Aiming for resilience: Enhancing citizen involvement in flood risk management with social capital

> A Hamburg and London Case Study

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Abstract

Climate change and urbanisation processes are increasing the risk of flooding in cities substantially. Merely traditional mitigation approaches mostly designed and implemented by public authorities do no longer suffice. In light of the changing context, in flood risk management the concept of resilience is gaining prominence. Resilience implies that a city not only tries to mitigate flood risk, it also means that a city has the capacity to adapt and transform in case of a flood event. This shifting perspective comes with a redistribution of roles and responsibilities. Where in the traditional approach flood risk management was solely a public responsibility, resilience requires broader stakeholder involvement: besides public authorities, private parties and citizens now also have to be involved to face the upcoming challenges. But how can it be ensured that citizens have the capacity do deal with their new role and responsibility in flood risk management?

The problem statement for this study focuses on how flood risk management can be arranged in such a manner that it can accommodate citizen involvement. A framework is developed by which citizen involvement can be studied. It contributes to the theoretical development of flood resilience, as it proposes criteria to create and stimulate social capital networks that enhance the adaptive capacity of citizens. In doing so, it not only evaluates a city's attempt to involve citizens in flood risk management, it also provides a tool by which policy makers and researchers have the opportunity to increase citizens' adaptive capacity to flood risks. The framework is tested through two cases: one in Hamburg and one in London, showing that within the cases initial steps for citizen integration are taken. However, traditional stakeholders are finding it difficult to progress with the shift towards resilience, thereby hindering further integration of citizens as part of the flood risk management arrangement. Furthermore, the case studies show that creating flood risk awareness among citizens remains a difficult challenge, and that awareness does not necessarily leads to more participation.

Keywords: Resilience; social capital; flood risk management; policy arrangements; capacity building

Preface

When I started my master Socio-spatial Planning at the faculty of Spatial Sciences of the University of Groningen, I did not expect to end up writing a thesis on flood risk management, let alone flood resilience. But when the concept was discussed during the faculty's thesis seminar, I knew this was what I wanted to study. I was triggered by the thought of resilience being a promising concept to address climate change. Not long after this realisation many questions started to arise, especially with regards to the implications that such a concept has for the division of public and private responsibilities. This allowed me to combine my newly found interest in resilience and my long-lasting love-hate relationship with the concept of social capital.

Deciding to study resilience and social capital meant I was in for a challenge. Theoretically, I had some catching up to do, as I was unfamiliar with the concept of resilience, and as you will see later on in this thesis, social capital is not one of the easiest concepts to study either. Moreover, I chose Hamburg as one of my case studies; meaning I needed to brush up on my German, which I had not studied since secondary school. Nonetheless, looking back on the past year, I am glad I made the decision. I had the opportunity to visited two beautiful cities: Hamburg and London, talk to some really interesting people, and most importantly it allowed me to become part of and contribute to one of the most important debates of the 21st century, namely: how to deal with climate change. I thoroughly enjoyed my academic journey, which I could not make without the help and support of so many people.

Firstly, I want to thank my thesis supervisors, Britta Restemeyer and Margo van den Brink for their challenging questions and for keeping me on the right track. Secondly, I want to thank all the interviewees for their invaluable insights. Without you I would not be able to write my empirical story. Thirdly, my gratitude goes to all my friends and family who I, unfortunately, cannot mention all by name. Thanks for reminding me every now and then that I also needed to relax. Fourthly, I want to thank my girlfriend Dewi Eshuis for keeping me motivated and for being patient with me, which, I can imagine, could not been easy at times. Fifthly, I want to thank my parents Watze and Augustien Kamstra, for letting me follow my own course and supporting me with everything that I did. Lastly, I want to thank my grandfather, Renze Kamstra, for being so engaged throughout the years with my academic progress and career choices.

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1. Introduction

1.1 Background

Currently, more than half of the world population lives in urban areas. This rapid urbanisation in combination with the effects of climate change sets difficult challenges for areas located along major water bodies (Zevenbergen et al., 2008). This is due to the fact that climate change is having an increasing influence on the probability and the potential impact of flooding in many regions around the globe, especially in delta regions (Kabat et al., 2005). There is a growing awareness that the historical data used to assess the risk of flooding may not be suitable anymore for future predictions, because of the complexity of issues regarding flooding (Kuhlicke & Steinführer, 2013; White, 2013). These changing circumstances increase the risk of flooding substantially.

Generally, flood risk is defined as the probability of a flood event happening, multiplied by the potential impact, or in other words, consequences of flooding. Traditional modes of flood control dealt with floods through 'hard engineering', which had a focus on reducing the probability of flooding by constructing civil engineering works such as dams, dikes and storm surge barriers (Meijerink & Dicke, 2008). In many countries the design and implementation of such 'resistance strategies' have been regarded as an exclusive responsibility of the state (Meijerink & Dicke, 2008). However, due to the changing circumstances previously mentioned, traditional modes of flood control are increasingly seen as inadequate to deal with flood risk (Hooijer et al., 2004; Vis et al., 2003). This is because if 'hard measures' that reduce the probability of flooding, such as dams and dikes, break, the impact will be enormous. Not least, because in a traditional approach governments were exclusively responsible for managing flood risk, given this, few citizens would be prepared in case a dam or dike is breached or overtopped.

Therefore, it is increasingly recognised that the concept of resilience seems promising (Davoudi, 2012). Resilience means that a city not only tries to mitigate flood risk with the help of technical measures, but also has the capacity to adapt to a situation of being flooded without having to accept any substantial damage (e.g. controlled flooding), and that it has the

transformative capacity to change based on new insights, such as previous flood disasters and climate change (Restemeyer et al., 2015). This shifting perspective towards resilience has implications for the public-private divide of roles and responsibilities in flood risk management. Aiming for resilience requires a broader involvement of stakeholders; besides governmental institutions, now citizens also need to be involved to face the upcoming challenges.

As it is unlikely that governmental institutions can face the challenge of climate change on their own (Meijerink & Dicke, 2008), policy domains responsible for flood risk management, such as water management, disaster management and spatial planning, therefore need to be structured in such a manner that within those policy domains there is room for citizen involvement. This means that within both the content and organisation of such policy domains, which are referred to as 'policy arrangements' (Wierink & Immink, 2006), the importance of citizen involvement has to be recognised for managing flood risks. This newly proposed make-up of flood risk management arrangements (FRMAs) with more citizen involvement requires awareness and preparedness of those citizens. Otherwise, a serious problem could arise where a state counts on the risk preparedness of citizens, while citizens in turn still completely count on their government to manage flood risk (Meijerink & Dicke, 2008). In order for citizens to be able to deal with this new role and responsibility, their capacities have to be built up (Restemeyer et al., 2015).

An important feature of capacity building is social capital (Adger, 2003; Aldrich, 2012), which can be described as 'the networks and resources available to people through their connection to others' (Aldrich, 2012, p.2). Strong social capital networks provide information, knowledge and access to members of the network, creates trust amongst their members, and can help build new norms about compliance and participation (Aldrich, 2012). Applied in a post-disaster situation, these networks serve as an informal insurance and mutual assistance after disaster, help overcome collective action problems that frustrate recovery, and strengthen voice and decrease the probability of exit of community members (Aldrich, 2012). Thus, when present, social capital can contribute to the flood resilience of a city, because such networks increase the capacity of the citizens within a city to deal with flood risk.

Yet, little research is done on how, within FRMAs, social capital networks are stimulated to enhance citizen involvement. Furthermore, research is also needed on creating social capital networks pre-disaster to enhance a city's flood resilience. The use of social capital in post disaster situations has been widely recognised and researched (e.g. Adger, 2003; Aldrich, 2012), but creating and stimulating social capital networks 'pre-disaster' to enhance a city's resilience has not. Therefore, this research tries to take the discussion on social capital in flood resilience further, by looking for ways to build and stimulate social capital networks in order to increase pre-disaster resilience. This study wants to contribute to this field of research by examining the cases of the HafenCity in Hamburg and the Royal Docks in London, both of which are trying to become more flood resilient.

1.2 Problem statement and research questions

The above problem definition is the starting point of this thesis. The research aims at getting a better understanding on the efforts being made within FRMAs to enhance citizen involvement by means of creating and stimulating social capital networks. In doing so, a comparative case study is presented of two former inner city harbour areas in Hamburg and London where first attempts of a shift from resistance towards resilience is noticeable, and new forms of the public-private divide emerge. The cases will be compared to each other, so that differences and similarities between the cases become apparent. In that way, this research can contribute to the wider scientific and practical debate regarding flood resilient cities. On the basis of these objectives and problem definition, the main research question is as follows:

How are social capital networks created and stimulated within flood risk management arrangements to enhance flood resilience in the HafenCity in Hamburg and the Royal Docks in London?

In order to answer the main research question three sub-questions have been defined, whereby the first sub-question is focused on the theories relevant for answering the research question. The second sub-question is directed to the empirical, and the third sub-question brings both worlds together. Subsequently, the following three sub-questions have been formulated:

- How do resilience, policy arrangements, and social capital relate to each other in flood risk management?
- How are social capital networks being used and perceived within the flood risk management arrangements of both cases?
- What are the main differences and similarities between both cases and what can they learn from each other?

1.3 Theoretical approach

The central theme throughout this research evolves around the enhancement of citizen involvement in flood risk management, so that cities can better cope with increasing flood risks. For this purpose, three theoretical concepts are central in this study: resilience, social capital, and policy arrangements. Resilience is of importance in this study, as the concept is seen as promising to deal with increasing flood risk vulnerability due to e.g. climate change and urbanisation processes (Kuhlicke & Steinführer, 2013; Scott, 2013). The research builds on the description of resilience in terms of robustness, adaptability and transformability (see Galdersi et al., 2010; Restemeyer et al., 2015; Scott, 2013).

According to academic literature, aiming for resilience requires broader stakeholder involvement, including citizens (Kuhlicke & Steinführer, 2013; Meijerink & Dicke, 2008; Merz et al., 2010). Subsequently, in order for citizens to be able to cope with their new role and responsibility in flood risk management, their capacities have to be built up (Adger, 2003). An important feature of capacity building is social capital (Adger, 2003; Aldrich, 2012). Therefore, the second central concept is social capital. Following Aldrich (2012), this research builds on the network view of social capital in terms of bonding, bridging and linking. For each type of social capital network, criteria are developed that identify the attempts made within responsible policy domains to create and stimulate such networks.

The third theoretical concept is that of policy arrangements. To study changes in roles and responsibilities in flood risk management this research looks at the policy domains responsible for managing flood risk. For Hamburg and London, these policy domains are the domains of water management, disaster management and spatial planning. In this thesis, these domains are studied on a city-level and are seen as part of a FRMA. The theory of policy arrangements provides a useful framework to understand the shape and structure of these policy domains (Arts et al., 2006; Wiering & Immink, 2006). It focuses on the content and organisation of the FRMA, thereby identifying if and how plans, actors, rules and so on accommodate citizen involvement through social capital stimulation. In doing so, a conceptual framework is established that describes the shape and structure of a FRMA of a city, and how, within this structure social capital networks are created and stimulated to enhance citizen involvement.

