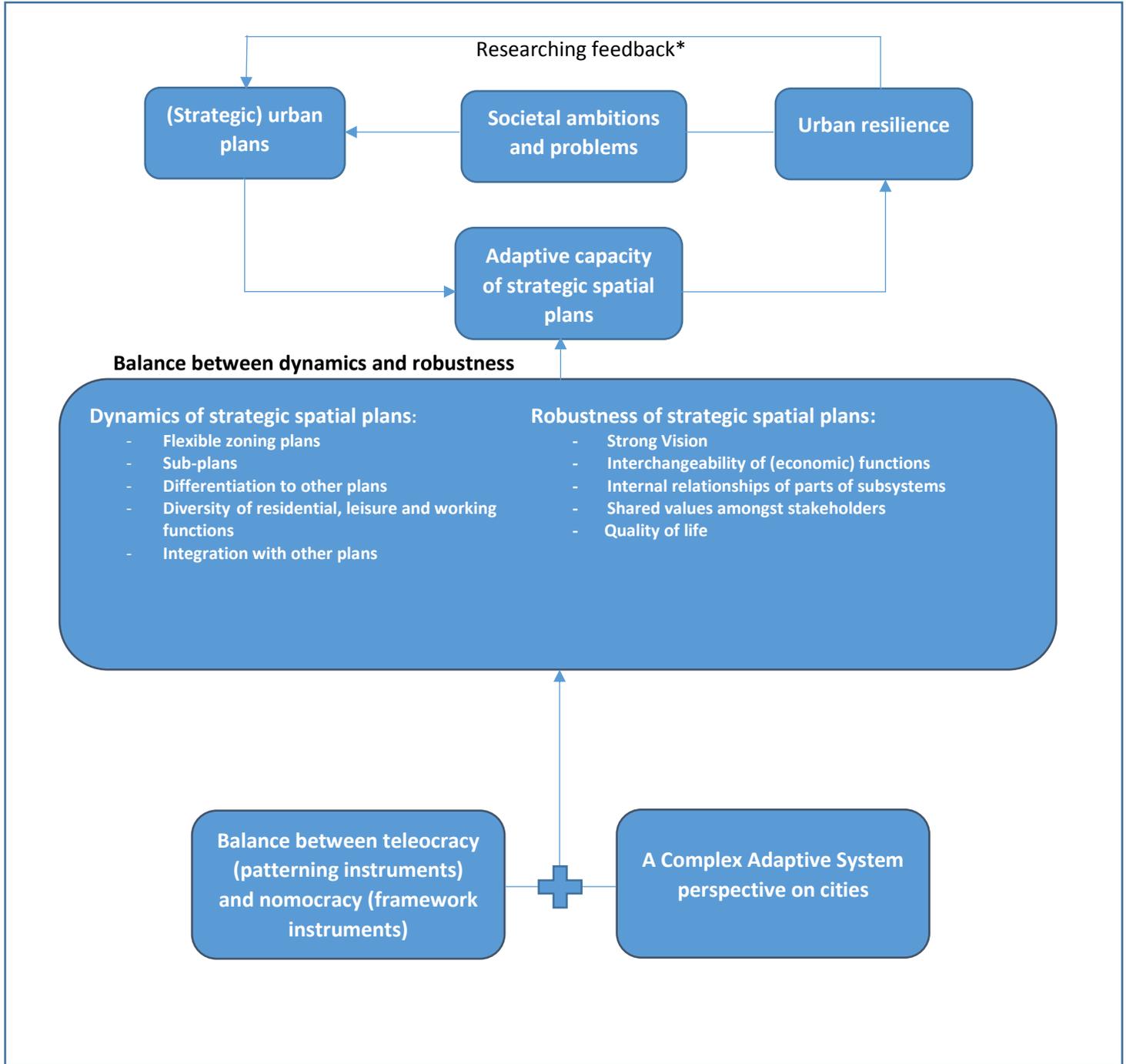


Figure 7: Conceptual model

* the goal is to develop a common framework in order to tune the appropriate behavior.

3. Methodology

This chapter discusses the research methodology. This includes a description of the research strategy, multiple data gathering and processing methods that will be used in order to answer the research questions that were formulated for this thesis. The choices that are made will be discussed. This will also entail an explanation of the advantages and limitations of these data collection and analysis methods. Furthermore, it discusses how the author will deal with limitations and how methods and techniques can strengthen or complement each other. Finally, the different methods that are analysed will be discussed.

3.1 Research Strategy

This paragraph will capture briefly the research strategy of this thesis. The strategy has several steps. These steps are going from an abstract theory to measured information which will lead to conclusions and recommendations for further research. In an illustration it will look like this:

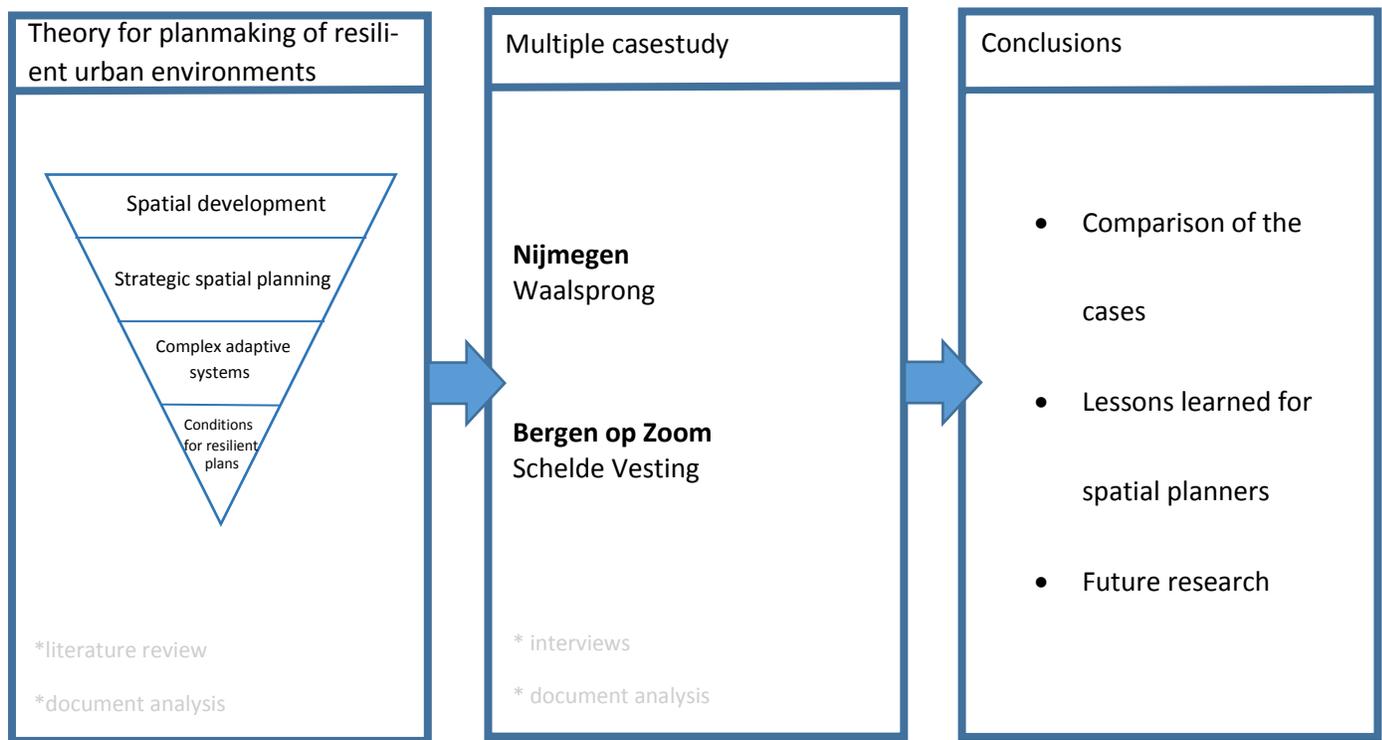


Figure 8: Research design (based on Hoen, 2015)

Table 1: Structure of the thesis

| | | |
|-------------------------------|---|---|
| Research Question | How can CAS-based principles contribute to strategic spatial planning in order to strengthen the resilience of strategic redevelopment and transformation plans in cities in the Netherlands? | |
| | Theory | Multiple Case Study |
| Sub-research questions | <p>Which (practical) challenges do Dutch municipalities face in making redevelopment or transformation plans in complex and uncertain situations?</p> <p>Which requirements must spatial planners meet to ensure that the redevelopment or transformation process is resilient?</p> | <p>Which requirements are met in the cases of the Waalsprong and ScheldeVesting and what are the differences between the Waalsprong and ScheldeVesting in their approach for redevelopment or transformation plans?</p> <p>What are the lessons for spatial planners that can contribute to redevelopment and transformation plans for a more resilient of urban environment?</p> |
| Required Data | <p>Concepts, definitions and viewpoints on strategic spatial planning and complexity theories.</p> <p>Factors that impact the urban adaptability.</p> | <p>Plan making processes, decision making and a historical overview of the cases.</p> <p>Content requirements for planning that can contribute to the resilience of the plans and lessons for planners that contribute to the adaptive capacity of urban redevelopment and transformation plans. The required data to achieve this goal are policy documents and interviews with experts.</p> |
| Research technique | Literature review | Policy documents analysis and interviews |

To make sure that the quality of this thesis is guaranteed, the approach of triangulation or mixed research approach is focused upon. This means that multiple perspectives (multiple case study: literature review, analyses of policy documents and interviews) taken into account at the same time (Yin, 2009; Flowerdew & Martin, 2005). The aim is to get stronger results than only focusing on the qualitative or quantitative side. Specific for this case that means that by doing both (structured) interviews and by studying the cases themselves will aim for better results than only doing interviews or only studying policy documents, because quantitative data can be supported by qualitative data. Furthermore, by doing the multiple case study simultaneously it can be conducted with getting strong results. This is because focussing on a single case study, for example Nijmegen, would get results that are specific the case for Nijmegen. When studying more than one case a comparison can be made between the cases. Furthermore, apart from the context specific goals, general results which can count for more than one case can be conducted and will better help to test the conceptual model in order to answer the research ques-

tions. However, a drawback of a case study itself that a case study is considered as a 'soft' approach (Yin, 2009), because it can deliver inappropriate results if the research is not done in an appropriate way. Although mentioned as 'soft', by doing the multiple case study the accuracy and convincingness of the results is optimized. For example, with the multiple case study the rationale behind the planning can be conducted and discussed as well. In this practical knowledge lies the strength (Flyvbjerg, 2006). This will be further discussed in the section of the multiple case study. This combination is of importance for this research because every context is different but general aspects can be conducted from different cases. In this way it will better help to answer the research question and to be more convincing than with one solitary case.

3.2 Data Collection Methods

For this thesis, both primary and secondary information will be collected. The first part (chapter 1, 2 and 3) is made on the basis of a thoroughly study of secondary information. This information is gathered by desk research. This desk research contains theoretical literature review and the analysis of policy documents. In the second part, based on the conceptual model, multiple cases will be studied. Information will be gathered through desk research and field research. The field research consists out of interviews in combination with visiting the site. This part is also aimed at getting the rationale behind the policy documents as well as getting new insights that are not mentioned in theory or in the policy documents. What rationale is behind the different data collection methods and how they are used will be discussed in the next parts.

3.2.1 Desk research

By getting through and discussing literature of different academic disciplines, in textbooks but also in scientific research articles, a firm basis of the theory about strategic spatial planning on redevelopment and complexity has been made for the empirical part of this thesis. The majority of the information is obtained by means of scientific searching machines as *Smartcat* and *Web of Science*. Also internet pages of the national government as well as internet pages from research institutes are used. Words that have been used, are: complexity, complex adaptive systems, strategic spatial planning, development planning, resilient planning, redevelopment planning and transformation planning. The search terms that have been used resulted in a large number of articles which were partly suitable for this study. Therefore, a further selection was necessary in order to get the article that are appropriate for this study. In some cases the title was obvious enough to select the article. If the title was not sufficient enough, the introduction and the conclusion were read in order to decide if the article was useful or not. Articles were considered useful when the concepts were appropriately presented and/or linked with urban redevelopment and/or transformation. Besides that, only articles were selected that described western-European and/or northern-American situation, because of transferability (Williams et al., 2014).

The articles and book chapters are analysed by looking for the history of spatial plan making and by examples which illustrate the history, concepts of strategic planning over time, the elements of teleocracy and nomocracy, concepts of complexity theory and more specific what characteristics of and mechanisms behind complex adaptive systems are important, what lessons can be learned about uncertainty and how the balance over time can be managed for the robustness and dynamics of the plans for urban redevelopment and transformation. The analyses resulted in marked documents where the most important things for this research were highlighted ([see Appendix A](#)).

A drawback of using a large amount of literature is that a lot of interpretation and attitudes of different authors get involved. Therefore there should be a thoughtful selection and understanding of the goals and backgrounds of the different studies (Flowerdew and Martin, 2015). Specific for this thesis through the demarcation of the research questions and the goals of this research the appropriate literature was selected in order to have a solid base for studying the cases. Furthermore, a good demarcation of the topic of this thesis helped by doing this.

3.2.2 Multiple Case Study

Through multiple case study can be ascertained to what extent Dutch municipalities differ in what conditions the planners use that are selected in the theoretical part of this thesis in order to contribute to more resilient urban environments. According to Yin (2009, p. 2) "*case studies are the preferred method when (a) 'how' or 'why' questions are being posed, (b) the investigator has little control over events, and (c) the focus is on a contemporary phenomenon within a real life context*". All the three conditions are met and that is a reason why a multiple case study is an appropriate method to conduct in this thesis. Firstly, the how question is posed in this thesis. Secondly, the author has little control over the events of the Waalsprong and ScheldeVesting, because the author has no influence on the specific cases.

Thirdly, the focus is on contemporary phenomenon within real life context, namely by studying the cases of the Waalsprong and ScheldeVesting, which are still in development. Furthermore, this thesis topic has to deal with uncertainty and complexity. For the reasons before mentioned multiple case study is a useful method to study how and why municipalities contribute to more resilient urban environments (Yin, 2009). Multiple cases often have more compelling results, because there can be made a comparison. Rather than only study Nijmegen, which will also give results, when discussing the results of the comparison between Nijmegen and Bergen op Zoom the results can be put in perspective and it is possible that some generalizations can be made. This is because with a comparison is possible to know if the results are context specific or not and if these results are more general and there can be a possibility that it also counts for other cases. Therefore, a multiple case study is viewed as a more robust approach in comparison with a single case study (Yin, 2009).

However, in the high amount of detail is a risk. There are no routine procedures to conduct this kind of research. Also a multiple case study takes a lot of resources and time. Furthermore, the problem of external validity can be a barrier (Yin, 2009). This can be a barrier because the research is conducted at a specific time and specific place and therefore makes it hard to generalize to other situations. Through the multiple case study, which gives both a historical overview as well as case specific information which can be generalized, if necessary, because a comparison is made between the different cases. These reasons make possible that through a multiple case study generalizations can be made and will give strong results.

3.2.3 Case Selection

The cases that are studied will be selected based on the following criteria:

- Municipalities that differ in size in the hope to that it will lead to stronger results and because comparison between different sizes is expected to cover a wider scope of reality.
- Municipalities that have explicitly some form of urban redevelopment or transformation. The reason for this is the assumption that more information can be gathered when municipalities are actively involved in urban redevelopment or transformation.
- Large and complex projects that deal with urban redevelopment and/or transformation.
- Projects are selected that are still in development, because more information can be gathered and the topic is not biased by time.

After consultation with employees within the company, a thorough analysis of all the projects that the internship company had on the basis of the criteria that are mentioned above and the consideration of resources and time the following two cases are most appropriate for this research and have therefore been selected for the multiple case study:

Table 2: selection of the cases

| Case Area | Municipality | Kind of project | Start-end |
|----------------|----------------|---|-----------|
| ScheldeVesting | Bergen op Zoom | Transformation of industrial area into a neighbourhood with 3700 houses. | 1995-2026 |
| Waalsprong | Nijmegen | New housing development that should result in a neighbourhood with 14.000 houses. | 1996-2029 |

In addition to scientific articles, policy documents of the selected cases are studied that were available to the researcher, specifically:

Nijmegen

- Gemeente Nijmegen (1996)- Structuurplan Land over de Waal
- Gemeente Nijmegen (2003)- Voorkeursmodel Waalsprong
- GEM Waalsprong (2013)- Ontwikkelingsstrategie Waalsprong 2013
- Van der Krabben en de Feijter (2014)- Slag om de Waalsprong

Bergen op Zoom

- Gemeente Bergen op Zoom (2011)- Ontwikkelpaan ScheldeVesting
- Gemeente Bergen op Zoom (2012)- Eindrapportage werkgroep Bergse Haven
- Gemeente Bergen op Zoom (2013)- Ontwerp bestemmingsplan Nieuwe Haven
- Van Overmeeren (2011)- Twee geloven op één kussen- vroegtijdige beëindiging van PPS joint venture bij gebiedsontwikkeling

These documents will be analysed with highlighting the most important things for the scope of this research. This marking is done by analysing what the (historical) context is of the case, how flexible the plans are in terms of complementarity and competitiveness, how rigid the plans are in terms of cohesion and compatibility, how the balance between these factors is and how it will be maintained over time, if there is a vision for the long- and short-term, if the plans are divided in sub-plans and how they relate to each other. Furthermore, if and how adaptive strategies for different development paths are built in into the plans. That resulted in marked policy documents ([see appendix A](#)) that helped for the argumentation of chapter 4.

3.2.4 Interviews with experts

In addition to the literature review, analysis of the policy documents and as part of the multiple case studies, (semi-structured) interviews are conducted with plan makers/project leaders of municipalities, corporate stakeholders and from consultancy firms that were involved during the planning process ([see appendix B](#)). This in order to understand the rationale behind the plan making and also to gather extra information that is not clearly mentioned in the policy documents, for example reasoning behind statements that are made in the policy documents. Public and private is incorporated to cover both sides of the spectrum. Each of the interviewees will be experts in the field of strategic planning for redevelopment or transformation areas. The spatial planners and project leaders from the municipality will be active officials. The experts working for private sectors will be employees of consultancy firms in urban design or urban planning and have a share in the case study area and are familiar with urban redevelopment or transformation. The interviewees were contacted via the internship company and were further contact by mail and telephone.

Furthermore, the questions of the interview will be linked to the theory ([see appendix C](#)) and therefore it will make the analysis of the interviews manageable to do, the operationalisation between theory and practice is possible and will give results that help to answer the main question of this research. Also this makes a comparison between the cases more applicable. Therefore is expected that a comparison produces stronger results than if there could not be made a comparison.

The interviews will be analysed through the following key words and if the key words can be found back in the answers that will be given, not exactly the same words of course: **teleocracy**; future oriented, forecasts, shaping devices, **nomocracy**; abstract rules, general rules, relational rules, all options open for the future, **multi-layered view**; network of public/private stakeholders, macro level, meso level, micro level, **self-organization**; information spreading, collective behaviour, individualistic dynamics, **co-evolution**; positive feedback, negative feedback, path dependence, lock-in and looking for the balance between **dynamics** in terms of competitiveness and complementarity and **robustness** in terms of cohesion and compatibility.

In order to guarantee the transparency and authenticity, all interviews are (of course with the permission of the respondent) recorded, literally transcribed and marked according to the keywords mentioned above.

3.3 Other research techniques

Of course there are a lot more research techniques than are used in this thesis, for example focus groups, field research, participative observations, survey and GIS. Focus groups, participative observations were not used in this thesis because of the time and resources that were available for this thesis. Furthermore, because of the relative distance between where the thesis was written and the location of the case study areas. However, for future research it is recommendable to stay, if possible, in the area that is under study in order to organise focus groups, doing field research or participative observations. In this way situation specific data about the cases can be obtained. Moreover, GIS could be used for studying the transaction revenues and costs within the area development. However, that kind of information does not bring added value within the scope of this research. Therefore, GIS was not used for this particular study.

3.4 Positionality

It is important to position yourself as a researcher. This is because you are biased by the university where you are following your education, by the teachers who educate and by the people you interact with during your education (Bourke, 2014). For a part this can be obviated by a critical attitude towards everything what is told to you. Not in the sense that everything that is educated is questionable, rather by asking questions and being open to different opinions. Specific for this research that attitude helped also. I tried be as critically as possible but at the same time being open to different and sometimes conflicting opinions in order to bring the thesis to a higher level. Sometimes that is difficult because you read a lot about the topic, however through listening to other opinions from experts in the field new and refreshing insights can be conducted. Rather than always rejecting everything that another person says.

Moreover Bourke (2014) comes with the concept of insider/outsider. Where he sees an insiders as someone who is actively involved with the topic under study and an outsider someone who is not actively involved, however has something to do with it. In this thesis I was an insider because I actively studied the cases and was part of the internship firms that dealt with the cases. Therefore it is important to continue reflect on the research process. This was done by continues critically reflecting with supervisors, colleagues and fellow students how they thought about this subject and to critically look at the thesis.

4. A Multiple Case Study on the resilience of plans for urban redevelopment and transformation

This chapter will discuss the results of the multiple case study. The municipal organizations of Nijmegen and Bergen op Zoom as well as the private parties who involved in the plans are assessed through the conceptual model on the plans of the Waalsprong and the ScheldeVesting. This in order to answer the following research question: *Which requirements are met in the cases of the Waalsprong and ScheldeVesting and what are the differences between the Waalsprong and ScheldeVesting in their approach for redevelopment or transformation plans?*

Case 1

Waalsprong



| | |
|-------------|--|
| Location | Nijmegen |
| Inhabitants | 172.100 (Gemeente Nijmegen, 2016) |
| Acreage | 57,60 km ² |
| Case | Waalsprong |
| Acreage | 1300 ha |
| Actors | Gemeente Nijmegen, inhabitants |
| Goal | Economical use of scarce space, strengthening the identity of the area and a mixed-use of the area |

4.1 Case 1: Waalsprong

This paragraph discusses the first case study of this thesis. It aims to reveal how the spatial planning is conducted with regard to the conceptual model that will help to understand the area development in the Waalsprong area in Nijmegen. Firstly, the case area will be introduced and the context will be discussed. Secondly, the plans for the Waalsprong will be assessed based on the conceptual model. Lastly, lessons learned concerning the barriers, challenges and chances for a more resilient urban environment will be presented.

4.1.1 Context of the Waalsprong

The Waalsprong area is situated at the northern part of Nijmegen north of the Waal. The area consists out of the old town of Lent and lies in between Oosterhout and Ressen. Through the Waalsprong goes the N325 which is connected to the A15 (see figure 9).

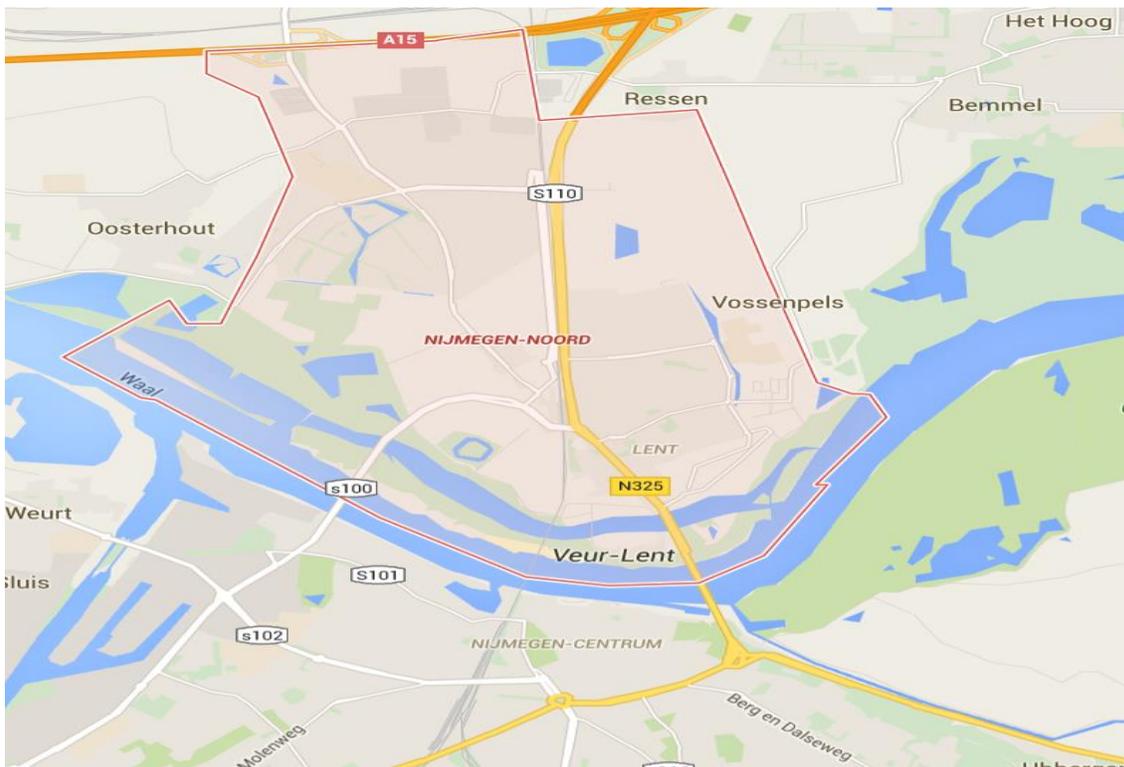


Figure 9: Waalsprong area

The Waalsprong is an area close to the highway and close to the inner-city of Nijmegen. This gave an ideal opportunity for the national government, the municipality and project developers to initiate a large-scale project with a mix of residential- and business functions.