1.4 Research strategy

Two cases are selected to study citizen involvement in flood risk management: the HafenCity in Hamburg, and the Royal Docks in London. The HafenCity in Hamburg is a waterfront redevelopment project. Located near the river Elbe, the former harbour is being developed into a large commercial, recreational and residential area. The HafenCity area lies outside the main dike line of Hamburg's inner city and is therefore basing its flood risk management strategy on adaptability. The redevelopment of the HafenCity has led to new flood risk management strategies to be proposed and implemented.

The second case, the Royal Docks in London, is also a former harbour being turned into a large commercial, recreational and residential area. The low-lying Royal Docks lie alongside the tidal river Thames, and is protected by the Thames Barrier. In the vision for the area, responsible authorities have expressed the intention to take more adaptive measures to manage flood risk (Environment Agency, 2012). In both cases, part of the proposed and implemented adaptation measures entail the involvement of citizens in managing flood risk.

Through the conceptual framework, first the content and structure of Hamburg's and London's FRMAs are described. Subsequently, by using the developed social capital criteria in the framework, it is studied how, within these structures, the different social capital networks are created and stimulated to increase citizen involvement in flood risk management. It does so by interviewing stakeholders and analysing documents on flood risk management. More on this can be found in chapter 3.

1.5 Relevance of the research

Scientific relevance

As briefly mentioned in the introduction, social capital is gaining importance in the discourse on resilience. Academic literature subscribes to the idea that capacity building is necessary to become resilient and social capital is needed to build up these capacities. It is therefore theoretically interesting to explore the relationship between social capital, capacity building and resilience more in-depth. This then can be used as input for the theoretical debate on the use of social capital in flood risk management. Additionally, finding the relevant characteristics of social capital networks for building resilience can be of importance for the theoretical debate on both concepts, because resilience and social capital are rather abstract concepts. Both are multi-interpretable, that is, they have different meanings in different contexts. By studying which characteristics of social capital play a role in building coastal resilience, the research can contribute to clarifying this ambiguity for the concept of social capital in the context of flood risk management.

Moreover, in the current literature on resilience, social capital is related to post-disaster recovery (e.g. Adger, 2003; Aldrich, 2012). Little academic attention has been given to the possibility of studying the role of social capital in creating pre-disaster resilience. It is therefore theoretically relevant to explore the role of social capital prior to a flood disaster.

Societal relevance

How to cope with the consequences of climate change (e.g. the intensification and increase in flood events, or economic and social unsustainability) will be of major importance in the coming decades. This research is therefore practically relevant in the sense that it tries to provide a possible solution to cope with these consequences.

As previously mentioned, in planning theory and practice, there is an increasing recognition to shift towards resilience in flood risk management. There is, however, a lack of clarity among scholars and practitioners about what this shift could mean in practice. Coming from a state wherein flood prevention was a responsibility of public water authorities, towards moving to a state that aims for adaptive governance arrangements comes with several practical hurdles such as: how to divide risks, or what is responsible governance. Consequently, the research is practically relevant, because it aims to provide policy makers with knowledge on how to address these hurdles; how to guide the shift from resistance towards the improvement of coastal resilience. Policy makers are explicitly mentioned here, because they are the ones that have the capacity to initiate and guide the transition.

1.6 Outline of the thesis

The thesis has the following structure. In chapter 2 the concepts of resilience, policy arrangements, and social capital are discussed. In addition, a theoretical framework will be developed that will function as a foundation for the empirical research. First, the emergence and different forms of resilience are discussed to provide a theoretical background. Thereafter, the structure in where changes in flood risk management are taking place is described through explaining the concept of policy arrangements. Subsequently, the need for citizen involvement is explained and how creating and stimulating different social capital networks contributes to building up the capacity of citizens in order to be involved in flood risk management. This results in a framework by which citizen involvement in flood risk management can be studied, and which can also be used by policy makers and researchers to enhance citizen involvement.

Chapter 3 explains the methods used for the empirical data collection in chapter 4 and 5. In this chapter it is explained why a comparative case study approach is taken, why Hamburg and London were chosen, and how the empirical data is collected.

Then, in chapter 4 and 5, the collected data from the HafenCity in Hamburg and the Royal Docks in London is presented. In chapter 4 The HafenCity is discussed, where first the FRMA of

the city is described. Thereafter, the creation and stimulation of the different social capital networks within the arrangement is studied. In chapter 5, the same is done for the Royal Docks in London.

Chapter 6 is the final chapter. It contains a conclusion and reflection on the creation and stimulation of social capital networks to enhance citizen participation within flood risk management in the HafenCity and the Royal Docks, and on the conceptual framework and methods. The chapter ends with providing recommendations for further research.

2. Combining concepts: resilience, policy arrangements and social capital

In this research it is about how social capital networks are built and stimulated within FRMAs to enhance a city's flood resilience. Three main components can be identified: resilience, social capital, and policy arrangements. The danger with the first two concepts is the fact that they are used in various scientific disciplines, where in each discipline the concepts have their own meanings. For example, social capital is a discourse in the social science literature, planning literature and philosophical literature. Resilience originates from the physical sciences, and is more recently translated to the social sciences. Needless to say, a lot of information on the concepts is thus available. While this may seem convenient, it may also lead to difficulties with regards to finding the concepts that are suitable for this research. Therefore, the research is framed in a social science and planning perspective, leaving out for a large part discourses in other fields of science such as the philosophical discourse on social capital and the physical discourse on resilience. The reason for this selection lies in the fact that the research is concerned with exploring how actors in a city plan for dealing with flood risk with the help of creating and stimulating social capital networks. Hence, a social science and planning perspective is needed.

As stated in the first chapter, resilience and social capital are multi-interpretable concepts. In order to study how social capital networks are built and stimulated within FRMAs, a clear framework must be developed in order to analyse both cases. This approach can be typified as a deductive approach, where relevant theories and ideas are identified and tested using data with the help of a framework (Saunders et al., 2009). Consequently, in this chapter the theoretical background of this thesis, i.e. the emergence and development of resilience, the shift towards the resilience paradigm in flood risk management, the theory of policy arrangements and the theory of social capital are explained in detail. Besides presenting a framework for empirical analysis, this chapter has as its goal to show a comprehensive understanding of the scholarly work already published on both theories, critically reviewing them to make a convincing argument relating to the research question posed in chapter 1.

2.1 What is resilience?

Resilience is a term frequently used in various social science disciplines (Shaw & Theobald, 2011). It is also used by decision makers, policy communities and non-state actors, as it is malleable to cut across the 'grey area' between academic, policy and practice discourse (Bristow, 2010). There is, however, a lack of clarity about what resilience actually is.

Resilience was first introduced by physical scientists to describe the stability of materials of a spring and its resistance to external shocks (Davoudi, 2012). Thereafter, resilience entered the field of ecology and multiple meanings have since emerged in several other fields of studies such as psychology, disaster studies, economic geography, and environmental planning (Davoudi, 2012).

Engineering and ecological resilience

A distinct starting point regarding the concept of resilience and its meaning, came from an article published by the ecologist C.S. Holling in 1973. In his paper he demonstrated the existence of multiple stability domains and their relation to ecological processes and random events (Folke, 2006). Holling (1996) made a distinction between engineering resilience and ecological resilience. Engineering resilience is the extent to which a system could resist disturbance and return to the equilibrium or steady-state (Holling, 1996). Resilience is here interpreted as the return time after disturbance. So, the faster a system 'bounces back' after a disturbance, the more resilient it is (figure 1). It is measured by the capacity of an ecosystem to absorb a shock event and the time the system needs to recover and return to its previous stable, equilibrium state (Jansen et al., 2007).

Ecological resilience, though, is the magnitude of disturbance that a system can absorb before changing its structure and flip into another stability domain (Holling, 1996). Here it is about 'bouncing forward' rather than bouncing back (figure 1). What separates both forms of resilience from each other is that engineering resilience assumes that there is one stable equilibrium, ecological resilience rejects this idea by acknowledging multi stable equilibriums to which systems can flip (Davoudi, 2012).

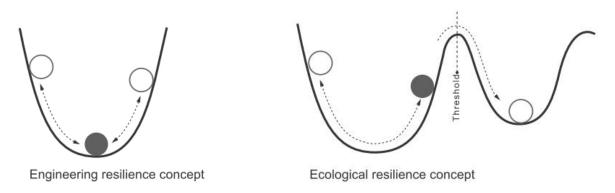


Figure 1: Engineering vs. Ecological resilience (Scheffer, et al., 1993; Folke, et al., 2004).

Socio-ecological resilience

For planning issues, however, both types of resilience are not very suitable. The very nature of systems may change over time with or without an external disturbance (Scheffer, 2009), and both engineering and ecological resilience do not account for that fact (Folke et al., 2010). Uncertainty and surprise are part of the game and it is necessary to be prepared and live with it (Folke, 2006). Thinking in linear and steady state systems, as done with engineering and ecological resilience, does not take into account the fact that socio-ecological systems, where planners operate in (systems where humans influence the environment and vice versa), are complex adaptive systems characterised by non-linear dynamics, limited predictability, and have multiple basins of attraction (Stockholm Resilience Centre, 2007). Unlike engineering and ecological resilience, socio-ecological resilience does take these interactions into account. As Wilkinson (2011) argues, socio-ecological resilience recognizes the critical importance of ecological considerations for urban studies. Moreover, it acknowledges the contingency, unpredictability and inevitability of ecological processes in planning (Swyngedouw, 2010; Wilkinson, 2011). So with socio-ecological resilience, instead of defining systems as predictable and mechanistic, systems are portrayed as process dependent, organic and self-organising with feedbacks between multiple scales (Stockholm Resilience Centre, 2007). Interactions in complex adaptive systems take place across temporal and spatial scales, with each level operating at its own pace (Folke, 2006). The panarchy model of Gunderson & Holling (2002) shows these

fast/slow dynamics and cross scale interactions between a set of nested adaptive cycles (figure 2).

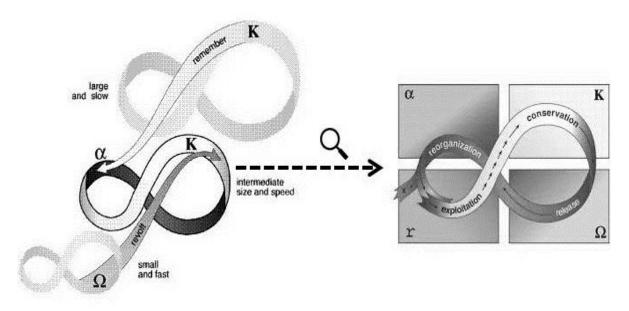
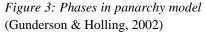


Figure 2: The panarchy model (Gunderson & Holling, 2002)



The model shows three levels and the speeds in which they operate. The 'revolt' connection illustrates that a critical change in one cycle can move up to a larger cycle thereby influencing its behaviour. The 'remember' connection facilitates renewal, drawing on previous and accumulated experience in a larger slower cycle (Wardwell & Allen, 2009). Each cycle exists of four phases of change in the structures and functions of a system (Davoudi, 2012) (figure 3). These phases are: exploitation (growth), conservation, release (creative destruction), and reorganisation (Gunderson & Holling, 2002). A resilient socio-ecological system has the capacity to create opportunities for doing new things, for innovation and development (Folke, 2006). What is important with the panarchy model is the fact that the phases of the model, as opposed to hierarchy, are not necessarily sequential or fixed (Davoudi, 2012). Moreover, as previously mentioned, systems do not function in a single cycle, but are a series of nested

adaptive cycles each operating at its own pace and on its own level, thereby interacting with each other.