In 1996, the first structure plan- *Land over de Waal*- for the Waalsprong was made. In this plan the spatial vision was determined (Gemeente Nijmegen, 1996). The city council formulated four strategic tasks as starting points for plan development; *Horen bij de stad, Wervende woonmilieus, Groeien in stappen and Duurzaamheid*. This resulted in a partnership agreement between the municipality and five project developers in order to realise, in a period of 20 years, the plans that are presented in the structure plan (Gemeentelijke Rekenkamer Nijmegen, 2012). This caused later on a lot of inflexibility. Active land acquisition policy was purchased, which resulted in 97% ownership of the land by the municipality (Van der Krabben & de Feijter, 2014), and therefore a lot of cost were made before it was even sure that all the land that was purchased, was going to be developed. As a consequence of the partnership agreement there were some regional developers which were not participating in the partnership who themselves strategically purchased land, so that the municipality had to cooperate with these developers as well (Needham et al., 2000). This resulted in *rigidity* because all the land was purchased before something was developed. Moreover, not all the land can be developed in for example 5 years, as the municipality also knew. In other words large investments were done in front and no earning are guaranteed. Also called the '*bathhtub effect*' (Interview with a professor of the University of Nijmegen, 2016).

Although at the moment 4.500 houses are realised in the area, several *(un)foreseen external problems* caused delays or readjustments of the plans. The first unforeseen external problem which caused a large delay was the fact that the municipality had to make a new Environmental Impact Report (EIR, in Dutch; MER). As a consequences of the new MER that had to be made, in the period from 2000-2003, the development of the area came to a standstill (Van der Krabben & de Feijter, 2014). Moreover, in 2003 the plans for the development were changed because of political intervention. It was decided not to build residential park Ressen. The second delay in the building plans was caused by the decision of the national government to relocate the dike. This forced the municipality to wait with the developments of areas that were close to the dike after the determination of the PKB of Room for the river. This forced the municipality to make in 2007 a new development image. However, the focus was still *on blueprint planning* which foresaw a large need of housing. In terms of the conceptual model, the focus was still on aspects of *teleocracy* and the *robustness* of the plan. The third delay was caused by the air quality of the main road infrastructure. For a decent spatial foundation for a zoning plan for the Waalsprong there had to be made a decision about the main infrastructure concerning the air quality. As a result, in 2006 the building of the Waalsprong was delayed because there was no final zoning plan. In 2007 the main infrastructure and the associate MER were determined. As a result the production of the zoning plans for the Waalsprong started again. These *(un)foreseen external problems* illustrate that the *flexibility* of the plans was not appropriately taken into account or as an interviewee (2016) said: "We were not appropriately prepared to deal with such changes".

What caused more inflexibility than the public-private partnership was the land exploitation. Firstly, there were two land exploitation companies. One company was owned by the municipality and the market parties together for the acquisition of the land and development of housing (called GEM-Grex). The other company was owned by the municipality for the development of the areas for businesses, institutes, special goals, the landscape zone with water and green and the above neighbourhood facilities

(called Gemeente-Grex). For two reason the division into two Grex's is strange. Firstly, the plan is presented as an integral area development, however the Grex's are divided.

Secondly, the problem with this is that the majority of the costs were made in the beginning phase of the plan while the revenues are realised in a later phase. Especially in this case large investments were made to purchase the land and no revenues were gained. What would be a better option with this kind of large integral area development is to cut the cost into smaller parts and first realise revenues for a particular sub-plan. This will help in order to build in more *flexibility* with regard to the financial part of the plan and also to better react to changes that are (un)foreseen. This can also help in balancing the dynamics with the robustness of the plan.

4.1.2. Awareness after the crisis

The situation after the crisis has again created the urgency for a revision of the plans for the Waalsprong. After the recent crisis in 2008 there was a large decrease in demand, the value of houses decreased and there was an enormous decrease in the housing production. In the beginning was the hope that the crisis soon would be over. However, after a while the municipality of Nijmegen realised that a total revision of the plans was necessary. They came with a new development strategy for the Waalsprong in 2013. In this strategy a *flexible and organic approach* is aspired. Besides, phasing of the plans is still necessary. The plan consists out of several sub-areas which will be further developed. Much of the sub-areas are in the phase of vision development. In this vision development the following 10 points were important for the municipality (GEM Waalsprong, 2013); the *robust framework* will be intact, development is going to be demand driven, stimulation of *organic and diverse building* in sub-areas, the plans will be in line with the principles of the land-exploitation, connection of the phasing to existing structures and facilities, , spatial quality, shortening of the time between planning and development, alignment of the Waalsprong with other competing living environments and a more *global and flexible framework* through ambition documents and land-use plans. In the past the municipality exactly prescribed what has to come where. Through the flexible framework that is no longer the case.

With regard to the urban ambitions nothing has changed because these were already good and flexible. Also the way in which the citizens are involved has changed in a positive way in Nijmegen. The changes of the plans of 2007-present with regard to the plans of 1997-2007 will be presented in the following table:

Table 3: Differences in ambitions, flexibility and role end user between the plans based on Gemeente Nijmegen (1996), Gemeente Nijmegen (2003) & GEM (2013)

| | Plans in the period 1997-2007 | Plans of 2007-present |
|--|--|---|
| Urban ambitions | Ambitions as ‘belong to the city’, ‘sustainability’, ‘growing in steps’ and ‘creation of canvassing living environments’ were important. | The current ambitions still advocate for a mosaic of residential areas, growing in steps and sustainability. |
| Flexibility concerning future changes | A master plan was made with a really detailed urban integral plan and a visual quality plan. | The development strategy gives clearance about the course until 2028 and is at the same time globally and flexible enough to react to, unknown and unpredictable, changes. This will be done through flexible frameworks in the form of ambition documents. The focus is on the power of the (current) strength of the area and the dialogue with the citizens. |
| Role end user | Market parties and municipality determined in large amount the detail what kind of houses should be built through the blueprint. | It is about organic area development, with an open ended process without blue print. Developers involve end users at the front of the process. |

4.1.3 Dynamics: complementarity vs. competitiveness

In the previous section the context of the Waalsprong is discussed. This showed some useful insights, namely a historical overview, how the flexibility was arranged and what (economic, political or social) factors played an important role in the (revision of) plans. In this part the case will be further discussed based on the conceptual model. In this model it showed that for a redevelopment or transformation plan towards a resilient urban environments it is important to have the right balance on the dynamic side between complementarity and competitiveness and to have the right frameworks instruments. This is also the case for de Waalsprong. In 1996 the plan for the Waalsprong was very detailed. Everything was focussed on the centre of the Waalsprong. As a result the urban plan was *complementary* in the sense of widely accepted qualities and an added value for the city of Nijmegen and the villages of Lent, Oosterhout and Ressen. Furthermore, there were factors that should guarantee the *competitiveness*. Namely, variation in building density, variation within the social sector and private sector, percentage private ownership (particulier opdrachtgeverschap), availability of services and the accessibility of the area (Needham et al., 2000). However, in the high amount of detail of the urban plan of 1996 lies also a risk. For example, when something changes which was (un)foreseen the complementarity and competitiveness of the plan will be directly harmed and the balance, that was already not appropriate, will then be lost. In other words, because of the high amount of detail of de urban plan for the Waalsprong the adaptive capacity to react to changes is low.

In 2003 the urban plan was revised amongst other things due the insufficient balance. Existing structures and qualities of the area determine the plan development. For example, the existing structures of the floodplains, field ways and old streams were taken into account in the plan making process (GEM

Waalsprong, 2007). Furthermore, the centre is direct towards the Waal. The reason to do this was to *complement* to the existing city. In this plan it is clear that attention is paid to the complementarity to the existing city. Also the complementarity between the different sub parts in the Waalsprong is achieved in this plan. In terms of competitiveness a strong mixture of functions is achieved. This to get areas that are typical for a city or a village (Gemeente Nijmegen, 2003). The mixture of the different functions should also achieve a liveliness of the area. However, still the strategy is based on blueprint planning (*an example of a patterning instrument*), which hindered the flexibility to deal with (un)foreseen changes and which will also hinder the balance between the complementarity and competitiveness.

In 2007, due to the relocation of the dike the municipality decided to make a new development vision for the Waalsprong. Still the focus was on blue print planning. However, one carefully tried to experiment with different plans and with the diversity of the housing areas in order to *respond to the actual market demand*. Rather, they still believed in a high need for housing and the continued pressure on the housing market. This was translated in 1000 houses per year to be realised. Also a large new citadel had to be created which had to have the same identity as the inner city. Although there was an attempt to experiment with *dynamics*, or in other words framework instruments, in the plan the focus was still on the blue print. So on the one hand it is tried to be more dynamic and on other hand is adhered to the blue print idea. These are two ideals that collide with each other, namely to be flexible on one side and at the same time to stick to blueprint planning. In other words the balance between the complementarity and competitiveness was not optimal in order to have a plan that can react to changes that are (un)foreseen. Furthermore, the balance between framework instruments and patterning instruments was also not optimal.

In 2008, the recession hit in and caused major decline of building, major decline of the housing market, major decline of the housing prices and the demand declined. As a result the plans for the Waalsprong had to be revised because of insufficient flexibility. An example of insufficient flexibility is the way is invested in the land exploitation. First all investments were done, before even benefits were made. This made it hard to adjust for the land exploitation. Also the blue print characteristic of the plan of 2007 didn't help with reacting on this radical change, because still the *robust* and *teleocratic (patterning)* aspects of the plan were predominant.

This change resulted that in 2013 a new plan was presented which was focused upon *organic developments* and a *global* and *flexible* development strategy. Space was created for *temporary use* of space. Which are all *nomocratic* and *dynamic* aspects. Also there was made a ground exploitation for the whole area instead of two different ground exploitations (GEM Waalsprong, 2013). The organic development and the global and flexible development strategy also helped in the contribution towards a more balanced dynamic approach in which the complementarity and the competitiveness of the plan are more in balance. The factors that there was one GREX and a global and flexible development strategy, which can lead *as a guidance* during the development process, helped for the complementarity of the plan. The factors of organic development and that the plan was global and flexible caused that there was also attention for the competitiveness of the plan. Namely, when a site is ready to be developed the details will be elaborated (*a framework instrument*). Besides that there is also a strong vision (*a patterning instrument*) for the sub-areas that are not yet ready to be developed so that developers know what the direction will be for the area. Therefore, there is more an appropriate balance in this plan of 2013 than was

the fact with the previous plans. An example of this is the difference between the plan of 2007 in comparison to the plan of 2013 (see figure 10).

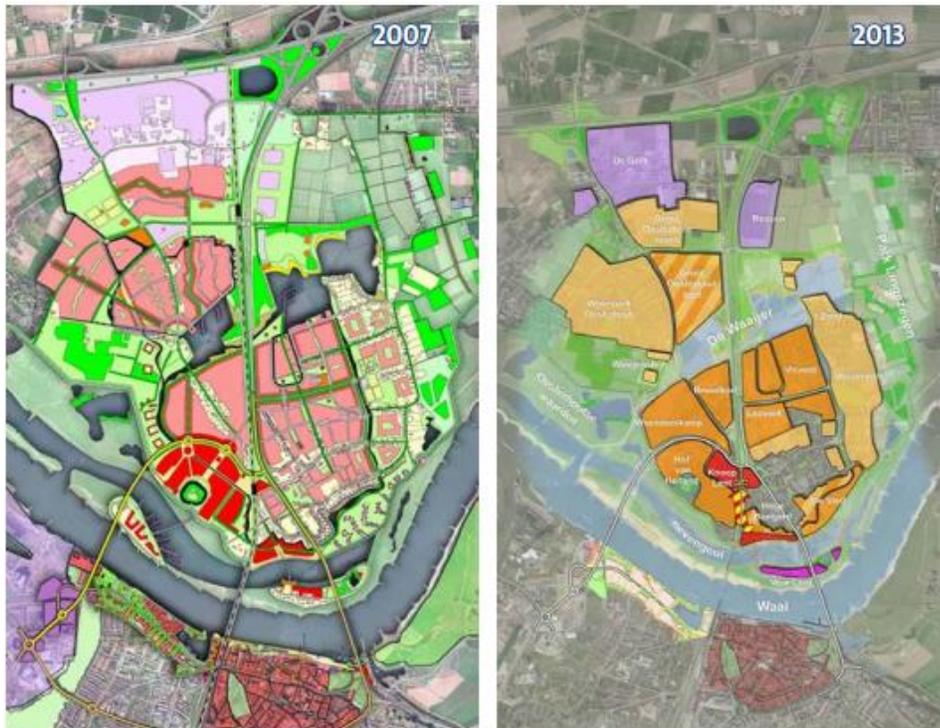


Figure 10: structure plan of 2007 vs. 2013 (source: van der Krabben & de Feijter, 2014)

Furthermore, the municipality and the project developers try to be as flexible as possible both in the planning process as well as in the development process. This in order to respond to current market trends. One way to do that is by making smaller zoning plans for the areas that are under development (interview with consultant, 2016). On the level of the whole area, the municipality tries to have flexibility through the scale of the Waalsprong. Because of this economy of scale the municipality is able to quickly switch between the different sub-plans. For example, when a development in a certain sub-plan slows down or stagnates, there are other sub-areas where development can take place. In that way the municipality is able to react to changes and can afford that in a certain area the development slows down or stagnates (*an example of a framework instrument*).

What is also of importance for the flexibility, or the *dynamics*, of the plan is to have a good risk analysis when the plan is made (Interview with consultant, 2016). Of course not every risk can be controlled, some risks have to be accepted or are simply 'unknown unknowns'. However the risk analysis gives a guidance how to deal with the complexity and uncertainty of the plan and how to manage these (*an example of a patterning instrument*). In the Waalsprong the municipality did the risk analysis by means of the Monte Carlo analysis. In this analysis the area development is simulated over 10.000 times which will give a certain amount of bandwidth. These risks are linked with control measures (Interview with consultant, 2016). This analysis contributed to the flexibility, because spatial planners know largely what the risks are and what *control measures* they have to react when the risk gets effect on the project. What is unfortunate is that this particular risk analysis is that the emphasis is on the financial side. On the one hand that is logical because the pressure is on the financial side, because of the high amount of ground that the municipality owns. On the other hand, there are other aspects that are important.

Namely; political/administrative, legal/regulatory, technical, organizationally, geographical, spatial and socially. A method that takes into account these aspects into account is the RISMAN-method. This risk-analyses can be coupled with a number of scenario's which describes *different development paths (an example of a framework instrument)* (interview professor of Radboud university, 2016).

For both the risk-analyses and the scenario's it is important that beforehand there is a good discussion between the municipality and stakeholders (national governments, regional governments, investors, project developers and citizens) to have an idea what is wanted and to see if the plans that were made are feasible (Interview with consultant, 2016). Furthermore, during the plan development and the area development it is important to stay in the discussion, in which dilemmas are appointed, with the stakeholders and to actualise regularly the plans for (market)developments that take place (Interview with consultant, 2016). About this there should be frequently reported so that the transparency is guaranteed to the municipal council and the stakeholders in order that they can follow the steps when something is done good or bad. This brings also a kind of sense of reality. This says about the complementarity versus competitiveness that a good risk analyses is appropriate to be on the one hand complementary by taking all the aspects into account and to have the appropriate control measures to be able to react (better) to (un)foreseen changes and thus stay competitive.

The following paraphrase strengthens what is discussed in the previous paragraph; "So it's more how we organize the process that we try not to take too many steps at a time and keep the zoning plan very abstract... So we try to find the optimum of how you can take care of the maximum freedom for the market or to be able to respond to market developments at least, because we ourselves are there to carry on the direction." (Interview with consultant, 2016). Also the interviewee indicates that it's important to phase processes, to find the balance in how flexible a plan can be, and what kind of framework instruments can be used in order to be resilient.

Lesson for an appropriate balance between complementarity and competitiveness

The lesson that are important to achieve for a balance that is appropriate to react to a (un)foreseen change is to have on the complementary side a good GREX for the whole area, a guiding global and flexible spatial planning and development strategy. On the competitive side it is important to have a global and flexible plan that is not prescribed in detail and through a good risk analyses having the appropriate control measures. These two factors can ensure that there is a possibility to be competitive and to stay competitive when there is a (un)foreseen change. As the interviewee said, the plan making and development is always a process of finding the appropriate balance. Also in using patterning and framework instruments for a specific place and time.

4.1.4 Robustness: cohesion vs. compatibility

In the previous section for the case of the Waalsprong it is discussed what is an appropriate balance between complementarity and competitiveness for a planning approach towards a resilient urban environment. In this section will be discussed what is an appropriate balance between cohesion and compatibility for a planning approach towards a resilient urban environment. In 4.1.5. these two balances will be brought together to come with a synthesis for an appropriate balance between dynamics and robustness.

On the robust side, for a plan it is important to have the balance between cohesion and compatibility. In 1996, the plan was very detailed and as result a lot of attention was paid to the strength of the internal

relationship, in other words the cohesion, of the Waalsprong itself. So, the cohesion within the Waalsprong was good. However, the plan of the Waalsprong was very self-centred (Van der Krabben & de Feijter, 2014). This appeared from the fact that the shopping centre of the Waalsprong was directed inwards and had no connection with the city of Nijmegen, which resulted that the cohesion with other parts of the city remained underexposed. The compatibility of the plan was not taken care of because the plan was so detailed in what kind of housing should come where and how it should look like. In other words, other economical functions within the plan could not be fit in because the plan was so detailed. The high level of detail hindered the compatibility because when something changes, (un)foreseen, it is harder to change the plan without having a large impact on the area as a whole than when there for example only a framework that guides the development in the area. In this plan the patterning instruments dominated.

In 2003, the largest change in the plan was the repositioning of the centre of the Waalsprong towards the Waal and therewith more towards other parts of the city of Nijmegen. This resulted in a much *stronger relationship* with these parts of the city. The other parts of the Waalsprong were also adjusted so the *cohesion* within the Waalsprong self was also remained. The cohesion remained because the municipality changed the structure in that way that both the link with the Waalsprong itself and the inner city of Nijmegen were strong, both instinctively and according to the plan for the Waalsprong (Van der Krabben & de Feijter, 2014). However, the balance with the compatibility was nowhere to be found because the plan was still very detailed and not much is arranged to have options for the interchangeability of economic functions. Precisely the interchangeability of (new) economic functions is a chance to keep the area vital and to react to changes that are (un)foreseen.

In 2007, another revision of the plan was made which caused for a better balance between the coherence and the compatibility of the plan. This was foremost done by creating more diversity in the zoning plan. Furthermore, the housing supply was better able to respond to the market. However, the plan was still blue print oriented (*an example of a patterning instrument*) and therefore not enough attention was paid to the compatibility to have an appropriate balance between cohesion and compatibility over time. This was shown when in 2008 the financial crisis hit in, an unforeseen change. All the predictions and goals to be achieved that were expected before the recession were no longer achievable and the plan had to be revised. When there had been an appropriate balance a total revision had not been necessary.

The result was that, in 2013, the plan for the Waalsprong was radically changed. This change benefited the balance between the cohesion and compatibility of the plans. This was because the plan still had a strong vision (*a patterning instrument*), but was at the same time more global and flexible. Still there was attention for the cohesion between the different sub-parts of the plan because there was an overall (global and flexible) plan for the whole area. Besides, also more attention for the interchangeability of different functions (read compatibility) because the plan was more global. Global in the sense that there is a framework for the whole area and for the sub-plans, but the details of a sub-plan will be determined at the moment when it is clear that the sub-plan will be developed. What for the whole area then should be ascertained are the spatial integration and the supporting infrastructure.

Another aspect that contributed to the robustness is the risk analyses (*a patterning instrument*) and the market research that has been done beforehand the development strategy was presented. In this way the municipality tried to underpin their choices and to make things sure that can be known in front. Furthermore important is to accept that there are uncertainties however be prepared and leave things open

for the future (*aspect of a framework instrument*) (Interview with consultant, 2016). In the plan this was done by taking control measures where possible, make a robust framework that can guide the development of both the Waalsprong and the sub-areas within the Waalsprong and be as flexible as possible where control measures were not a solution. This makes other aspects of the plan less complex and the plan more robust. Also in this sense there will be an appropriate balance between the framework instruments, important when considering *nomocracy*, and the patterning instruments, important when considering *teleocracy*.

One of the interviewees stated it like this; “I think you should just accept that there are uncertainties. Also this means that you must have a degree of flexibility in your plan” (Interview with consultant, 2016). Continuous monitoring on the financial aspects but also about the quality of the plan is thereby highly important. That is built in in the plans through the risk analyses and a global framework as guidance for the development of the Waalsprong and the sub-areas within the Waalsprong.

4.1.5 Concluding remarks

What can be learned for plan making toward resilient urban environments from this case are four fold. Firstly, the large investments that were done in the beginning of the project which directed the municipality in a way that there was a constant pressure to develop. What has been found a more appropriate way to do, is to cut the costs and first get some revenues from smaller projects in order to be more flexible on the financial side. Secondly, in the beginning of the vision development the plan was way too detailed for a time period of 20 years. What should have been, also considering the time period of the plan, a more appropriate option is to have a more global, flexible vision which guides the (organic) developments within this plan. This is what the current plan is trying to do through a good risk analyses before the plan was made (*a patterning instrument*), a thorough discussion with the stakeholders to get a feeling what is wanted and what is feasible and with a global, flexible development plan which is further developed in sub-areas to keep the flexibility and which also facilitates organic developments (*a framework instrument*). Thirdly, during plan making it is important to continuously be in discussion with the stakeholders, because these are the people which provide the support and make it possible to develop the area. Foremost on the area level with investors, project developers and citizens. Thereby continues monitoring of the plan itself and the market situation to see if the plan is still feasible is important. Finally a good risk-analyses, not only on the financial side where the emphasis is on at the moment, but also about the political/administrative, legal/regulatory, technical, organizationally, geographic/spatial and socially. One method that does this is the RISMAN-method. This RISMAN method has to be combined with having in mind that not everything can be foreseen and therefore there should be space in the plans how to deal with complexity of non-linear changes, urban systems and regulations and uncertainties of economic development, (political) decisions and citizens’ behaviour. This can be done to have an appropriate balance between dynamics and robustness and thereby an appropriate balance between the framework and the patterning instruments, which could support a more appropriate balance between the robustness and dynamics of the plan.

Case 2

ScheldeVesting



| | |
|-------------|--|
| Location | Bergen op Zoom |
| Inhabitants | 66.320 |
| Acreage | 93,13 km ² |
| Case | ScheldeVesting |
| Acreage | Unknown |
| Actors | Gemeente Bergen op Zoom, project developers and inhabitants |
| Goal | Significantly improve the spatial, economic and social quality of the area and restore the historical connection between the city and the water. |

4.2 Case 2: ScheldeVesting

This paragraph will discuss the second case study of this thesis. It aims to reveal how the plan making is conducted with regard to the conceptual model that will help to understand the area development in the ScheldeVesting area in Bergen op Zoom. Firstly, the case area will be introduced and the context will be discussed. Secondly, the plans for the ScheldeVesting will be assessed based on the conceptual model. Lastly, lessons learned concerning the barriers, challenges and chances for a more resilient urban environment will be presented.

4.2.1 Context of ScheldeVesting

The ScheldeVesting area is situated at the west side of Bergen op Zoom and it contains a former industrial area which is now called the Nieuwe Vesting, the old harbour channel, the Waterschans, the Spaensche Scharen, the Geertruidapolder and Kijk in de pot (see figure 10).

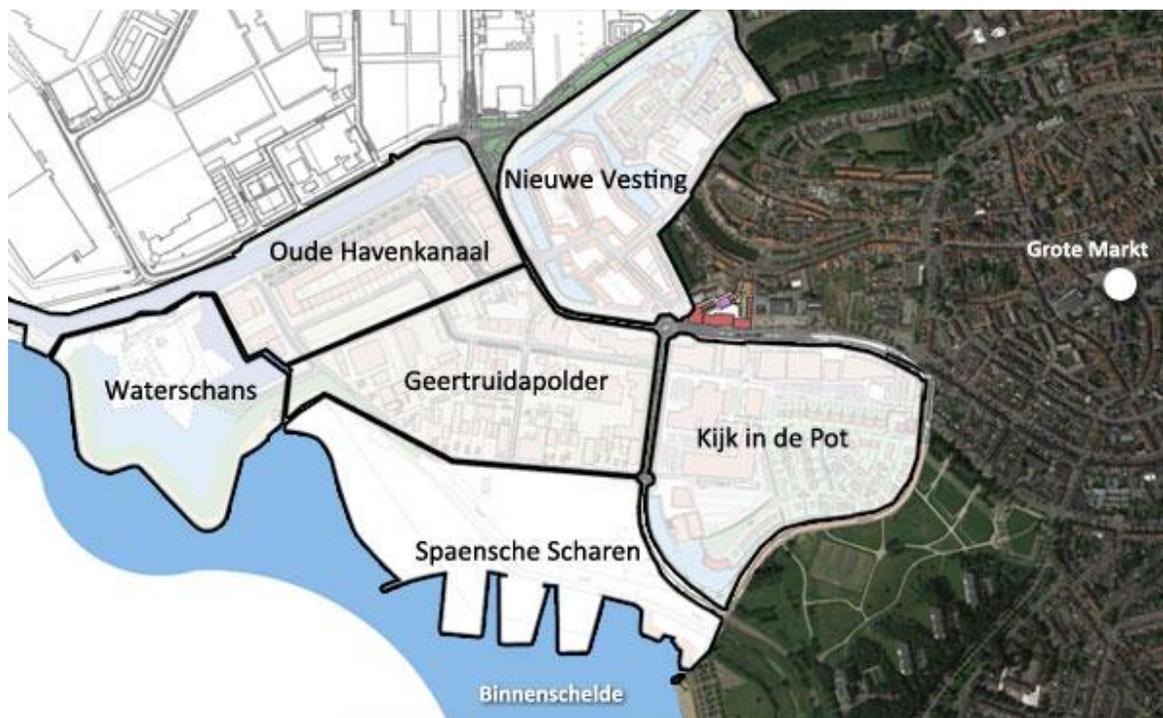


Figure 11: ScheldeVesting area(source: [scheldevesting](http://scheldevesting.nl))

The first vision development about the redevelopment of the area was around 1995 with the creation of the framework vision. The goal of this vision was to strengthen the spatial-, economical-, social- and ecological structure of Bergen op Zoom (Overmeeren, 2011). Subsequently, in 2001 a long-term vision for the area was made. The following goals had to be realized; 4000 houses had to be built, restoration of the connection between the city and the water, transformation of the old industrial area with the relocation of the alcohol producer Nedalco, open connection between the Binnenschelde and the Zoommeer, improve the water quality and the realisation of a marina. As can be read this plan vision was really detailed in terms of how many houses and how the houses, restoration of the connection, transformation of the industrial area and the open connection of the Binnenschelde and the Zoommeer should look like (see figure 12).