The synopsis of this story is that, when acknowledging that abrupt change in a socioecological system may occur, resilience in the engineering or ecological sense do no longer suffice for planning issues. With complex, non-linear and self-organising systems that are imbued with uncertainty requires not only persistence or robustness to disturbance, it also requires adaptability and transformative capacities (Davoudi, 2012; Folke, 2006). The focus lies therefore on the adaptive and transformability capacity, room for learning and innovation. This type of resilience is called socio-ecological resilience. Therefore, this study takes the socioecological concept or resilience as its standpoint, because it addresses adaptive capacity, transformability, learning and innovation. These parameters are important for the renewal in water management (Jansen et al., 2007). Folke (2006) made an overview of these different types of resilience and their characteristics (table 1).

Resilience concepts	Characteristics	Focus on	Context
Engineering resilience	Return time, efficiency	Recovery, constancy	Vicinity of a stable equilibrium
Ecological/ecosystem resilience social resilience	Buffer capacity, withstand shock, maintain function	Persistence, robustness	Multiple equilibria, stability landscapes
Social-ecological resilience	Interplay disturbance and reorganization, sustaining and developing	Adaptive capacity transformability, learning, innovation	Integrated system feedback, cross-scale dynamic interactions

Table 1: Resilience concepts (Folke, 2006)

Adaptive capacity, transformability, learning and innovation

Adaptive capacity, transformability, learning and innovation in the socio-ecological resilience concept do not just happen they need to be built. Good management is needed to ensure that a social-ecological system is resilient. Adaptive governance is thus key to address the complex interactions in a socio-ecological system, and increase its resilience (Stockholm Resilience Centre, 2012). Such an adaptive governance system framework relies for a large part on the collaboration of a diverse set of stakeholders that operate at different social and ecological scales (Olsson et al., 2004). Social networks are seen as the web in this adaptive governance system that ties everything together (Folke, 2006). According to Berkes and colleagues (2003)

adaptability in a resilience framework means to have an adaptive capacity to respond within a social domain, and also have the adaptive capacity to respond to and shape ecosystem dynamics in an informed manner. Adaptability in resilience is thereby referred to as the capacity of people in a socio-ecological system to build resilience with the help of collective action (Walker et al., 2004). Transformability is the capacity of people to create a fundamental new socio-ecological system when ecological, political, social, or economic conditions make the existing system untenable (Walker et al., 2004). The importance of these characteristics of socio-ecological resilience can also be seen in the discussion on resilience in flood risk management. This is discussed in the following section.

2.2 The resilience paradigm in flood risk management

In recent years, the concept of resilience has gained prominence in a number of different domains. Why the theory of resilience has gained popularity in flood risk management has several reasons. As mentioned earlier, flood risk is generally defined as the probability of a flood event happening multiplied by the potential impact of that flood. Traditionally, flood risk management focused on reducing the probability of a flooding. Flood risk was dealt with through a resistance strategy. This strategy was aimed at keeping the floods away from urban areas by constructing civil engineering works such as dams and dikes (Meijerink & Dicke, 2008). However, an increasing awareness amongst policy makers and experts about climate change and urbanisation and the subsequent increase in flood risk, has led to a paradigm shift in flood risk management (Meijerink & Dicke, 2008). White (2013) argues that the data used to plan for flood risk management and to map risk does not capture the dynamics of change in the system within which the knowledge is constructed. The uncertainty that climate change brings in combination with urbanisation processes and globalisation results in a complexity that makes it difficult to rely on historical scientific data. Not all floods can be predicted and prevented. What makes the complexity even more complex is the different types of sources that can cause flooding and the direct and indirect impacts of floods (White, 2013). False precision is created caused by an overreliance on data that is subject to rapid and fundamental change. Therefore, in many countries, flood risk management is moving away from the one dimensional resistance approach,

towards a more strategic, holistic and long term approach that tries to both mitigate flood risk and adapt to flood events (Scott, 2013); a move is made towards the improvement of resilience of socio-ecological systems to cope with the uncertainty brought about by climate change and urbanisation processes. Galderisi et al. (2010) describes flood resilience in terms of robustness, adaptability and transformability, whereby each concept relates to a different phase in a disaster. Robustness is of importance to withstand an event, adaptability is needed in the phase when the city is being flooded, and transformability is needed after the event in order for the city to be better prepared for the next event. Although Galderisi does point out the three crucial features of resilience, linking each of the characteristics to a specific phase seems to be in contradiction with the concept of resilience. As explained in the previous section, the different phases in a resilient socio-ecological system are not fixed; they interact with each other on different levels and at different speeds. This means, for example, that when aiming for socio-ecological resilience adaptability and transformability are also important in the pre-disaster phase. Hence, the main aim of this research to study efforts within policy arrangements to build and stimulate social capital networks to increase the adaptive capacity of citizens in a FRMA prior to a disaster shows its relevance.

The shift towards resilience in flood risk management brings about new types of measures to address flood risk. As seen above, not only mitigation measures are necessary, a resilient approach also implies an increase in non-structural measures to foster adaptability and transformability. Therefore, social adjustments are now also required, because the complexity in the current flood risk management context means that the state cannot manage flood risk on its own. For example, in case the flood defences of a city are breached or overtopped, citizens who are at flood risk need to know what to do in order for them to be safe. Physical adjustments (e.g. houses on poles) to the hinterland will partly contribute, but it also requires active involvement of citizens in flood risk management so that they are aware of the flood risks and know what their role and responsibilities are in dealing with these risks (Restemeyer et al., 2015). Thus, the resilient measures require a redistribution of roles and responsibilities in where citizens are transformed from passive stakeholders to active risk managers who are encouraged to make

decisions regarding the prevention and mitigation of flood risk (Kuhlicke & Steinführer, 2013). In order to determine whether these changes actually occur in practice, the policy domains that deal with flood risk need to be examined. After all, it is from here that the traditional stakeholders in flood risk management (e.g. authorities) have the means to initiate a change. Within these domains they, for example, have the opportunity to develop new policy plans and documents, implement policy measures, propose legislation, and involve new actors to increase the flood resilience of a city. Van Tatenhove et al. (2000) developed the concept of *policy arrangements* as a means to analyse policy domains. This concept is the subject of the next section.

2.3 Flood risk management arrangements (FRMAs)

'A policy arrangement refers to the temporary stabilisation of the organisation and content of a policy domain, at a specific level of policy making' (Van Tatenhove et al., 2000, p.54). This quote can be explained as follows. Throughout the years, certain patterns in a policy domain can be identified. Organisations (e.g. authorities, social groups, or companies) adopt certain positions, develop certain ways of doing things, and exchange visions with each other (Wiering & Immink, 2006). Their methods and views become institutionalised. At the same time, existing policy arrangements are constantly changing and new arrangements are created, due to new insights. Generally, a policy arrangement consists of two parts: content and organisation. Subsequently, Wiering and Immink (2006) distinguish four strongly interrelating analytical dimensions in a policy arrangement by which the dominant visions and institutions in a policy domain can be identified. In this thesis the flood risk management domain in a specific country is the focus of analysis. Such a FRMA can exist out of multiple policy domains, depending on the country's institutional make-up. For example, some countries have a more integrated approach to flood risk management where the policy domains of water management, disaster management and spatial planning work together. Other countries may have little collaboration between policy domains and are therefore more fragmented, or even see flood risk management solely as a responsibility of the water management domain. Returning back to Wiering & Immink's four dimensions in a policy arrangement, they use the term 'policy discourse' to refer to the *content* of a policy domain and the way in which actors give meaning to, and derive meaning from that content. For the *organisational* dimensions they use 'power and resources', 'rules of the game' and 'actors and coalitions'. Power and resources refer to the tools available to actors with which they can exercise influence, e.g. financial resources and strategic use of knowledge. Rules of the game are for example, formal rules such as legislation and procedures, which show the institutional patterns and visions, or informal rules such as the dominant political negotiation culture in a policy domain. The third organisational dimension refers to clusters of actors who are grouped around certain points of view, interests, or policy perspectives (Wiering & Immink, 2006). By using this concept with its four analytical dimensions, existing FRMAs of particular cases can be examined.

In light of the need to shift towards flood resilience, and the associated broadening of stakeholder involvement in flood risk management, the third organisational dimension of 'actors and coalitions' is of special importance, as citizens now also have to be involved in flood risk management so that they know what to do in case of a flood event.

Yet, acknowledging that within a FRMA there should be room for citizen involvement to enhance the flood resilience of a city is one thing, but to have citizens who have the capacity to deal with their new role and responsibilities is another. Capacities have to be built up. Building up such capacities in coastal communities requires hard work (Kuhlicke et al., 2011). Capacity building literature stresses the importance of the social dimension in the attempts of communities to deal with the impacts of a flood event (Kuhlicke et al., 2011). Especially the adaptation element in resilience hinges for a large part on the social dimension in a community. According to Folke et al. (2005) this dimension connects individuals, organisations, agencies and institutions at multiple organisational levels. They argue that the social sources of resilience are essential for the capacity of a socio-ecological system to adapt (Folke et al., 2003; Folke et al., 2005). Moreover, Adger (2003) claims that the ability of a society to adapt depends for a large part on the ability of a community to act collectively. A key component of this social dimension in capacity building is social capital (Adger, 2003; Adger et al., 2005; Folke, 2006; Folke et al., 2003; Folke et al., 2003; Folke et al., 2005).

2.4 The foundations of social capital

Social capital supposedly enhances the adaptive capacity of communities to flood events, but what is social capital? In academic literature, social capital is used in different ways. For example, some authors see social capital as the definition of trust and trustworthiness, others consider social capital to be a form of social networks (Durlauf, 2002). The ambiguity of the term leaves room for reinterpretation, which for some can lead to fuzziness. A striking example of the conceptual generalisation of social capital comes from Coleman (1990). Coleman (1990) suggested conceiving social capital as 'these socialstructural resources' consisting of 'a variety of different entities having two characteristics in common: 'They all consist of some aspect of a social structure, and they facilitate certain actions of individuals who are within the structure' (Coleman, 1990, p.302). Another example comes from Putnam's definition of social capital as 'connections among individuals, social networks and the norms of reciprocity and trustworthiness that arise from them' (Putnam, 2000, p.19). Not the description itself caused fuzziness but subsequent empirical studies, which used terms as social capital, social networks, reciprocity and trustworthiness interchangeably (Lin & Erickson, 2008). Those diverse interpretations and approaches make it difficult to assess the validity of the concept and the reliability of empirical findings¹. Therefore, the boundaries of the concept have to be made clear otherwise it may become a concept robbed of any distinct meaning. Rather than trying to discuss all different forms and definitions of social capital, the research tries to give a clear and founded definition of social capital applicable for this research. In order to do so, this section builds on the network view of social capital and for this reason discusses the concept in terms of bonding, bridging and linking social capital.

Social capital networks: bonding, bridging and linking

In the social sciences there is a growing interest in the concept of social capital and the role it plays in facilitating collaborative and collective actions (Maloney et al., 2000). Probably the most famous and comprehensive social science study on social capital comes from Putnam

¹ It is not the goal of this research to discuss all different forms and definitions of social capital. For an in-depth analysis on this, see the work of Lin and Erickson (2008).

(2000). In his book titled 'Bowling Alone', Putnam refers to social capital as 'connections among individuals, social networks and the norms of reciprocity and trustworthiness that arise from them' (Putnam, 2000, p.19). This definition has become widely accepted (Pelling & High, 2005). Putnam argued that social capital, for a variety of reasons, was declining in the United States. Empirical evidence of the decline in social capital was sought in membership associations, voting rates, neighbourliness, and social trust (Aldrich, 2012). The reasons for decline included suburban sprawl, generational change, women working outside of their homes, and greater television and Internet use (Aldrich, 2012).

With explaining social capital, Putnam makes an important distinction between two forms of social capital. The first form is *bonding* social capital (exclusive), which has an inward focus and tends to reinforce already existing ties within homogenous groups. It facilitates cooperation within closely tied communities (Aldrich, 2012). Bonding social capital can have negative externalities, because the strong sense of belonging created in the group can stimulate indifference or hostility towards non-members. When residents have a deeply felt connection to their group, bonding social capital can in some cases cause polarization, isolation and even violence (Aldrich, 2012).

The second form is *bridging* social capital (inclusive), which is more outwards looking, cutting across different layers of society. It connects members of a network to extralocal networks, linking such group members to external assets (Putnam, 2000, p.23). Although the ties described by bridging social capital are weaker than the ties described by bonding social capital, it is more useful to 'get ahead' in society with the help of bridging social capital. Bonding social capital supports our narrower selves, whereas bridging social capital generates broader identities and reciprocity (Putnam, 2000). Putnam states: 'In short, for our biggest collective problems we need precisely the sort of *bridging* social capital that is toughest to create' (Putnam, 2000, p. 363, emphasis added).

However, according to Maloney et al. (2000) Putnam's approach lacks to acknowledge the role of public authorities in creating social capital. This is a surprising discovery, as social capital is of great value in showing how relationships between and among citizens in a network relate to

the effectiveness of governance (Szreter, 2002). According to Szreter (2002), Putnam ignores the role of government in his analysis, while some of his empirical evidence clearly shows that 'the state' (in the form of the local government) played a crucial role in providing infrastructure, planning and regulating activities to stimulate economic regeneration.

Therefore, a third form of social capital has been introduced in social capital literature, namely, that of linking social capital (e.g. Szreter & Woolcock, 2004). Where bonding and bridging social capital encompass connections among individuals of more or less the same status (horizontally), linking social capital takes vertical connections into account as well (Aldrich, 2012). It is often seen as a sub-category of bridging ties (Pelling & High, 2005; Putnam, 2000; Woolcock & Narayan, 2000). This form of social capital enables communities on a lower level to be provided with external resources and information. Linking social capital is of special importance for those communities who are developing or underdeveloped, because it provides for resources and information normally not available for those communities (Aldrich, 2012). Societies rich in linking social capital thus benefit from the vertical resource and information flows, according to Pelling & High (2005). However, at the same time these societies are more likely to have difficulties maintaining social trust and cooperation (Pelling & High, 2005). While linking ties may provide information from top to bottom, it can also open up relationships of dependency and exploitation (Pelling & High, 2005). Therefore, the (non-) existence of linking social capital does not automatically mean the (in)capability of a local community to adapt with the help of information and resources provided by NGOs, governmental organisations et cetera. Instead, the impact of linking social capital should be mapped in its social context. This goes the same for other forms of social capital. Figure 4 shows a schematic overview of the three types of social capital networks that have just been discussed.

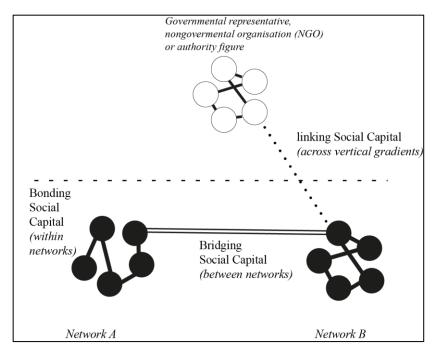


Figure 4: Bonding, bridging, and linking social capital (Aldrich, 2012)

This figure, made by Aldrich (2012), shows the three types of social capital networks whereby each circle represents an individual within a network who is tied to friends, kin and neighbours (through bonding), to other ethnic, demographic or religious groups (through bridging), or to governmental organisations some distance away in positions of power (through linking). Projecting these different social capital networks onto the context of flood risk management, they can help determine how authorities are trying to build and stimulate these networks to enhance the adaptive capacity of residents to flood risk.

The three types of social capital networks influence the adaptive capacity of citizens within the governance arrangement differently. Bonding social capital facilitates cooperation among closely tied members of a network, bridging social capital facilitates this cooperation between different networks that have more or less the same status, and linking social capital facilitates this cooperation vertically between both bonding and bridging networks and their interaction with governmental organisation in positions of power. All in all, it is recognised by the different authors discussed, that the networks contribute to the facilitation of collective action. Moreover, it is acknowledged that these networks can be created and therefore also stimulated. The usefulness of the various social capital networks within flood risk management is discussed in the next section.

2.5 FRMAs & social capital networks: a conceptual framework

The goal of this research is twofold. It aims to study the efforts made within a FRMA to involve citizens in flood risk management, and find a way to study social capital in relation to flood resilience *a priori*. Therefore, the concepts of 'policy arrangements' and 'social capital networks' are the basis for building a conceptual framework.

Based on Wiering & Immink's dimensions described in section 2.3, this framework identifies the dominant visions and institutions in a specific FRMA on a city level. Thereafter, the framework zooms in on the dimension of the 'coalition of actors' and examines how citizens are involved in flood risk management within this particular arrangement, by using the theory of social capital. In doing so, a framework evolves which can be used to study the way in which roles and responsibilities within a FRMA are redistributed to citizens, and if these attempts increas the overall resilience of the arrangement. Figure 5 shows this conceptual model. In the rest of the section, the framework is discussed in more detail.

Theory / Purpose	Dimensions of policy domain	Criteria for analysing arrangement
Flood risk management arrangement /	Content: the substance of a policy arrangement	- Dominant visions and concepts (content analysis)
Describe flood risk management arrangement in a city	Organisation: the way in which the policy arrangement is organised	 Who are involved (coalition of actors) Who has the authority to do what; what plans to make, which decision to make (power and resources) Legislation and planning culture (rules of the game)
	Social capital networks	Criteria for analysing creation and stimulation of social capital networks
Social capital	Linking: Social networks between people who interact	- Provision of information to citizens to

networks /	with formal or institutionalised		increase their flood awareness
Explain citizen involvement	xplain citizen power nvolvement		Use of local knowledge to enhance governance capacity to adapt to local situation
an inward f reinforce al within hom Bridging: S are more of	Bonding: Social networks with an inward focus and tends to reinforce already existing ties	-	Encouragement of strong community building to stimulate information provision among citizens themselves
	within homogenous groups	mogenous groups -	Use of collective memory of previous flood disasters to increase awareness
	Bridging: Social networks that are more outward looking, cutting across different layers of society	-	Stimulation of interaction among different networks to foster flood awareness of whole community, including the more vulnerable groups

Figure 5: Conceptual framework

Content of policy arrangement

To examine the particular FRMA of a city, the framework builds on Wiering & Immink's four analytical dimensions. These are: 'coalition of actors', 'power and resources', and 'rules of the game' to describe the organisation of a FRMA, and 'policy discourse' to describe its content. However, the way this research understands the content of a policy domain slightly differs from Wiering & Immink's description of policy *discourse*, as this research only looks at what is stated in the policy documents and plans (content). Examples are; statements on how the city protects itself from high water, or what goals have been set for the future to address climate change. The extra dimension that 'discourse' adds to an analysis, which for example also implies an analysis on *how* something is written or said, is not done in this part of the study. Therefore, this research refrains from using the term 'discourse', and instead uses the term 'content analysis'. By analysing the content of the flood risk management domain, dominant concepts and visions can be identified, which includes: the flood protection concept of the city, and goals for the future.

Organisation of policy arrangement

For the organisational dimensions, in this research the 'coalition of actors' will focus on describing the different stakeholders involved in addressing flood risk. This provides insight in who is involved and who is not, and which changes are occurring in the FRMA with regards to stakeholder involvement. This is of importance, due to the fact that the appearance of new actors, changes in the composition of coalitions, and the broadening and breaking of coalitions often occur within a policy arrangement (Arts et al., 2006). In light of the need for citizen involvement, studying the changes within the coalition of actors provides information on the status of their role in flood risk management.

'Power and resources' describe the decision-making powers of the different stakeholders, e.g. whom has which policy measures at their disposal, or what is the hierarchy between the different actors involved. As these four analytical dimensions that are being discussed are inextricably interwoven (Arts et al., 2006; Wiering & Immink, 2006), a change in one dimension induces change on other dimensions. For example, the appearance of new actors or the changing of coalitions also implies a change in power relationships (Arts et al., 2006).

The 'rules of the game' refer to formal and informal rules, the former being legislation and the latter the dominant planning culture. Legislation on a higher administrative level can inform legislation on a lower level (Arts et al., 2006). For example, the European Water Framework Directive informs national water management policies. The same goes for national water management policies that inform regional or local water management policies. With regard to dominant planning cultures, planning practices in various countries can differ greatly from one another. The geographical circumstances and national history of a country shape and influence strategies to intervene in the spatial domain, and the flood risk management domain. For example, a low-lying country situated adjacent to a sea can result in a strongly developed water management sector, and the institutional structure in a flood risk management domain is highly dependent on the constitutional make-up of a country.

Together, the four analytical dimensions shed light on both the content and organisation of the FRMA in place. Thereafter, the framework allows for examining how, within this FRMA, through building and stimulating social capital networks, citizens are involved in flood risk management.

Social capital networks

Within a flood risk management context, collective action is needed to enhance the adaptive capacity of coastal communities to flood risk (Adger, 2003; Aldrich, 2012; Pelling & High, 2005; Wolf et al., 2010). Enhancing this capacity is necessary, because the redistribution of roles and responsibilities within flood risk management entails that citizens now also have to be aware and know what to do with regards to flood risk. The different types of social capital networks can accommodate this redistribution.

As seen above, linking social capital is typified as a network that consists of bonds between individuals within a network and governmental organisations that are in a position of power (e.g. public water authorities). Its use in flood risk management lies in the fact that such a network increases the awareness of citizens on flood risk, as the network allows for those governmental organisations to provide information to the citizens (Aldrich, 2012). In addition, often communities have more information about the local situation in which they themselves live than that the government does. They can provide critical information free or at low costs, thereby enhancing the governance arrangement's capacity to adapt to the local circumstances (Aldrich, 2012). When a linking social capital type of network is in place, an opportunity is provided for citizens to inform government on these local situations. But not only linking social capital enhances the adaptive capacity of coastal communities. According to Folke et al. (2005), both horizontal and vertical dimensions of collaborations are necessary for adaptive governance.