Figure 12: Masterplan Bergse Haven (source: [soetersvaneldonk](http://soetersvaneldonk.nl))

In 2004 the Master plan Bergse Haven was determined and in 2005 the framework plan was made. Almost like a kind of blue print plan with a high amount of detail on what houses should be built and how it should look like (see figure 12). After the framework plan was made, in 2006 the municipality, Amvest and AM founded the GEM Bergse Haven BV. These partners made the following appointments; an intention agreement, a cooperation agreement and a land exploitation or realisation agreement.

There are several reasons for the establishment of the public private partnership (Overmeeren, 2011):

- Size and complexity of the project were big for a municipality as Bergen op Zoom.
- Knowhow at the moment of plan development.
- Knowledge, experience and creativity of the market parties.
- Sharing of the financial risks.
- Restrict the liability of the municipality.
- Public private partnership was also stimulated from the national government.

The above points give the impression that through this partnership the right way was chosen. However, from the beginning there were tensions between the municipality and the private partners. Firstly, the budget was not conclusive. Nevertheless, the partners thought that with other projects they could make the revenues to compensate for this plan. Secondly, the establishment of the GEM and the making of the plan took 3 years, from 2003 till 2006. In 3 years a lot of things can happen and change. Thirdly, during the development of the plan, which consisted out of different sub-plans, the partners had different ideas about development details. This is because the municipality has a political responsibility and that market parties do not have this political responsibility. This discussion was really inefficient and caused tension right from the beginning. Fourthly, there was a discussion in how, in which way and how much land should be acquired. Which also caused tensions between the parties. In the meantime, in 2008, the re-

cession hit in, which meant disappointing sales of houses and a decrease in the values. This has a consequence for the pace and the amount of money earned out of this plan which already did not have a conclusive budget.

So, altogether the tension between the market parties and the municipality became too high and it burst. The market parties left the GEM and the municipality was left alone. On the one hand this was the mistake of the municipality because they had contracts with the market parties where it was way too easy for the market parties to leave the GEM. However, there is also a matter of trust. The municipality felt the security of the contract so that the municipality could develop with the market parties. Without trust there cannot be a development. However, the agreements could be tighter for the market parties so that they could not have left that easily or without a scratch.

In 2009 some key figures from both the municipality and the GEM stopped working and were replaced by other people. A new project alderman and a new director of the GEM were assigned. First thing the new director did, was to make a plan of action how to proceed with the plan and development of ScheldeVesting. The strategy was to create a more smart plan which suited within the existing zoning plan, another land price system, revenue guarantees, more possibilities to act in line with the market and to move forward the revenues and to move the costs more to the end. In order to do this first some sub-plans should be realised (Overmeeren, 2011).

In 2011 the plan ScheldeVesting was developed in order to get first some revenues. On broad terms there is an urban vision (*an example of a patterning instrument*). However, the actual details can be modified during the process (*an example of a framework instrument*). The area is divided in sub-areas. In these sub areas the building is phased (Gemeente Bergen op Zoom, 2011). For the most sub-areas this also means that there should come a new zoning plan because the old zoning-plan is not appropriate for the new situation. The new zoning plan(s) can create opportunities to better cope with the uncertainties and complexity the ScheldeVesting has to deal with. A nice example is the zoning plan for the sub-area of Nieuwe Vesting. It is a global/overall zoning plan which sets the main structure but where exactly the houses should come and how they should look like, will be addressed in the realisation plans (Gemeente Bergen op Zoom, 2013).

To give a good overview of what has changed during the period of 1995-2009 with respect to 2009-present in the sense of urban ambitions, flexibility and role end user. The changes will be presented in table 4:

Table 4: Differences in ambitions, flexibility and role end user between the plans based on Gemeente Bergen op Zoom (2011), Gemeente Bergen op Zoom (2013) and Overmeeren (2011)

| | Plans in the period 1995-2009 | Plans of 2009-present |
|--|--|--|
| Urban ambitions | Strengthen the spatial-, economical-, social- and ecological structure through connecting the city with the water and to create a new urban area that is integrated to the current inner city. | The current ambitions still aims for the goals that were set in the period of 1995-2009. |
| Flexibility concerning future changes | A master plan was made (see figure 12) with a really detailed urban integral plan and a visual quality plan. | The development strategy gives clearance about the course and while at the same time being globally and flexible enough to react to (un)foreseen changes. This will be done through flexible sub-plans and overall guiding frameworks in the form of ambition documents. The focus is on the power of the (current) strength of the area and the dialogue with the citizens. |
| Role end user | Market parties and municipality determined in large amount the detail of the type of housing. | It is about area development, with an open ended process without blue print. Developers involve end users at the front of the process. |

4.2.2 Dynamics: complementarity vs. competitiveness

In 2001 the long-term vision (*example of a patterning instrument*) for the area was determined which was really detailed in the zoning, which also hindered the dynamics of the plan. The only implementing actions that were mentioned in the long-term vision about the competitiveness is to transform the industrial area into an attractive environment for living, working and recreation. With regard to complementarity of the plan the municipality mentioned to restore the relation of the inner-city with the water. These are positive aspects. On the other side, moreover because of the high amount of detail, the balance between the competitiveness and complementarity is not mentioned. In other words, how the creation of an attractive living environment is balanced and/or integrated with the restoration of the inner-city was not mentioned in the plan. One of the reasons for this, it was a really stable period with more attention for the stable factors and patterning instruments of the plan and not so much the dynamic aspects and framework instruments of the plan.

As a result of the recent crisis and the change of key figures in 2011, the municipality came with a new development plan for the area called ScheldeVesting. In this plan it is expected that there is no competitiveness with other projects, because it is a unique living environment. Unique in the sense that it is a new housing area close to the city which has the goal to be a part of the existing city. However, the municipality recognize that there is an opportunity that other projects, for example in larger cities in the Randstad but also within the city of Bergen op Zoom, can hinder the development of the project of ScheldeVesting (Gemeente Bergen op Zoom, 2011). Hinder, because other projects may deceive citizens that otherwise would had chosen for Bergen op Zoom or more specifically for ScheldeVesting and then choose to go and live in other (bigger) cities in South-Holland. A *steering group* (an example of a framework instrument) is established in order to assure that the different sub-plans of ScheldeVesting are well matched among each other and with the existing inner-city in order to create an attractive and unique living environment so that people will choose for ScheldeVesting. Therefore, in this way the balance between competitiveness and complementarity is realized in a more appropriate way than before. This was also confirmed in the interviews that there is a steering group who monitors the different project within the municipality so that the projects, including ScheldeVesting, are well coordinated and in this way can be both complementary and competitive at the same time.

4.2.3 Robustness: cohesion vs. compatibility

As can be read in section 4.2.1. the long-term vision and the plan for the ScheldeVesting of 2001 was really detailed. The internal relationship of the plan is ascertained through the high amount of detail. However, the interchangeability of different functions is difficult because of the high amount of detail. What makes it even more difficult for the interchangeability of this project is that ScheldeVesting is solely housing with one business park. However still some compatibility is possible, because there can still be variation in housing. At that moment the cohesion of the plan and the compatibility of the plan were not appropriately in balance, because there was a lot of attention to the internal relationship of the area and not so much attention to the interchangeability (of functions). On the one hand that is logic because it was a stable period and then the attention will be to factors that are important in stable periods. However also in stable periods there should be attention for factors, such as compatibility, that are important in unstable periods. Another reason that the compatibility deserved less attention was because the majority of the plan had the function of housing (interview team manager municipality, 2016) which makes it harder to have interchangeability. However, still attention could have been paid to the variation in housing or the possibility to vary in type of housing, without losing the balance with cohesion.

With the development plan of 2011 the balance between these two factors is better arranged. This is because the zoning plan is more *global and flexible*. In other words, framework instruments became more important where still the cohesion is important but also the interchangeability of functions, in this particular part the housing function, is better arranged. The cohesion will be assured through the steering group which will manage the different sub-plans in order to make the ScheldeVesting as a new neighbourhood of the city and to assure to connection with the city itself. Furthermore, the connection of the inner-city with the water. As earlier mentioned the plan is less detailed and more flexible. Less detailed, because there are sub-areas that are filled in with less detail qua how and what should be build. Besides there is a framework which guides the development (*an example of a framework instrument*). When it is sure that development takes place the details will be further discussed. The flexibility is built in through different sub-plans which will be executed by different market parties and not one market

party for the whole area (Gemeente Bergen op Zoom, 2011). This will bring flexibility because for example when a development in a certain sub-area will delay or even stagnate, developments in other sub-areas still can go on.

Furthermore, the sub-area are projects on their own and that allows that various projects can be realised at the same time without losing the cohesion for the whole area, because there is supervision over the whole area. Furthermore, there is much more interaction with the end user and the projects are smaller. This ensures that it is easier to switch between different (housing) functions and to be more adaptive. That makes the overall plan also more robust. Furthermore, because there is a better balance between the framework instruments and the patterning instruments.

4.2.4 Balance between dynamics and robustness

With the plan of 2001 it was clear that for the long-term vision the focus was mainly on patterning instruments and the robustness of the plan which are important in a situation of order/uniformness. However, the balance between complementarity, competitiveness, cohesion and compatibility was not arranged and through time it can be seen that too much attention is paid to the patterning instruments and the robustness of the plan. This is evident from the fact that when the situation changed and became less stable the plan could not adapt in a way that made it possible to further develop the area. Furthermore, the tensions between the market parties and the municipality became too high. As can be read in section 4.2.2 and 4.2.3, through making the plan on the one hand more flexible, in the sense of have sub-plans and to not prescribe these plans in full detail. In other words by adding framework instruments and more dynamics to the plans. On the other hand also having a robust framework that can guide the development, an example of a patterning instrument. In this way it is possible to have a more appropriate balance between dynamics & robustness and framework instruments & patterning instruments. This is also logic because after the crisis in 2008 the situation is more chaotic and as a reaction to that more attention is paid to the competitiveness and compatibility. The risk then is that one will focus too much on these two factors and loose the factors of cohesion and complementarity out of sight. The balance between the four factors should always be kept in sight and should be addressed for no matter if there is a situation of order or chaos.

Furthermore, during the planning process a risk file was made where two different risk analyses were made. One was the RISMAN method in which quantitative and qualitative aspects are taken into account. However this analyses was too difficult for the city council. Therefore, another risk analyses was made, called IFLO-plus, which was more on the financial aspects and was more understandable for the city council. To the risks control measures are linked (Interview with consultant, 2016). This was one way to manage uncertainties and also to accept some uncertainties that are hard or impossible to manage. As a continuation of the risk analysis, scenarios were drawn that were presented to the city council and the board of Mayor and Aldermen. As can be seen it is important to be transparent about the methods that have been used and to be in continues discussion both the city council and the Board of Mayor and Aldermen as well as investors, project developers and citizens. The discussion with the city council and the board is important for the coordination with the residential vision municipal wide. The discussion with the investors and project developers is important to get a feeling what is desired and to look if the plan is feasible. This combination of a solid risk analyses (*a patterning instrument*) and the scenario's (*a framework instrument*) enables the municipality to have a good balance between dynamics and robustness. This was possible because on the hand the municipality kept open the possibility to be flexible. This was done through making sub-plans and not totally prescribe the plans in detail. While at the same time

there is a good framework, for example through the risk-analyses with control measures, the different scenarios that were made and the overall plan for the area, that can act as a guidance for the development in the area.

4.2.5 Concluding remarks

As can be seen from this case there are obviously two periods. The period before the recession and the period after the recession. In the period before the recession more attention by the (municipal) spatial planners was paid to the factors which were important during times of order and therefore there was not an appropriate balance between the four factors and between framework & patterning instruments. In the period after the crisis the balance between these four and between the instruments was tried to restore. It is not that the municipality uses these four factors themselves in order to come with a good plan. This happens partly subconscious and partly through the team managers that oversee the bunch of projects that are developing in the city.

Another important aspect after the crisis was the risk analyses that were made. These risk analyses helps to better manage the uncertainty and complexity of the plan. Which has shown by that when something change, through the control measures the civil servants know better how to react and developers know , through the control measures, how the municipality is going to react to changes. Furthermore, the transparency to the stakeholders and also the city council helped to get a better communication and therefore to further unease the complexity. Also the phasing of the total plan with thereby the division of the plan in sub-plans helped to better cope with the complexity and made the projects that had to be done within the larger plan less complex. Thereby it is important to notice that not everything can be foreseen so there should always be built in space in the plan for the unexpected.