Bonding social capital represents the relationships between friends, neighbours and family. Characteristic for these kinds of networks is that the members in the network are closely tied in with each other. Such a network strengthens the memory about past natural disasters and the exchange of information about possible future risks and mitigation behaviour (Dzialek et al., 2013). These flood memories and stories play an important part in building knowledge capacities among local community members (Kempe, 2007).

Bridging is a less used strategy by individuals for household level responses to a shock, but it is of importance for understanding the functioning of collective action groups. Moreover, bonding social capital can have negative externalities in the sense that it can exclude less resourceful and powerful groups such as minorities, elderlies, the poor and the less educated (Pelling, 1998). Hence, stimulating bridging social capital networks between marginalised groups and the rest of society plays a role in enhancing the flood resilience of the cases and is of great importance, as it could decrease the vulnerability of these groups to flood risk. Furthermore, the weaker links (bridging) may allow for the transfer of local knowledge about flood risk to e.g. new inhabitants (Berke et al., 1993; Bolin & Stanford, 1998), as these networks are more outwards looking. Therefore, not only bonding, but also bridging social capital should be built and stimulated. At first glance, opportunities to create and stimulate bridging social capital networks lie in mixing the different groups (e.g. tenants and buyers, the working class and the middle class) so that social interaction is encouraged. This indeed is often a policy strategy taken by planners and policy makers, according to Lees et al. (2012). However, stimulating close physical ties between members of different groups does not automatically lead to closer social ties (Blokland-Potters, 2003; Butler, 2003). In fact, Lees et al. (2012) argue that social mix policies are largely ineffective for a variety of reasons such as that it is a one sided (governmental) strategy, and that policy makers have given little consideration to how the mixed groups interact as neighbours. It will be investigated how actors within the current FRMA in place tries to achieve and deal (with) all this.

The goal of this part of the framework is to study how, within the FRMA of the case, social capital networks are created and stimulated to increase citizen involvement, thus, zooming in on the dimension of 'the coalition of actors' within a policy arrangement. For example, how are past disasters utilised to increase the awareness of citizens (bonding social capital), how is it ensured that also more vulnerable groups within the area (e.g. new residents) are aware of flood risk (bridging social capital), how is information on flood risk provided to citizens and how is local information used in flood risk strategies (linking social capital)? In light of the shift in water management, where traditional stakeholders (governments) now have to redistribute roles and

responsibilities, studying social capital networks can provide insights of the traditional stakeholders approaches to enhance citizen involvement in flood risk management. This is, as discussed, necessary for increasing the flood resilience of cities.

2.6 Conclusion

This chapter illustrated the theoretical concepts of resilience, policy arrangements and social capital. It is argued that resilience seems a promising concept to deal with increasing flood risks; resilience implies a broadening of stakeholders, including citizens; social capital creation and stimulation is needed to ensure that citizens have the capacity to deal with their new role and responsibility; and to be able to study how these networks are created and stimulated, existing FRMAs of cities need to be studied. Consequently, a framework is developed by which citizen involvement in flood risk management can be studied. In chapter 4 and 5 the framework is tested through two cases: The HafenCity in Hamburg and the Royal Docks in London. The following chapter, chapter 3, first discusses how the literature review of the theories in this chapter was carried out, and which methods are used to collect the empirical data of chapter 4 and 5.

3. Methodology

As the main research question requires explanation or understanding of social phenomena in its context, a qualitative and interpretivistic approach is taken in the form of comparative case study research comprising of semi-structured interviews and document analyses. In the following sections, first the methods for reviewing the literature in the previous chapter are discussed. Then, it is explained why a qualitative research approach was adopted by discussing the philosophical underpinnings of the research. Thereafter, the reasons for a comparative case study and the particular case selections are discussed. The chapter ends with elaborating on the research strategy and the particular methods and techniques that were used to analyse the cases.

3.1 Literature review

The previous chapter was the literature review. It showed the theoretical background of the thesis, e.g. the need for resilience in water management, how citizen involvement relates to resilience, and how to examine policy arrangements. Additionally, it explained the theories of resilience, policy arrangements and social capital more deeply, resulting in a conceptual framework that is used for the empirical study in chapter 4 and 5.

Several articles were used as a starting point for the literature review of this research. Such articles were Meijerink & Dicke's (2008) article on the shift in the public- private divide in flood risk management, and Mees, Driessen and Runhaar's (2014) article on legitimate adaptive flood risk governance beyond the dikes. From there, the reference list of the articles was used as an indicator of relevant articles to read, thereby focusing on publication date, (combination of) key words in titles such as 'resilience', 'social capital', 'citizens', 'citizen involvement', 'flood risk management', 'policy arrangements', 'England', 'Hamburg', 'Royal Docks', 'HafenCity'. To gain an image of the key scholars in the relevant fields, the author looked at the amount of times certain authors were mentioned in articles. For example, in the literature on resilience. In the social science literature on social capital, this goes for Putnam, and in literature on policy arrangements, well-known authors are Arts, Immink, Tatenhove, and Wiering These insights

were used to gain a strong understanding of the concepts by reading the work of these key scholars. And because of the author's background in Socio-spatial Planning, the author already read some social science literature on social capital, mainly Robert Putnam's work and his explanation of different forms of social capital such as bonding and bridging. Moreover, the author followed several courses during the master's degree programme of Socio-spatial Planning and Environmental and Infrastructure Planning that covered several planning theories and articles. These theories and articles were also used as input for this research.

Sharp et al. (2002) note that there are two main reasons for reviewing the literature. The first reason for reviewing the literature is to generate and refine the research ideas. The second is to show the reader the current state of knowledge on the subject, its limitations and to provide insights in how this thesis fits in a wider context. The author refined the research topic by starting to read a wide arrange of literature on resilience in flood risk management, policy domains, and the need for citizen involvement in planning in general and in flood risk management in particular. Initially, there was little thought on how to select appropriate articles, other than using the articles proposed by lecturers, digging through reference lists of those articles, and searching for articles with the help of typing in key-words in search engines such as Google scholar, WorldCat, Picarta, et cetera. Through this approach, many relevant articles were found. According to Berg (2001) this stage of the literature review should be carried out with the help of thinking creatively about cryptic search topics, listing cryptic search terms, developing different search areas, and so on. Such a strategy was not taken in this research. In today's world, there is such a vast amount of academic resources available through the Internet, that it is not that difficult to find relevant information. Moreover, students have become quite handy with the use of search engines and key words that relevant information is found quickly. The initial search resulted in a pile of information, which in some way needed to be brought back to a selection that was relevant and still reviewable. According to Carnwell & Daly (2001), with the use of exclusion and inclusion criteria such as time frame, focus of articles, language or national context, the selection of articles could be narrowed down. In this case and in this stage a broad selection of articles was made that focused on the planning for and management of flood risk,

citizen involvement in flood risk management, social capital in planning and flood risk management, and the concept of resilience in flood risk management. With the help of this literature review the researcher gained some preliminary insights, which was used as input for the second phase.

After the initial search resulted in a reviewable and comprehensive database, the object of research was defined more specifically. The focus was on literature that in some sort of way combined social networks, social capital, and citizen involvement with resilience and flood risk management. By searching for this combination, new scholars, articles and books were found.. Because of the refinement of the research object, it became clear that the emphasis of the research would lie on strategic recommendations for governmental policy. Therefore, the researcher also made an initial search for relevant documents of policy makers on the HafenCity and the Royal Docks in combination with flood risk management. More on this can be found in the next sections of this chapter, which discusses the methods used to collect the empirical data.

3.2 The research philosophy

To a large extent, the way in which the method of data collection is formed depends on the worldview that guides the investigation (Guba & Lincoln, 1994). The research philosophy used contains important assumptions about the way in which the author views the world. In turn, these assumptions underpin the research strategy and the methods that are part of this strategy (Saunders et al., 2009). Two major components of a research philosophy are ontology (the researcher's assumptions about how the world operates) and epistemology (the ways of knowing the world) (Hay, 2010). To be able to outline the ontological and epistemological perspectives of this planning research, it is essential to have an understanding of the philosophical context that lies at the basis for the various planning perspectives of the world, and to have knowledge of the discussions in the general and social sciences that constantly influence these perspectives (De Roo & Voogd, 2004).

For a long time planning as a science followed the natural scientific method, characterized by reductionism, cause-effect relations, formulas, and so on. Planning operated on the premise that there was an objective reality to be found. This ideology could clearly be seen in the technical blueprint planning of the 70s in the previous century, where planners drew up plans in their ivory towers. Planning was seen as a scientific profession in where certainties and control could be obtained by reasoning through scientific knowledge (De Roo & Voogd, 2004). However, this modernistic philosophy that dealt with planning issues in a technical rational manner led to outcomes that were infeasible and impractical (De Roo & Porter, 2007). For the more complex issues where conflicts of interests were an issue and multiple stakeholders were involved, the technical rational approach did not offer a solution (De Roo & Voogd, 2004). Because of this, new constructions explanations were developed, such as bounded rationality, strategic choice approach and scenario planning. As with the technical rational approach, but the focus was on the development of various alternative future scenarios and the ways to get there (De Roo & Voogd, 2004).

In the 90s of the previous century, another paradigm shift took place (Allmendinger, 2009). The belief in obtaining absolute certainty in the planning process was discarded (De Roo, 2010). The concept of communicative rationality emerged which advocated an approach where reality is seen as relative and therefore interaction with social actors is needed to come to an agreed upon reality when faced with complex issues. More importantly, it became apparent that the world was constantly changing, and societies are not contained systems but are constantly influenced by external factors. With this, the intersubjective character of planning was acknowledged (De Roo & Voogd, 2004). It became apparent that there is no one objective reality to be known understood by mathematics. Instead, it became clear that multiple realities exist, because what reality is depends on the view of the person(s), and therefore reality is (inter) subjective. This ontological perspective is used in this research because planning issues manifest themselves in a context that is constantly changing, due to changing perceptions of actors involved.

With this in mind, epistemologically, an interpretivist stance is taken. Unlike the natural world, the social world is far too complex to lend itself to theorising by definite laws (Saunders et al., 2009). Reducing this complexity to law-like generalisations will lead to useful insights to be lost. With this planning research, research is conducted among people. It tries to find out how

social actors see the use of social capital in trying to enhance flood resilience. A positivistic natural science method characterised by value-free research focused on causal relationships is inappropriate here, because the social world is mediated through meaning and human-agency, not governed by law-like regulations (Snape & Spencer, 2003). Moreover, the interpretivist stance acknowledges that with planning research, the researcher and the social world impact each other, and facts, values, and findings are inevitably influenced by the researcher's perspective and values. This makes it impossible for the researcher to conduct value-free research. For the planning researcher it is therefore essential to be as transparent as possible when making assumptions, which means that a clear research strategy and techniques to extract and analyse data have to be in place.

3.3 Comparative case study research

The decision for case study research was made, because it allows for a detailed analysis of why theoretical concepts or explanations do or do not occur in the context of the particular case (Baxter, 2010). In the context of social capital networks, policy arrangements and resilience, the case study helps to gain insight to study these concepts in practice. By and large, case study research is used as a research method when the following three situations apply:

- The main research question is a 'how' or 'why' question;
- The researcher has little or no control over behavioural events;
- And the study focuses on a contemporary phenomenon (Yin, 2014).

For this research a 'how' question is composed, as the research has as its aim to explain how citizens are involved in flood risk management. In doing so it tries to further explain the relationship between governments and residents in a flood risk management context. The second and third conditions help to make the distinction between doing history, case study and experimental research (Yin, 2014). Case study research makes use of many of the same techniques as a history study, but as opposed to the latter, case study research has the opportunity to add two more sources of evidence when dealing with contemporary issues, being: direct observations of the events studied and interviews with the persons involved. With regards to

experiments, case study research is more suitable for this research, since the researcher has no control over the set of events that are being studied.

Within the case study method a distinction can be made between single case study research and multiple case study research. In this instance a multiple case study design is chosen, because the evidence of multiple cases is considered to be more compelling, and therefore more robust (Herriott & Firestone, 1983). Moreover, the comparative nature of the research means that a cross case comparison between cases can be made, taking into account the different contexts in which the cases are manifested. It allows the researcher to analyse within each setting and across settings (Baxter & Jack, 2008). With a comparative case study, careful consideration is needed with the selection of cases that are going to be compared to each other. On the basis of the background sketch, the subsequent research questions and the literature review, in this research two cases are selected in which it is pre-presumed that the shift in flood risk management can be seen in both cases, which therefore also means that social capital networks are in some way used to enhance citizen participation in flood risk management. In the following section the rationale for the case selection is explained in more detail, the case analysis itself will be done in the next chapter.

3.4 Case selection

Many large metropolitan areas with access to river or sea have waterfront development projects, turning former harbour areas into new residential, commercial and recreational areas (Priemus & Davoudi, 2012). These kinds of un-embanked projects are interesting case studies, since often the responsibility of flood protection fall beyond the scope of the public authorities (Mees et al., 2014). First attempts where a shift from the technical towards resilience is noticeable, and new forms of the public-private divide emerge, are The HafenCity in Hamburg and The Royal Docks in London. Both cases lie in big West-European cities and both are former harbours turning into massive regeneration projects. The HafenCity in Hamburg is situated outside the main dike line and therefore falls beyond its protective scope. Hence, more adaptive flood protective measures are being implemented in the HafenCity. For the Royal Docks case, it is explicitly stated that

enhancing flood resilience in parts of the Royal Docks will be an element of the regeneration scheme (see Thames Estuary Plan 2100, p. 122).

Both cases are in a different state of development, a large part of the HafenCity has already been built, whereas the Royal Docks has not. This takes away the possibility to interview residents of The Royal Docks. However, these different stages of development also provide opportunities when comparing both to each other and are therefore suitable for comparison. The different stages of development give the opportunity to make a comparison with the underlying notion of 'lessons learned'. This means that the field study explores the implementation of the HafenCity plan thereby having the operationalization of social capital networks as the main focus, and looking more closely at the so-called 'Flutschutsgemeinschaften', which are civic communities, who are responsible for the flood preparedness and closing the mobile flood doors in case of a flooding (Mees et al., 2014). More on this can be found in the case analysis itself. Thereafter the plans for the Royal Docks are analysed, thereby studying if, and how, these plans take into account the role of social capital networks to enhance citizen involvement in flood risk management. Thus, in this chapter the emphasis will lie more on the intentions of the involved stakeholders to address flood risk and involving residents, rather than focussing on what is already there. This case is especially interesting to research, as there are no communities yet from where such networks can be stimulated. Therefore, it is all the more interesting to explore how the stakeholders involved with the regeneration are planning to create and stimulate such networks from the ground up.

3.5 Strategy & analysing techniques for the empirical research

For this research, the case study evidence for both cases consists of documents and interviews. Multiple sources of information are used, because conclusion drawn on the basis of multiple sources of information are likely to be more convincing than conclusions that are drawn on the basis of one source of information (Yin, 2014). Therefore, different sources of information are used to validate the findings for the case studies. To set the stage, a context description is given with the help of various documents about the specific case and more general information regarding flood risk in the area. To understand the structure in which social capital may unfold,

the analysis builds on Wiering & Immink's concept of 'policy arrangements' as discussed in chapter 2. Thereafter, the various social capital networks are covered, and how, within the FRMAs these networks are being built and stimulated. This part of the analysis is done on the basis of the theoretical framework from chapter 2, and will explain how the FRMA that is in place tries to involve residents by building and stimulating social capital networks. Thereafter, the findings are summarized, compared, interpreted, and reflected upon. Table 2 gives an overview of the various steps taken in the empirical chapters and how the theoretical framework is linked in with these steps. In appendix 1 a complete overview of analysed documents and their link to these research steps is provided.

Steps	Topic of analysis	Analytical strategy	Link with theory
1: Contextualisation	- Case description.	Analysing regeneration	
(sections 4.1 & 5.1).	- Flood risk in the case	plans and data on flood	
	study area.	risk for the area with the	
		help of a document	
		analysis and interviews.	
2: Description of	- Structure in which	Analysing visions,	Wiering & Immink's (2006)
flood risk	social capital may	concepts, actors,	description on content and
management	unfold: Visions,	responsibilities, and rules	organisations (see section 2.3 of
arrangement	concepts, actors,	for dealing with flood	this research) is used as input for
(sections 4.2 & 5.2).	responsibilities, and	risk with the help of a	structuring the analysis.
	rules for dealing with	document analysis and	
	flood risk.	interviews.	
3: Explanation of	- Analysing the creation	Analysing three different	The three different social capital
citizen involvement	and stimulation of the	social capital networks:	networks discussed in the
(sections 4.3 & 5.3).	different types of	bonding, bridging and	theoretical framework of chapter
	social capital networks	linking with help of a	2 function as the structure for the
	within the policy	document analysis and	analysis.
	arrangement so as to	interviews.	
	include citizens in		
	flood risk		
	management.		
4: Comparison of	- Comparing the case		
case findings and	findings, and		
interpretion of	interpretation and		
findings (chapter 6)	reflection on the use of		
	social capital networks		

management.	in flood risk		
	management.		

Table 2: Overview of research steps

Document analysis

An important feature of the case study research is the document analysis. Analysing documentation on the two cases provides the opportunity for assessing data that can be reviewed repeatedly, is unobtrusive and exact, and has a broad coverage (Yin, 2014). Most importantly, documentation on both cases can help figure out if evidence gained through the interviews corroborates with the documentary information. However, it should be kept in mind that such documents may be biased. When reviewing the documentation it is important to understand that every document used, is written with a certain purpose. By constantly trying to identify these objectives, the researcher can avoid being misled (Yin, 2014). For the analysis of the documents, the method of 'interviewing your documents' by O'leary (2010) is used. This method treats the document that is being analysed as a respondent. Pre-defined questions are drafted, and every part of the document that answers or contributes to answering the questions is highlighted. Subsequently, to organise the information, the highlighted parts of the texts are copied into a separate file and sorted by question. For the document analysis the following questions were prepared:

- What are the redevelopment plans for the area? (Case description)
- What flood risks are there? (Case description)
- What measures are in place? (Flood risk management arrangement)
- Who is involved, what are their roles and responsibilities? What policy measures can they take and what rules applies? (Flood risk management arrangement)
- How are social capital networks built and stimulated? (Explanation of citizen involvement)

Interviews

For this research, part of each case study is a set of interviews. The interviews are semistructured, because it allows for some key themes to be set up that function as a guideline for the interviews. Within these key themes, questions are formulated that may vary depending on the interviewee. In this way, it allows the researcher to incorporate flexibility in the empirical data collection method, but still provides the possibility to maintain key guidelines that are essential for answering the main research question. In order to answer the main research question, it is necessary to understand the reasons for the participants' decisions, opinions and views. The semi-structured interviews allow the researcher to use probe questions when an explanation for such a particular decision, opinion or view is needed. This is important, because the research takes an interpretivist epistemology in where the researcher is concerned with understanding the meanings that the various stakeholders ascribe to social capital networks in enhancing flood resilience.

Interviews were held with seven persons, with the goal to understand how the stakeholders in the HafenCity and the Royal Docks see and use the available social capital in practice. In both instances, the researcher went to the cases. This gave the researcher the opportunity to study the perceptions of the stakeholders within their context and directly observe the events being studied. This contributed to the researcher's ability to contextualise the cases and put the developments in perspective. In London an interview was held with a governmental official of the Borough of Newham, since the Borough is responsible for granting planning permission for the development in the Royal Docks. Also, two interviews with the Greater London Authority (GLA) were held, because the GLA is the main driver of the Royal Docks regeneration project. For information about a particular residential redevelopment scheme an interview was conducted with the leading architect of the proposed development scheme and the housing association. With these two interviews, insights could be obtained about what is actually happening in the Royal Docks at this moment and how resilience and social capital are being integrated in the development plans. In the HafenCity two interviews, one with the ministry of Interior and Sports, and one with a resident who is also a builder and flood protection officer of his building in the HafenCity, were held so to gain an image of the ways in which the HafenCity manages its flood risk; how it is handled on a strategic level and how it is perceived on a local level. The following table shows an overview of the interviewees.

Interviewee	Type of interview	Date
Senior Project Manager in the development and new business	Skype	23-05-2014
department of a housing cooperation. Responsible for taking the		
proposed residential development scheme through the planning		
process.		
Associate Director at architectural firm. Lead architect on proposed	Face to face	27-05-2014
residential redevelopment scheme.		
Planning Officer at London Borough of Newham.	Face to face	29-05-2014
Development Manager in the Housing & Land Directorate of the	Face to face	29-05-2014
GLA. Regulator of social housing providers in London.		
Strategy Manager for climate change adaptation and Water at the	Face to face	29-05-2014
GLA. Responsible for increasing London's resilience to extreme		
weather and climate change.		
Resident of the HafenCity in Hamburg and part of a	Face to face	02-06-2014
Flutschutzgemeinschaft. Also owner of a company that built several		
buildings in the HafenCity.		
Head of the department for civil and disaster protection. Responsible	Face to face	05-06-2014
for the disaster management of the city of Hamburg.		

Table 3: Overview of interviewees.

Practical considerations

The selection of the seven particular organisations was made because of their substantive relevance to the research, but also practical considerations were part of the selection. For a research, there is no fixed number of interviewees to be interviewed. The number of interviews depends on the goal of the research, but also has to do with more practical considerations such as time and money limitations. Because the research analyses two foreign cases, the researcher had to choose for participants that were relevant, but could also be reached and interviewed within the time that the researcher was on location. To interview as much relevant stakeholders as possible, the researcher provided the option for Skype, telephone or e-mail interviews, as well. However, despite the different possible ways to do the interviews, the geographical, time and

money limitations did have its effect on the selection of the interviewees. This meant that some organisations that initially were marked as possible stakeholders were later crossed of the list, because it became clear that these stakeholders were unreachable, unable or unwilling to be interviewed on the subject. One such important stakeholder was the Environmental Agency (EA), who, because of the recent floods in the UK, did not have the time to be interviewed. Therefore it was decided to do a more extensive document analysis on reports of the EA, so to fill the gap. Another stakeholder who could not be interviewed because of reasons aforementioned was the HafenCity Hamburg GmbH, who is responsible for managing the development of the HafenCity.