Communication tends to be one of the key factors in this whole. First of all, the communication within the organisation of the municipality itself, which should ensure that everyone is aligned. For the municipality this is important, because in that way the investors know what the municipality wants and that will attract the investors that are wanted for the plan. In other words, the people from the municipality who have to deal with the area need to have the same state of mind. That means that they communicate in the same way about the project to the outside. Furthermore, by involving project developers earlier in the process prevents tensions and ambiguities later on in the process. Moreover this can help in order to determine decisions, plans and processes that are certain. If the stakeholders and the municipality then have a good view of the things that are certain, the decisions, plans and processes that are less certain or uncertain can be identified and further steps of action can be taken with regard to the decisions, plans and processes that are less certain and or uncertain.

4.3 Enabling and Constraining Factors

In this chapter the enabling and constraining factors for resilient redevelopment and transformation plans will be discussed for the cases of the Waalsprong and ScheldeVesting. In this essence a comparison can be made between the cases in order to analyse what the similarities are and what the differences are. This will be further elaborated upon in table 4.

Table 5: Comparison of factors that enabled or constrained the resilience of redevelopment or transformation plans based on interviews and analyses of the policy documents

| | Waalsprong (Nijmegen) | ScheldeVesting (Bergen op Zoom) |
|----------------------|---|--|
| Enabling factors | <p>Risk analyses both qualitative and quantitative.</p> <p>Global and flexible plan which is divided in sub-plans while at the same time gives guidance for municipality, investors, project developers and citizens.</p> <p>Continuous monitoring of the market and the interested parties.</p> <p>Transparency about the results of the monitoring.</p> | <p>Risk analyses both qualitative and quantitative combined with various scenarios.</p> <p>Global and flexible plan which is divided in sub-plans while at the same time gives guidance for municipality, investors, project developers and citizens.</p> <p>Attention for co-creation in front of and during the planning and development process.</p> <p>Evaluation of the planning and development process.</p> |
| Constraining factors | <p>Risk analyses is strongly focussed on quantitative aspects. That hinders the flexibility sometimes.</p> <p>Complexity of regulations and the relationship between various interested parties.</p> | <p>Employees who are not as flexible as desired by program manager in terms of plans that had to be made or when thinking along in the process of spatial planning for the area.</p> <p>Evaluation is strongly focussed on the financial part resulting in an underexposure of non-financial factors.</p> |

In table 4 there are a number of similarities and differences. Both plans are global and flexible plans divided into sub-plans in order to manage the complexity of non-linear changes, urban systems and spatial regulations and the uncertainties of economic development, (political) decisions and citizen behaviour. The plans have both these characteristics because after the recent crisis it had become clear that a different approach was necessary in order to manage complex and uncertain cases. One way to do that was via a global and flexible plan, which still can guide the development. Both plans had a risk-analysis. However, at the case of ScheldeVesting the municipality combined the risk-analysis with scenarios. The latter is a really useful thing to do, because in that way a combination is made between the quantitative aspects of a risk analysis and the qualitative aspects of the scenario analyses. This will give much stronger control measures compared to when only a risk analysis is conducted. Furthermore, when the control measures are better grounded that the (municipal) spatial planners are better able to appropriately react to (un)foreseen changes.

What the two cases also had in common was that the risk analysis and the evaluation/monitoring was driven by financial (quantitative) aspects and not so much on the qualitative aspects, such as the goals of the plan. The reason is because the pressure is on the financial side. However, the right balance between these two is necessary (Interview with the consultants, 2016), also because otherwise the qualitative aspects of the plan will be underexposed and that will also harm the resilience of the plan itself. Also in times where the pressure is on the financial side.

Other differences are for example that in Bergen op Zoom the employees sometimes had to be stimulated to be more flexible and that was not the case in Nijmegen. Explanatory factor in this can be that in Nijmegen the pressure is relatively high because of the large (financial) investments and interests. Another difference is that in Nijmegen it was hard to keep the overview in all the complex regulations. The factors that played an important role are that in Nijmegen all the land was pursued and it is a bigger project than Bergen op Zoom. That makes it automatically more difficult, also because more risks are at stake and more stakeholders are involved. This was not seen as a constraining factor in Bergen op Zoom.

5. Towards resilient plans

This chapter discusses the conclusions based on the research questions that were stated and on the results that were found doing the case study. Firstly, the research questions will be answered in a brief way and will be linked to the conceptual model. Secondly, a reflection of the conceptual model will be discussed. Thirdly, the lessons learned for the practice will be discussed. Fourthly, there will be a reflection on the research process. Finally, limitations of the research will be presented and possibilities for future research will be suggested.

The goals of this thesis are threefold. Firstly, to find out what contribution to strategic spatial plan making is for transformation/redevelopment areas in cities. Secondly, how to deal with complexity and the thereby coming uncertainties during the process of plan making and development. Thirdly, how to go towards a more resilient urban environment so that the plan, that is made for a redevelopment or transformation area, can react to different development paths that are (un)foreseen. These goals were translated into the following main research question:

How can CAS-based principles contribute to strategic spatial planning in order to strengthen the resilience of strategic redevelopment and transformation plans in cities in the Netherlands?

The research question will be further answered and reflected upon in the next paragraphs.

5.1 Practical challenges and content conditions

As can be read in chapter two of this thesis over time municipality had different approaches from blue print planning in the beginning till public private partnership and bottom up approaches later on. This lead to several practical challenges for municipalities. Firstly, the municipality has to find the appropriate balance between on the hand patterning instruments and framework instruments. Secondly, what approach is appropriate to use will depend on what kind of issue and situation. In the cases that were studied in this thesis, which are complex cases where uncertainty plays an important role, the challenge is how the balance between flexibility and robustness is taken into account in an appropriate way. Thirdly, from complexity theory it has become clear that time is an important factor which has an impact on change that has to be dealt with. Practical challenges are for municipalities to determine what the issue is and how dynamic issues can be handled.

Considering these three practical challenges will lead to certain action perspectives. This led to a few conditions which should be kept in mind when dealing with a complex case. The first that is an important factor is to ensure the balance between teleocracy and nomocracy in order to responding to uncertainty. What the right balance is, is question specific. Some conditions about uncertainty is that it is moment/place specific, change can go from small to big, it is about structural change, approach is dependent on what phase (order or chaos). Out of this came that the right balance between robustness and dynamics. Further specified, the balance between complementarity, competitiveness, cohesion and compatibility.

By studying the different cases three things stand out, with respect to what content conditions are important and what the lessons are for planners and plan making in order to contribute to resilient plans for redevelopment or transformation of urban areas.

Firstly, from the conceptual model it becomes clear that when guiding urban redevelopment and transformation with a global and flexible plan is needed where framework instruments are appropriately balanced. Furthermore, which is also robust in the sense that it can guide the development and takes care of the bigger picture. In order to manage this patterning instruments are necessary. In the conceptual model called the balance between robustness and dynamics. What this means is that the plan has a clear vision, *an example of a patterning instrument*, of what should happen with the area both long-term and short term, but not in the sense that everything is prescribed in detail already. Rather, a dot on the horizon which guides for the following developments. Besides that the plan should be flexible in order to follow different development paths within the guidelines of the plan. One way to build in flexibility, which was also addressed in the interviews and that both municipality did, is through phasing the plan (*an example of a framework instrument*). In others words, subdividing the plan in different projects. One of the reasons that is done because it makes the project less complex and better to manage. However phasing the plan is not the only solution the make the plan more flexible. Beside the sub-plans also flexibility in the land-use plans has to be pursued in order to shift between functions (*an example of a framework instrument*) when it is necessary. What furthermore helps to build in flexibility is to continuous monitor and evaluate during the planning and development process. In this way there can be made adjustments when that is necessary.

Secondly, a good risk analyses in front of the plan making process is necessary, which is a form of a patterning instrument. During the studying of the cases the emphasis was foremost on the quantitative side of the risk analyses. This is one the one hand logical because the pressure is on the financial side. On the other hand in this manner the qualitative side remains underexposed and that is unfortunate. Out of the conceptual model comes that there should be made a balance between the quantitative and the qualitative side by focussing also for example on the goals of the plan and monitor on that aspect. This can be done by splitting up the responsibilities as for example was done in Bergen op Zoom. One team manager is responsible for financial/quantitative side and is the 'conscious' of the team manager urban development which focusses more on the qualitative side of the plan. In this manner a good balance can be created between the qualitative and the quantitative sides of a risk analyses. Also that will help to have a balance between the framework instruments and the patterning instruments. Furthermore, that will help the balance between the dynamics and the robustness of the plan. All in all this helps the resilience of the plan because control measures can be prepared which help to deal with the complexity and uncertainty. Thereby it is important to keep some space for the unexpected. Of course, it is hard to know which the uncertainties are because it is not possible to predict the future. What is possible to do is as good as possible identify the uncertainties and to manage the uncertainties. This requires continues monitoring and good communication. Also the acceptance of uncertainties is one way to deal with uncertainties. On the one hand dealing with the control measures from the risk analyses and on the other hand dealing with uncertainties is always a process of finding an appropriate balance that is context and situation specific.

Thirdly, communication tends to be of importance when making a plan for an area that has to be redeveloped. Communication is also an important factor in the conceptual model. Namely, on the robust side the shared value amongst stakeholders and on the dynamic side integration of the plans. Both require good communication. This means that in front of and during the plan making process stakeholders (investors, project developers and citizens) should be involved. In the beginning this process will require some extra time. However, in the end it will save time and provides more support from the stakeholders that are involved. Furthermore, it is important to be transparent to the city council and the board of Mayor and Aldermen about the progress that is being made during the planning process. This transparency can be guaranteed by continuous insight in what is done and why the steps in the process are made. The transparency makes it easier for the planners and for the stakeholders to know in which direction to go and how to react when something changes, foreseen and/or unforeseen.

5.2 Reflection on the conceptual model

A lot of factors that were considered important in the conceptual model were also considered to be important factors for the (municipal) spatial planners. For example good communication, balance between quantitative and qualitative aspects and that a global and flexible overall plan is needed in order to guide the development and to react to (un)foreseen changes. However, there was one aspect that in both cases was an important factor and that was the risk-analyses. This factor was not taken into consideration in the conceptual model. This is because the focus in the theoretical framework as well as for the conceptual model was about how to manage uncertainties. Furthermore, the theories underneath this framework also focus on uncertainties. However, with a risk analyses the focus is more on factors that are certain or partially known, rather than the '(unknown) unknowns' focused upon in the theoretical framework. Despite the fact that the risk analyses was not mentioned in the theory that was used for this thesis it can deliver useful insight when dealing with complex cases. Namely, through a risk analyses, which not only addresses the financial side but also the qualitative aspects, control measures can be prepared in order to know how to react to (un)foreseen changes. Furthermore, when there is transparency on what the control measures are the other stakeholders know how to respond to (un)foreseen changes and the manageability of a (development) plan for urban redevelopment or transformation is relatively easier. Therefore, the risk analyses, that was not covered in the conceptual model, is despite of added value for the resilience for a redevelopment or transformation plan and therefore worth discussing in this thesis. What furthermore reveals this is that not everything can be covered by scientific theory and empirical research is necessary to grasp the bigger picture. A link between theory and empirical evidence is most of the time necessary when talking about spatial planning, more general social science. A conceptual model can thereby help to function as a bridge, or in other words as operationalisation tool, between theory and practice. However the bridge works also the other way around. This is because of the empirical

5.3 Recommendations

There are some opportunities to solve the barriers that are discussed in the case study section and the conclusion. In this section these opportunities will be translated into three recommendations for spatial planners that can help to go towards a resilient redevelopment or transformation plan. The choice for three is to keep things clear. By these three recommendations it is not said that if these are followed that the barriers that were found during research will be solved. This is because of the relative high complexity and uncertainties that the spatial planners have to deal with during the kind of redevelopment or transformation plans that are discussed in this thesis.

- ❖ Focus on quantitative and qualitative (risk) analyses

In the process of planning for a complex urban redevelopment or transformation having a good analyses, both quantitative as qualitative, is important. One possibility is a risk analyses in combination with scenario studies. The risk analyses can be done in a quantitative way or in qualitative way. Both have their advantages and disadvantages as is discussed in chapter 4 of the thesis. The most appropriate way is to balance the quantitative and qualitative analyses. The RISMAN method is a risk analyses that takes both the qualitative and quantitative aspects into account. Next thing that should be taken into consideration if it is possible to combine the RISMAN analyses with scenario's that are appropriate for the situation.

- ❖ Keep an appropriate balance between dynamics and robustness

The four factors that are also presented in the conceptual model of chapter 2 and further discussed in chapter four, namely; complementarity, competitiveness, cohesion and compatibility, should be taken into account in order to have the appropriate balance in being on the one hand flexible through framework instruments to react to (un)foreseen changes and other the other side being robust through patterning instruments in order to guide the development. One possibility to keep the balance between the four factors and at the same time using framework and patterning instrument can for example be done through making a flexible plan with framework instruments which has a clear vision in which patterning instrument are integrated, which can serve as a dot on the horizon. That is of course the most ideal situation. Because of the complexity and uncertainties that spatial planners have to deal with in situations that are discussed in this thesis, the ideal situation is hard to achieve. However, striving for such a situation can be taken as a starting point.