An additional constraint had to do with the language barrier. For the HafenCity interviews, some of the interviewees had to be approached by e-mail. But because some of candidates preferred to communicate in German, some of the e-mails and one of the interviews had to be in German. In deliberation with the thesis supervisor, who is German, it was agreed that the supervisor would help translate the e-mails and would take part in the interview to translate and ask the questions with the interview that was held in German.

Structure and process of the interviews

With most organisations, first contact was sought by e-mail. In the first contact, the researcher clarified the intentions of the interview and provided some background information. In some instances the researcher already had a specific person of the organisation in mind, because of the researcher's own network, or by suggestion of the thesis supervisor or another interview candidate. When this was not the case, the organisation usually provided the relevant person within the organisation based on the background information provided by the researcher. As previously mentioned, the option for Skype interviews was also given to the participants, and in one occasion such an interview was indeed conducted because the participant was unavailable in the time the researcher was on location in London.

As stated previously, semi structured interviews were conducted. The foundation for each interview was the same, but for each participant slight alterations were made. For example, to

understand what was happening in the Royal Docks, the interviews with the architectural firm and housing association really helped to gain insight in the developments there. But to gain such an understanding, the interview questions had to be more directed towards the development plans and less towards the theoretical concepts of resilience and social capital. Moreover, because this research is part of a larger research group, some of the interviews were held together with another researcher who's research partly overlaps with this research and therefore had to interview the same participants. To do the interviews as efficient as possible, both researchers interviewed those participants at the same time. Therefore, some interview guides exist out of questions of both researches. Also, each interview provided the researcher with more insights about the case. These insights were included in each subsequent interview, which also had an impact on the formulation of these interview questions. In appendix 2 the interview guides can be found.

3.6 Conclusion

In this chapter, the methods for reviewing the literature and collecting the empirical data were discussed. As explained in section 3.2, due to the intersubjective character of planning, an interpretivistic stance has been taken. These ontological and epistemological perspectives inform the research approach taken in this research. Hence, a qualitative research method in the form of comparative case study research is carried out where, with the help of semi-structured interviews and document analyses two cases are analysed. In the following two chapters the results of the case studies is presented. Firstly, the case of the HafenCity in Hamburg is described and analysed. Thereafter, in chapter 5, the same is done with the case of the Royal Docks in London. Both chapters follow the research structure as described in section 3.5, which is: contextualisation, description of the policy arrangement, and explanation of citizen involvement.

4. The HafenCity Hamburg

4.1 Contextualisation: the HafenCity redevelopment & flood risk

Case description

The HafenCity in Hamburg is currently one of Europe's biggest inner city development projects (HafenCity Hamburg GmbH, 2013). It is located near to the city centre, the distance to the town hall and central station is 0.8 and 1.1 km respectively. The development aim of the project is to provide a new waterfront city centre that has a harbour ambience for housing, offices, culture, tourism and shopping (HafenCity Hamburg GmbH, 2006). The total size of the area covers 155 hectares, of which 55 hectares is water and 100 hectares is land (HafenCity Hamburg GmbH, 2006). More than 6.000 residential units are being built that will house over 12.000 people, and the development offers over 45.000 job opportunities (HafenCity Hamburg GmbH, 2014a). In total, 10 quarters make up the HafenCity redevelopment, each having its own individual profile. So far, 56 projects have been completed and another 49 are in construction or in the planning stage (HafenCity Hamburg GmbH, 2014a). Most of the developments are aimed at building high quality and high value house buildings. Some of these developments mix uses (e.g. commercial and residential) and the form of housing (e.g. tenants and buyers), albeit that most of it is for the higher segment. In the future, more affordable housing will be available in the HafenCity, according to its website, as the presence of corporate housing associations will be greater in the area.

The redevelopment for the area officially started in 1997, when the former mayor of Hamburg announced the city's plans for redeveloping the whole area. Though, well before 1997 already processes for the redevelopment were put in motion. The redevelopment became possible when the old harbour infrastructure in the area was no longer usable, due to modern container traffic (Othengrafen, 2012). This caused the sites for container traffic in the area to be moved to the southwest, thereby creating an opportunity to open up the city towards the Elbe (Othengrafen, 2012). Up to then, the harbour area was separated from the inner city by the 'Speicherstadt' (the old warehouse district), which was seen as an artificial boundary (Hautz,

2008). With the displacement of the sites for container traffic, it became possible to remodel Hamburg's inner city by reconnecting it with the harbour area. However, before this became possible, the sites had to become publicly owned land. Therefore, in 1991 the former mayor authorized the Hamburg Port Authority (HPA) to purchase sites in the harbour and to allow contracts of enterprises to expire (Othengrafen, 2012). At first, this process was guided by a small group of people: the mayor, the ministers for economy, finances and urban development, and the Hamburg Port Authority. This, in order to prepare the conversion of the former harbour sites without involving the broader public. Reason being that involving the broader public would likely have led to resistance in the port industry, as well as resistance to the acquisition of buildings or companies, which would have raised the stakes in terms of costs. Then in May 1997, on the basis of a feasibility study, the former mayor announced that the area was going to be redeveloped, and in August of that year Hamburg's Senate and parliament gave the go-ahead for the HafenCity project. Based on the feasibility study a concept Masterplan was drafted. No less than 175 planning offices participated in a competition to develop the final Masterplan (Othengrafen, 2012). In 2000 the HafenCity Masterplan was officially approved, formulating the urban development concept of the area with the help of urban typologies, use structures, infrastructure provisions and implementation phases. The redevelopment is phased from west to east, and north to south. Construction of the first neighbourhood in the area started in 2003 and the first occupants moved into the HafenCity in 2005. The projected completion for the whole redevelopment is in 2025 (HafenCity Hamburg GmbH, 2014a).

Flood risk

The HafenCity is part of the city of Hamburg, which is the second largest city in Germany and has the second largest port in Europe. The city is faced with an increasing flood risk from sea level rise, as well as, from rising discharge levels from the river Elbe (Mees et al., 2014). The HafenCity project expands the inner city of Hamburg by 40 percent, bringing the inner city of Hamburg closer to the river Elbe (Restemeyer et al., 2015). The area is situated on low-lying land, 4 to 5.5m above sea level. It hugs the river Elbe for more than 3.1 km and has a total

waterfront of over 10.5 km (HafenCity Hamburg GmbH, n.d.). Figure 6 shows the location of the HafenCity and its position with respect to the river Elbe. Moreover, it shows that the area lies south of the main Hamburg dike. This means that the existing dike line does not provide protection for the HafenCity project from the river Elbe.



Figure 6: HafenCity Hamburg, existing dike line, and the Northern Elbe

4.2 Description of HafenCity's FRMA: content and organisation

Content: visions and concepts

The authorities in Hamburg find that the HafenCity should receive the same level of flood protection as the inner city area behind the main dike line (LSBG, 2012b). With the design of the HafenCity two possible solutions were suggested to deal with the issue: building a new dike around the area (the polder solution), or elevating all buildings, roads and bridges up to at least

7.5 meters above sea-level (the dwelling mound solution)² (Restemeyer et al., 2015). Instead of building another dike around HafenCity, the authorities in Hamburg favoured the dwelling mound solution. This approach was chosen, because surrounding the HafenCity with dikes meant that development of the area could only begin after completion of the dikes, hindering a speedy start. Also, the construction of dikes would have generated high front-end costs, and from an aesthetic standpoint dikes would have precluded the unique waterfront characteristics of the area (HafenCity Hamburg GmbH, 2014a). Figure 7 shows the flood protection concept. The ground floors and basement levels function as the flood protection. Some of these levels are used for commercial uses, some for parking garages. In this way, the HafenCity has the same level of protection against flooding as the inner city area behind the main dike line, and the elevated roadways provide safe access and egress routes for the fire brigade and ambulance services. In the event of a flood, temporary floodgates are installed so that the functions on ground level (parking garages and commercial uses) are not damaged (Restemeyer et al., 2015).

Other flood risk measures taken in the HafenCity vary from construction to legal measures. Within the area, specific building codes are in order that regulate the flood protective adjustments of HafenCity buildings. Infrastructure in the area is climate proofed, such as the elevation of evacuation routes. Furthermore, a local flood protection law is of effect in the area, which legally secures the different measures and responsibilities. In addition, evacuation schemes and warning schemes for the HafenCity exist which inform residents on what to do in case of a flood event. These include information such as which areas are safe and which escape routes can be taken.

 $^{^{2}}$ 7.5 meters is the same height as the existing dike line that protects the inner city of Hamburg. In some newer parts of the HafenCity, dwelling mounds are being built that are higher than 7.5m, due to changing climate predictions (Interview BIS, 2014).

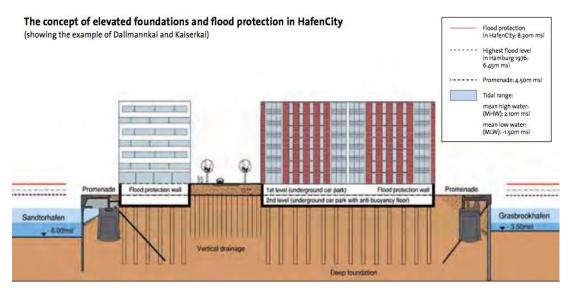


Figure 7: Dwelling mounds concept and flood protection in the HafenCity

Organisation: actors, authority and rules

Flood risk management and disaster management have become important policy fields in Hamburg, due to the storm surge of 1962 where more than 300 people died (Restemeyer et al., 2015). Within these domains, important governmental decision making bodies are the Ministry of Urban Development and Environment (BSU) who is concerned with planning related issues, the state agency (LSBG) who is responsible for flood protection infrastructure and is part of the Ministry of Economy, Traffic and Innovation (BWVI), and the Ministry of Interior and Sports (BIS) responsible for the disaster management of the city. The BSU has the official duty by German law to care for flood protection. BSU sets the agenda on flood protection policies and makes decisions on the flood protection strategies for the HafenCity and on the policy instruments (Mees et al., 2014). For example, the minimum heights of the dwelling mounds are legally secured through building codes for each of the HafenCity neighbourhoods. The BSU checks at both the design stage and at the completion of the BSU's responsibilities (Mees et al., 2014). It conducts regular research on climate change and sea level rise (for example: 'Gewässer und Hochwasserschutz in Zahlen', LSBG, 2012a), which is used as input to set the

targets on the flood protection norms in the HafenCity. The BIS holds a special position in the institutional structure of Hamburg. The BIS is the body responsible for emergency planning for all the risks in Hamburg, be it aircraft accidents, chemical disasters or floods (Interview BIS, 2014). This centralised structure in Hamburg is rare in Germany, as normally the lower district is responsible for disaster management. The centralised policy composition of disaster management in Hamburg is a consequence of the 1962 flooding where 30 percent of the city area flooded and more than 300 people died (Interview BIS, 2014). The disaster led to the realisation that the city needed a political level that had the capacity to make urgent decisions quickly without too much bureaucracy, and knew how to manage the situation with the help of predetermined plans that could be used to inform lower authorities, the police, the fire brigade, health services and the Hamburg Port Authority (Interview BIS, 2014). Hence, the Ministry of Interior and Sports gained to responsibility for disaster management, which includes managing emergencies regarding flood risk.