- ❖ Continuous communication and monitoring the planning and development process

During the planning and development process continuous monitoring if the balance between robustness and dynamics is still appropriate and if there is an appropriate use of framework and patterning instruments for the context in which the redevelopment or transformation takes place is necessary. Furthermore, if the balance is not appropriate how to change that is an important step to take. This requires appropriate communication between the various stakeholders. Therefore, is necessary that the different stakeholders need to know exactly what their responsibilities are. About these results transparency is needed to both the board of Aldermen and the various stakeholders who are involved during the urban redevelopment or transformation. Furthermore, communication is one of the hardest things there is and because of the relative high complexity and uncertainties an even more important point to focus upon. Therefore, continuous communication between the stakeholders and the (local) government is important. This in order to assure that everybody is still working according the same objectives and to avoid misunderstandings. However, sometimes the appropriate balance is missing. This is also logical because we are dealing here with really complex cases and not everything can be sorted out because of the high complexity and uncertainties spatial planners have to deal with. However, whatever the situation is commutation is a key factor, also for the appropriateness of the other two recommendations.

5.4 Reflection on the research process

During the interviews it became clear that the theories that were used in this thesis were not one on one known with the experts. This makes it on the one hand difficult to bridge the gap between what is claimed in theory and how things work out in practice. The role of the researcher in this is to operationalize that and bridge the gap between theory and practice. An example of this was to make concepts and definitions out of theory understandable for the interviewees so that it is possible to react on that and get valid answers. On the other hand in different way aspects as flexibility and robustness are taken into account in the different cases allowing to make the bridge or operationalize between abstract theory and practice. The quality of the research did not suffer under this aspect although sometimes it was difficult to operationalize all the concepts and theories.

This factor was also difficult for translating the findings of the policy documents into the thesis and get the appropriate link with the theory. That is because there is no direct link between theory and the policy documents. The role of the researcher in this was to make sure that the topic itself was appropriately demarcated and that there was an appropriate level of understanding of the concepts and definitions. Through marking the most important thing it is tried to search for (indirect) links between theory and practice. The difficulties of getting a link between theory and practice has not led to a reduction in quality. On the contrary, here lies the power of this research.

5.5 Suggestions for future research

One of the things that were not mentioned in the theoretical framework of this thesis is the importance of the risk analyses in practice. For future research it would be interesting to further study what the relation is between the risk analyses and dealing with complexity and uncertainty and also how the risk analyses can contribute in dealing with complexity and uncertainty in order to go towards resilient urban environments. Furthermore, 2 cases were studied in this thesis. For a further strengthening of the findings in this thesis and possibly to make more generalized statements, more cases can be studied. In this way comparisons can be made between the different cases. This can give more validity or support to the earlier findings. Moreover, enabling and constraining factors that contribute to the resilience of plans for urban redevelopment or transformation can be further studied, because it will give an even better overview of what the enabling and constraining factors are for the resilience of plans when redeveloping or transforming an urban area. This can be done through further literature study combined with case study analysis. This can lead to some further recommendations for municipalities what to do and what not to do when dealing with complexity and uncertainties during planning and development of urban redevelopment and transformation areas.

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Appendix A: Examples of marking the policy documents and articles

The is a representation of the marking the most important concepts and theories of the policy documents and articles. This was done based on the criteria that were mentioned in chapter 3.

Example marked policy documents

Knoppen om aan te draaien

We hebben hiervoor gezegd dat de vraag naar woningen nauwelijks is te beïnvloeden. Maar dat wil niet zeggen dat je 'wonen in de Waalsprong' niet kunt promoten. Dat gebeurt natuurlijk ook al, zowel door de gemeente als door corporaties en marktpartijen, getuige ook het grote aantal borden langs de weg waarop nieuwe woningen en bouwkvavels worden aangeprezen. Met het 'Nijmegen Omarmt de Waal'-programma zijn er goede mogelijkheden om die promotie in de toekomst nog sterker in te zetten.

Misschien wel de belangrijkste knop om aan te draaien voor de gemeente is de fasering van het concurrerend aanbod van locaties voor nieuwbouw van woningen, binnen de regio, maar vooral ook binnen de gemeentegrenzen. Hierbij gaat het vooral om afstemming tussen Waalsprong en Waalfront. De keuze waaraan voorrang te geven is geen gemakkelijke, maar het is wel een keuze die de gemeente in belangrijke mate zelf in de hand heeft. Een andere maatregel met mogelijk veel impact die de gemeente zelf in de hand heeft is de bijstelling van het woningbouwprogramma. Met de keuze voor een bepaalde mix van prijsklassen 'stuurt' de gemeente de vraag naar woningen. Die keuze heeft ook direct effect op de grondexploitatie: bouwgrond voor duurdere woningen levert meer op dan bouwgrond voor goedkopere woningen. Nijmegen heeft onlangs het woningbouwprogramma bijgesteld, dus het ligt niet voor de hand dat op korte termijn opnieuw te doen. Op wat langere termijn kan aanpassing van het programma aan de marktomstandigheden wel aan de orde zijn.

In haar ontwikkelstrategie geeft Nijmegen al aan om op allerlei manieren uitnodigend en faciliterend te willen zijn voor privaat initiatief. Het is een uitdaging om daar ook (nieuwe) bewoners bij te betrekken. In de 'oude' aanbodgestuurde planologie werden de bewoners primair gezien als woonconsument, koper of huurder van een woning. In de 'nieuwe' planologie wordt de nieuwe bewoner uitgenodigd te participeren in de gebiedsontwikkeling. Het

Fasering

Nijmegen ambieert in de Ontwikkelstrategie 2013 een flexibele aanpak en een organische ontwikkeling van de wijken in de Waalsprong. Toch is een fasering van de plannen noodzakelijk. In de eerste plaats is die fasering van grote invloed op het financieel resultaat van de grondexploitatie voor de Waalsprong. In de tweede plaats moeten ontwikkelaars, corporaties, bouwbedrijven en particulieren weten waar ze aan toe zijn. Bij de start van de Waalsprong werd ervan uit gegaan dat realisatie ongeveer twintig jaar zou duren. De Waalsprong zou zo rond 2016 gereed zijn. Die verwachting is in de loop van de jaren geleidelijk aan verschoven. Inmiddels gaat Nijmegen er vanuit dat de laatste woningen zo rond 2029 opgeleverd zullen worden. Het plangebied van de Waalsprong bestaat uit verschillende deelgebieden. In Visveld, Nijland, Grote Boel, Laauwik en Vossenspels zuid worden op dit moment deelplannen uitontwikkeld. Onder andere de deelgebieden: De Stelt, de Waaijer, Hoge Bongerd, Zuiderveld, Vossenspels Noord, Veur Lent, Broodkorf en de Woenderskamp moeten nog worden ontwikkeld. Voor Hof van Holland en Veur Lent is men op dit moment in de fase van visievorming en oriëntatie. Medio januari 2014 staat de teller op circa 4200 verkochte kvavels. Figuur 37 geeft de fasering van de deelgebieden volgens de huidige inzichten:

Example marked articles

competitiveness C_{com} , complementarity C_{cpt} , cohesion C_{coh} and compatibility C_{cpa} (the 4 Cs) to be the conditions of such a spatio-economic system. We arrive at such conditions based on the circumstance that urban and regional development involves spatial change and economic advantages. We therefore argue that the four conditions (the 4 Cs) are essential for a spatio-economic system to adapt and change.

We regard competitiveness as a potential driver for a region to differentiate itself from other regions. It can be turned into an advantage and a driving force enabling regions to develop and progress. It relates to internal dynamics and contextual diversity. What we can derive from a complex adaptive understanding of spatial economic regions is that a competing region will also have to identify its complementary qualities in order to relate to and benefit from its contextual environment. In other words, a region cannot be solely competitive (as well as being unique and specific); it must also relate to widely accepted qualities which it shares with and adds to neighbouring systems (De Roo, 2012; Hermanns and De Roo, 2006). Competitiveness C_{com} and complementarity C_{cpt} are linked to a certain degree to cohesion C_{coh} and compatibility C_{cpa} . The cohesion of a region is an important asset allowing dynamics to occur, as it represents a robust link between sub-systems which are influential for a region's development. Compatibility represents diversity while remaining robust. The diversity of a regional economic zone allows it to be fault tolerant/resilient if, for example, one or several specific functions disappear, avoiding disruptions to the region as other economic functions absorb the surplus labour. This is a condition for interchangeability building upon a 'plurality of potentials'.

By teleocracy, I refer to a form of government – a social ordering system – in which 'patterning-instruments' are the main tools used by the state to regulate (not only its actions but also, and in particular) the actions of private parties. If framework-instruments are employed as well, they have only a secondary, less relevant role.

By nomocracy, I mean a form of government in which only 'framework-instruments' are used to regulate private actions; whereas patterning-instruments are introduced solely as means to discipline and guide public actions (e.g. to supply basic public infrastructure on public land with public funds). In the case of nomocracy, the point is not necessarily (as Alexander (2012a: 40) claims) the 'minimisation of collective intervention', but the idea of radically changing the way in which we intervene. The crucial issue is not the volume or quantity of the state's activities, but the kind or nature of its activities.

First, we have patterning-instruments. In the case of land use, 'patterning' refers to a particular configuration or arrangement of the urban system. The typical tool is a comprehensive set of prevalently 'map-dependent rules' (Alfasi et al., 2012) – that is, rules which are different for different tracts of land within the same city – which I call 'directional' (Moroni, 2010). Patterning-instruments try to define the role of the diverse parts or components of the urban structure. They look for a form of 'substantive coordination'. They try to generate a social order directly: their aim is to obtain a certain correspondence between the rules introduced and the emerging socio-spatial order. They are 'shaping-devices', and they are 'future-oriented'. An example of patterning-instruments is the traditional land-use plan still widely used. As Andreas Faludi (1986) observes, such

Appendix B: Overview interviewees

| Name | Function | Date | Place |
|------------------------------|--|------------|-----------------------------------|
| Ir. R.P. Hümmels MRE MRICS | Director GEM Waalsprong & director ABC Nova Holding | 27-05-2016 | Nieuwegein |
| Prof. Dr. E. van der Krabben | Professor | 25-05-2016 | Interview was conducted via skype |
| Ir. J. de Jong MSc MSRE | Project- en process leader & partner ABC Nova Nieuwegein | 26-05-2016 | Bergen op Zoom |
| Drs. RA J.J. Wouts | Teammanager Land Issues | 26-05-2016 | Bergen op Zoom |
| H. Krouwel | Teammanager urban development | 26-05-2016 | Bergen op Zoom |

Appendix B1: Interview Guide Waalsprong

This interview guide was constructed for an employee of the consultancy firm:

Name: ir. R.P. Hümmels MRE MRICS. (directeur GEM Waalsprong & directeur ABC Nova Holding)

Date: 27-05-2016

Place: Nieuwegein

Inleiding

Wat is uw functie binnen de gemeente/ het bedrijf?

Welk soort werkwijze gebruikt de gemeente/ het bedrijf voor transformatie/herontwikkeling van gebieden?

- Projectmanagement. Hoe gaat dat in zijn werk?
- Procesmanagement. Hoe gaat dat in zijn werk?
- Anders. Hoe gaat dat?

Onzekerheden

Wat zijn de aandachtsvelden geweest bij risico-analyse voorafgaand aan het plan voor de Waalsprong/tijdens het plan voor de Waalsprong?

- Financieel
- Juridisch
- Veiligheid
- Projectmatig
- Procesmatig
- Kwalitatief

Hoe zijn de risico's meegenomen in het ontwerp van het plan?

Hoe ging de gemeente/ het bedrijf om met onzekerheden voorafgaand aan de planvorming voor de Waalsprong?

- Hoe robuust (overtolligheid is in het systeem ingebouwd) is het plan?
- Hoe efficiënt (kosten efficiëntie, markt gerelateerde managementvormen en geïntegreerde contracten) is het plan?
- Hoe adaptief (leren door doen, experimenteren) is het plan?
- Hoe reactief (alleen reageren wanneer het absoluut noodzakelijk is) is het plan?
- Hoe veerkrachtig is het plan (veerkrachtig systeem dat schokken en verassingen kan weerstaan)

Hoe gaat de gemeente/het bedrijf om met onzekerheden tijdens het projectontwikkeling van de Waalsprong?

Teleocracy and Nomocracy

In hoeverre is het plan voor de Waalsprong gebaseerd op voorspellingen over de toekomst? Hoe wordt dat gedaan?

In hoeverre is het plan voor de Waalsprong op het heden/trends van vandaag de dag gericht? Hoe wordt dat gedaan?

- o Urban codes
- o Toekomst openhouden
- o Voorkomen van negatieve effecten

Multi-layered view on governance

Op welke manier wordt er tijdens de besluitvorming omgegaan met beleid van verschillende schaalniveaus (maso; europees en/of nationaal, meso; provinciaal, micro; gemeentelijk)? Waarom wordt dat op deze manier gedaan?

Zelf organisatie

De gemeente zet in op organische ontwikkeling en daarbij ook op meer zelf-organisatie van de eindgebruiker. Wat is het beoogde resultaat?

Emergence & Transitions

Hoe zorgt de gemeente dat het beter om kan gaan met onverwachte (externe) veranderingen? Bijvoorbeeld het opnieuw maken van een MER, wachten op andere besluiten als PKB voor Ruimte voor de rivier en luchtkwaliteit hoofdinfrastructuur.

Co-evolutie

Hoe hebben jullie ervoor gezorgd dat verschillende ontwikkelingen mogelijk blijven tijdens het planvormingsproces van de Waalsprong transitie?

- Pad afhankelijkheid

Wat is de rol van evaluatie tijdens de planvorming/ ontwikkeling van de Waalsprong? Hoe wordt dat gedaan?

Dynamisch en robuust.

Hoe zorgt de gemeente ervoor dat er een goede balans is tussen de concurrentie tussen bepaalde woonmilieus (bijvoorbeeld waalfront en waalsprong en binnen de waalsprong zelf) en de complementariteit (borgen algehele kwaliteit, toegevoegde waarde) van deze woonmilieus?

Hoe zorgt de gemeente dat er een goede balans is tussen de cohesie (gedeelde waarden, kwaliteit en welbevinden) in woonmilieus(in de waalsprong zelf, maar ook met de binnenstad van Nijmegen) en de verwisselbaarheid van sociale-, economische- en fysieke functies?

Flexibiliteit

De nadruk ligt op de globaliteit en flexibiliteit van beeldkwaliteitsplannen en ambitiedocumenten. Waar zit die flexibiliteit in?

Hoe zorgt de gemeente dat deze beeldkwaliteitsplannen en ambitiedocumenten niet te flexibel worden? Hoe wordt de balans gewaarborgd?

Afsluiting

Heeft u nog aanvullingen of informatie die relevant kunnen zijn voor het onderzoek?

This interview guide was constructed for a professor of the university of Nijmegen:

Name: Prof. dr. E. van der Krabben

Date: 25-05-2016

Place: Assen & Nijmegen. This interview was conducted via skype

Inleiding

Wat is uw functie binnen universiteit?

Hoe ben u precies betrokken geweest bij het onderzoek naar de Waalsprong?

Onzekerheden

Hoe denkt u dat er om moet worden gegaan met onzekerheden voorafgaand aan de planvorming voor de Waalsprong?

- Hoe robuust (overtolligheid is in het systeem ingebouwd) zou het plan moeten zijn?
- Hoe efficiënt (kosten efficiëntie, markt gerelateerde managementvormen en geïntegreerde contracten) zou het plan moeten zijn?
- Hoe adaptief (leren door doen, experimenteren) zou het plan moeten zijn?
- Hoe reactief (alleen reageren wanneer het absoluut noodzakelijk is) zou het plan moeten zijn?
- Hoe veerkrachtig zou het plan (veerkrachtig systeem dat schokken en verassingen kan weerstaan) moeten zijn?

Hoe denkt u dat er om zou moeten worden gegaan met onzekerheden tijdens het projectontwikkeling van de Waalsprong?

Teleocracy and Nomocracy

In hoeverre is het plan voor de Waalsprong gebaseerd op voorspellingen over de toekomst? Hoe wordt dat gedaan?

In hoeverre is het plan voor de Waalsprong op het heden/trends van vandaag de dag gericht? Hoe wordt dat gedaan?

- Urban codes
- Toekomst openhouden
- Voorkomen van negatieve effecten

Multi-layered view on governance

Op welke manier zouden tijdens de besluitvorming omgegaan moeten worden met beleid van verschillende schaalniveaus (maso; europees/nationaal, meso: provinciaal, micro; gemeentelijk) meegenomen moeten worden voor de planvorming? Waarom?

Zelf organisatie

De gemeente zet heel erg in op organische ontwikkeling en daarbij ook op meer zelf-organisatie van de eindgebruiker. Hoe kunnen deze organische ontwikkeling en zelf-organisatie ervoor zorgen dat er beter kan worden omgegaan met onzekerheden?

Emergence & Transitions

Het opnieuw maken van een MER, wachten op andere besluiten als PKB voor Ruimte voor de rivier en luchtkwaliteit van de hoofdinfrastructuur waren een aantal factoren waardoor het plan stagneerde of moest worden gewijzigd. Hoe kun je er voor zorgen dat de gemeente beter om kan gaan met onverwachte (externe) veranderingen?

Co-evolutie

Hoe is ervoor gezorgd dat verschillende ontwikkelingen mogelijk blijven tijdens het planvormingsproces van de Waalsprong?

- Pad afhankelijkheid

Wat zou de rol van evaluatie moeten zijn tijdens de planvorming en ontwikkeling van de Waalsprong? Waarom?

Dynamisch en robuust.

Hoe zorg je ervoor dat er een goede balans is tussen de concurrentie tussen bepaalde woonmilieus (bijvoorbeeld waalfront en waalsprong en binnen de waalsprong zelf) en de complementariteit (borgen algehele kwaliteit, toegevoegde waarde) van deze woonmilieus?

Hoe zorg je ervoor dat er een goede balans is tussen de cohesie (gedeelde waarden, kwaliteit en welbevinden) in woonmilieus(in de waalsprong zelf, maar ook met de binnenstad van Nijmegen) en de verwisselbaarheid van sociale-, economische- en fysieke functies?

Flexibiliteit

De nadruk ligt nu op de globaliteit en flexibiliteit van beeldkwaliteitsplannen en ambitiedocumenten. Hoe kan ervoor gezorgd worden dat deze beeldkwaliteitsplannen en ambitiedocumenten niet te flexibel worden? Hoe wordt de balans gewaarborgd?

Afsluiting

Heeft u nog aanvullingen of informatie die relevant kunnen zijn voor het onderzoek?

Appendix B2: Interview Guide ScheldeVesting

This interview guide was formulated for both the employees of the municipality and the employee of the consultancy firm:

Name: Ir. J. de Jong MSc MSRE (project- en procesleider & partner ABC Nova Nieuwegein), Drs. RA J.J. Wouts (team manager Grondzaken) en H. Krouwel (teammanger stedelijke ontwikkeling)

Date: 26-05-2016

Place: Bergen op Zoom

Inleiding

Wat is uw functie binnen de gemeente/ het bedrijf?

Welk soort werkwijze gebruikt de gemeente/ het bedrijf voor Schelde Vesting?

- Projectmanagement. Hoe gaat dat in zijn werk?
- Procesmanagement. Hoe gaat dat in zijn werk?
- Anders? Hoe gaat dat?

Wat zijn de aandachtsvelden bij risico-analyse voorafgaand aan het plan voor Schelde Vesting /tijdens het plan voor Schelde Vesting?

- Financieel
- Juridisch
- Veiligheid
- Projectmatig
- Procesmatig
- Productmatig
- Kwalitatief
- Materieel
- Etc.

Hoe zijn de risico's meegenomen in het ontwerp van het plan?

Hoe ging de gemeente/ het bedrijf om met onzekerheden voorafgaand aan het plan Schelde Vesting?

- Hoe robuust (overtolligheid is in het systeem ingebouwd) is het plan?
- Hoe efficiënt (kosten efficiëntie, mark gerelateerde managementvormen en geïntegreerde contracten) is het plan?
- Hoe adaptief (leren door doen, experimenteren) is het plan?:
- Hoe reactief (alleen reageren wanneer het absoluut noodzakelijk is) is het plan?:.
- Hoe veerkrachtig (veerkrachtig systeem dat schokken en verrassingen kan weerstaan) is het plan?:

Hoe gaat de gemeente om met onzekerheden tijdens de herstructurering van Schelde Vesting?

Teleocracy and Nomocracy

In hoeverre is het plan voor Schelde Vesting op voorspellingen over toekomst gebaseerd? Hoe wordt dat gedaan?

In hoeverre moet Schelde Vesting op het heden/trends van vandaag de dag gericht zijn? Hoe wordt dat gedaan?

- Urban codes
- Toekomst openhouden
- Voorkomen van negatieve effecten

Multi-layered view on governance

Op welke manier wordt er tijdens de besluitvorming omgegaan met beleid van verschillende schaalniveaus (maso: europees en/of nationaal, meso; provinciaal, micro; gemeentelijk)?

Zelf organisatie

Tijdens het Masterplan van Bergse Haven waren er vanaf het begin spanningen tussen de partijen. Hoe is er voor gezorgd dat de samenwerking tussen de gemeente en projectontwikkeling harmonieuzer verloopt?

Emergence & Transitions

Op welke manier wordt er rekening gehouden met ontwikkelingen die binnen en/of buiten het gebied van Schelde Vesting gebeuren maar toch invloed kunnen hebben op de herontwikkeling?

Co-evolutie

Hoe hebben jullie ervoor gezorgd dat verschillende ontwikkelingen mogelijk blijven tijdens de planvorming voor Schelde Vesting?

- Pad afhankelijkheid

Wat is de rol van evaluatie van het plan tijdens de planvorming/ ontwikkeling van Schelde Vesting? Hoe wordt dat gedaan?

Dynamisch en robuust.

Hoe wordt ervoor gezorgd dat er een goede balans is tussen de concurrentie (innovatie kracht, diversi-

teit en differentiatie) tussen verschillende woonmilieus in Schelde Vesting en binnen de gemeente en de complementariteit (borgen algehele kwaliteit, toegevoegde waarde) van deze woonmilieus?

Hoe wordt ervoor gezorgd dat er een goede balans is tussen de cohesie (gedeelde waarden, kwaliteit en welbevinden) in de woonmilieus(in Schelde Vesting zelf, maar ook met de rest van de stad) en de verwisselbaarheid van sociale-, economische- en fysieke functies?

Flexibiliteit

De nadruk ligt op de globaliteit en flexibiliteit van bestemmingsplannen en beeldkwaliteitsplannen. Hoe wordt die flexibiliteit in het plan meegenomen?

Hoe wordt ervoor gezorgd dat deze bestemmingsplannen en beeldkwaliteitsplannen niet te flexibel worden? Hoe wordt de balans gewaarborgd?

Afsluiting

Heeft u nog aanvullingen of informatie die relevant kunnen zijn voor het onderzoek?

Appendix C: Link between interview guide and conceptual model

Teleocracy and Nomocracy

In hoeverre is het plan voor Schelde Vesting op voorspellingen over toekomst gebaseerd? Hoe wordt dat gedaan?

In hoeverre moet Schelde Vesting op het heden/trends van vandaag de dag gericht zijn? Hoe wordt dat gedaan?

- o Urban codes
- o Toekomst openhouden
- o Voorkomen van negatieve effecten

Balance between teleocracy and nomocracy

Multi-layered view on governance

Op welke manier wordt er tijdens de besluitvorming omgegaan met beleid van verschillende schaal-niveaus (maso: europees en/of nationaal, meso: provinciaal, micro; gemeentelijk)?

Zelf organisatie

Tijdens het Masterplan van Bergse Haven waren er vanaf het begin spanningen tussen de partijen. Hoe is er voor gezorgd dat de samenwerking tussen de gemeente en projectontwikkeling harmonieuzer verloopt?

Emergence & Transitions

Op welke manier wordt er rekening gehouden met ontwikkelingen die binnen en/of buiten het gebied van Schelde Vesting gebeuren maar toch invloed kunnen hebben op de herontwikkeling?

Co-evolutie

Hoe hebben jullie ervoor gezorgd dat verschillende ontwikkelingen mogelijk blijven tijdens de planvorming voor Schelde Vesting?

- Pad afhankelijkheid

Wat is de rol van evaluatie van het plan tijdens de planvorming/ ontwikkeling van Schelde Vesting? Hoe wordt dat gedaan?

Dynamisch en robuust.

Hoe wordt ervoor gezorgd dat er een goede balans is tussen de concurrentie (innovatie kracht, diversiteit en differentiatie) tussen verschillende woonmilieus in Schelde Vesting en binnen de gemeente en de complementariteit (borgen algehele kwaliteit, toegevoegde waarde) van deze woonmilieus?

Hoe wordt ervoor gezorgd dat er een goede balans is tussen de cohesie (gedeelde waarden, kwaliteit en welbevinden) in de woonmilieus(in Schelde Vesting zelf, maar ook met de rest van de stad) en de wisselbaarheid van sociale-, economische- en fysieke functies?

Flexibiliteit

De nadruk ligt op de globaliteit en flexibiliteit van bestemmingsplannen en beeldkwaliteitsplannen. Hoe wordt die flexibiliteit in het plan meegenomen?

Hoe wordt ervoor gezorgd dat deze bestemmingsplannen en beeldkwaliteitsplannen niet te flexibel worden? Hoe wordt de balans gewaarborgd?

A Complex Adaptive System perspective on cities

Balance between dynamics and robustness

Dynamics of strategic spatial plans:

- Flexible zoning plans
- Sub-plans
- Differentiation to other plans
- Diversity of housing
- Integration with other plans

Robustness of strategic spatial plans:

- Strong Vision
- Interchangeability of (economic) functions
- Internal relationships of parts of subsystems
- Shared values amongst stakeholders
- Quality of life