On a district level, the HafenCity Hamburg GmbH (GmbH), the Bundesamt für Seeschifffahrt und Hydrographie (BSH), private stakeholders who build and reside in the HafenCity, and residents of the HafenCity are important stakeholders. The GmbH is the development company of the city that coordinates the HafenCity project. It is fully owned by the city and gained the responsibility of managing and coordinating the development, which includes the financial responsibility for public investments such as roads, bridges and parks, but also other responsibilities such as clearing and preparing sites, planning and building public places, acquiring and contracting real estate developers, and maintaining public relations and communication (HafenCity Hamburg GmbH, 2014a). Concerning the GmbH's role in addressing flood risk, they, for example, have the responsibility to both finance and implement the flood proof measures for urban infrastructure, such as the elevated evacuation routes. The BSH is an important stakeholder, as it stands in direct contact with the residents of the HafenCity to inform them in case a storm surge is approaching (Interview Resident / Flutschutzbeauftragter HafenCity, 2014). In the implementation phase of the established flood measures, private responsibilities manifest themselves more clearly. The city of Hamburg provides for the dwelling

mounds and the evacuation routes in the HafenCity, but the private stakeholders cover the costs for building, operating and maintaining the basement levels of the buildings, as well as the floodgates. As a governmental official of the Ministry of Interior and Sports (BIS) states:

'In the harbour city, every company who builds their house is responsible for the flood protection of the building. We gave them the ground plus eight meters above sea level, and them we told them: "Please, you can build your building, but if you want to go into the ground have a look at what you are doing there. You have to close the doors, the gaps, you have to make sure that nobody goes in, in case of high water in the flooded areas.""

This responsibility of private stakeholders to operate the floodgates of their buildings also applies to residential buildings. Residents themselves, who own a property within an individual building of the HafenCity, are responsible for operating their floodgates. This responsibility is institutionalised into so-called 'Flutschutzgemeinschaften' (see Flutschutzverordnung-HafenCity, HmbGVBI, 2002). All residents within a residential building are automatically part of the Flutschutzgemeinschaft. Every Flutschutzgemeinschaft (and also every building in the HafenCity redevelopment that houses private companies) has a Flutschutzbeauftragter. The Flutschutzbeauftragter is the main contact person of the building and responsible for closing the flood gates in case a storm surge is expected. For residential buildings the Flutschutzbeauftragter is often a resident of the building, for buildings that house private companies the responsibility is usually outsourced to an external company (Interview BIS, 2014).

Thus far, the dwelling mound solution used in the HafenCity redevelopment shows that a move is made from the one dimensional resistance strategy towards an approach that tries to mitigate flood risk, but also tries to adapt to flood events. The composition of involved actors shows this transformation as well. Not only are private parties now involved, residents are given a role, too. In order for those residents to have the capacity to take on this new role, social capital networks are needed. On the basis of the theoretical framework of chapter 2, the following will explain how, within the existing policy arrangement just described these different social capital networks are built and stimulated.

4.3 Explanation of citizens involvement: social capital networks

Linking social capital networks: top down and bottom up information provision

Signs of linking social capital stimulation can be identified in the HafenCity redevelopment. As the BIS is responsible for emergency planning, they are afforded the task to inform the citizens on flood risk. They do so by publishing various information brochures on flood risk periodically. For example, every two years a 'merkblatt' (leaflet) is sent to the citizens of Hamburg directly, containing general information about flood risk, a checklist for what citizens can do, and which channels are used to inform the citizens (BIS, 2012). Also, the brochures provide additional information on flood risk in relation to the specific district that a resident lives in. For the HafenCity district, this information includes the characteristics of the area, how the area is protected, when evacuation in the area is necessary, and which parts of the area are risky parts in case of a flood and which parts are safe (BIS, 2014). In addition, more general information brochures on flood risk and what to do in case of a flood can be found on the website of the city of Hamburg (BIS, n.d.). Also, the BSH is in direct contact with the Flutschutzbeauftragter through a 'Hochwasser Hotline'. Via SMS, e-mail and telephone the Flutschutzbeauftragter is informed by the BSH when there is a storm surge coming. Hence, according to the BIS, the awareness on flood risk among citizens of the HafenCity is high. As a governmental official of the BIS states:

'The people who live very close to the river Elbe, they know the risk. They know it and they are able to handle with the risk, especially in the harbour area they know it very good, very good [...]. If you live in the HafenCity they know it.'

But, in contrast to the perceived risk awareness of residents by the BIS, according to a local resident and Flutschutzbeauftragter of the HafenCity, there is little awareness amongst the citizens about flood risk, and the city's efforts to raise the awareness are not really successful (Interview Resident / Flutschutzbeauftragter, 2014). He states: 'To be honest, residents are rarely aware of flood risk'. This is a surprising remark considering the efforts of the city to increase the

awareness of citizens by information provision. Apparently there is a discrepancy between the perceived risk awareness of residents by the BIS, and the actual risk awareness of people according to the interviewed Flutschutzbeauftragter. The same interviewee sees the lack of awareness as a result of the indifference that citizens of the HafenCity have towards flood risk in the area:

'Residents are indifferent towards flood risk [...]. You have the information brochures here as well, but the people simply feel safe here.'

Hence, this indifference can be explained in part because residents feel safe in the HafenCity, and partly because the citizens in the HafenCity are predominantly renters and the interviewee believes that these are uninvolved and have no idea and experience of the flood risk in the area:

'The individual residents are predominantly tenants, who are entirely uninvolved. They have no idea, no experience. They just want to live in the HafenCity and want to enjoy living in the HafenCity; they do not want to think about the flood risks' (Interview Resident / Flutschutzbeauftragter, 2014).

As evidenced by the foregoing analysis, stimulating linking social capital by top down information flows is of importance in the HafenCity. The city tries to establish a bond between government and their citizens, to increase their awareness so that they know the flood risk and how to act in an emergency. At the same time, low awareness is present among citizens. The question is why, despite the stimulation, the awareness is still low. As Pelling & High (2005) point out, linking social can also have negative externalities in the sense that it creates a state of dependency where citizens depend on the city for information. Since the city of Hamburg is active in providing information to their citizens, it could be assumed that citizens do not feel the need to actively participate themselves. Yet, despite their low awareness, so far there have been no major flood related accidents in the HafenCity. Moreover, the cooperation between authorities

and Flutschutzbeauftragten is perceived as being adequate, as when asked how the cooperation among stakeholders is going, a Flutschutzbeauftragter answers:

'Great, so no problems. My task I would say, as Flutschutzbeauftragter, is, when it actually comes that high, then we would just inform the residents and say: "Please leave the HafenCity". That would be my task; that everybody is informed and that the houses are evacuated.'

Thus, even though there is low awareness amongst citizens of the HafenCity, no major flood related accidents occurred, which leads to conclude that the configuration authorities – Flutschutzbeauftragten seems to be working and the cooperation between them seems to be going well. This can also be an explanation as to why the stimulation of linking social capital does not result in an increase in the awareness of HafenCity residents. On the one hand, authorities provide information to citizens to increase their flood risk awareness, but on the other hand, the connection between authorities and Flutschutzbeauftragten results in residents who do not feel the need to actively participate in flood risk management, as they might feel they can count on their Flutschutzbeauftragter to inform them on what to do in case a storm surge is expected.

As illustrated, top down information provision is strong in the HafenCity. However, the other way around: the use of bottom up information provided by citizens to adapt to the local situation seems to be encouraged less actively. A governmental official of the BIS explains that they have drawn up a general plan for flood risk. This plan discusses various scenarios, so that in case of a flood event it is clear what route to take. As much as possible is pre-defined. The general plan consists of several sub-plans: one for the police, one for the fire brigade, one for the lower authorities, one for the Hamburg Port Authority, and one for the health services. When a certain crisis arises, contact is sought with the various lower authorities to communicate what is going on, and on the basis of the pre-determined plans the authorities know what to do. These pre-determined plans are partly based on information that comes from lower authorities, police and the fire brigade (Interview BIS, 2014). When something does not go according to plan, e.g.

streets are not cleaned after a flood, or the port is reopened while there is still water on the roads, the BIS evaluates and discusses these matters with the responsible authorities so that it will not happen next time.

The aforementioned shows that the BIS does to a certain extent base its plans, and adapts its management, on the basis of information provided by lower authorities. However, noticably the BIS, in its explanation on receiving bottom up information, does not mention information provision by citizens as input for their plans and management. This is to an extent, because public responsibility with regards to flood risk is dominant in Hamburg. Mees et al. (2014) showed that the dominant public responsibility is a result of the 1962 flood, and because more recently federal government has put renewed pressure on German states to take on their public responsibility to care for flood protection, as Germany faced several major flood events in the 2000s. Therefore, the relationship between the state and its citizens has a hierarchical character, where the state provides information on flood risk to citizens and not the other way around. In addition, perhaps, using bottom up information provided by HafenCity citizens is not necessary, as each residential building in the HafenCity has a Flutschutzbeauftragter who is in direct contact with the lower authorities. This line of thought is illustrated in the next section.

Bonding social capital: communal information provision and collective memories

The concept of the Flutschutzgemeinschaften entails that a community of residents within a building is responsible for dealing with flood protection on a collective basis. As a group, they are responsible for the adaptive measures in the building: closing the floodgates, and warning the responsibilities residents. These are legally secured in paragraph 5-6 of the 'Flutschutzverordnung HafenCity' (HmbGVBIm, 2002). The fact that the concept is institutionalised and that the buildings are designed to facilitate the concept seems to show that authorities in Hamburg try to create bonding social capital networks in the HafenCity. From above an attempt is made to create a dense group of residents who, as a collective, are responsible for managing a part of the flood risk for their building. As explained, ultimately, the responsibility of the Flutschutzgemeinschaft lies with the Flutschutzbeauftragter. Given the concept, it is likely that the Flutschutzbeauftragter has contact with its fellow residents on flood risk related issues. In other words, it is therefore expected that the creation of bonding social capital networks results in the sharing of information between residents of the Flutschutzgemeinschaft and their Flutschutzbeauftragter. This is also the perspective that the BIS has of the relationship Flutschutzgemeinschaft – Flutschutzbeauftragter. A governmental official of the BIS explained that he receives a lot of phone calls from companies asking him what to do in case of high water and flooding. When he replied by saying 'Ask your Flutschutzbeauftragte' they discarded the advice and kept asking for information from him. But, as he makes the comparison with residential buildings he explains: 'The houses where the people live in, it is easier. They know him, they speak to him'.

In practice, however, this relationship is found to be less strong. One Flutschutzbeauftragter states that they (residents and Flutschutzbeauftragter) do not regularly meet, and when asked if the Flutschutzgemeinschaft as a concept strengthens the network among residents, he replies: 'No, no, that makes everyone for themselves'. One of the reasons why the relationship between residents and their Flutschutzbeauftragter is less strong than the concept suggests, could be that in many residential buildings the responsibility of the Flutschutzbeauftragter is collectively outsourced to a private agency. This means that in many cases, residents have a Flutschutzbeauftragter who is not one of their fellow residents. Besides completely outsourcing the responsibilities of the Flutschutzbeauftragter to a private agency, the Flutschutzbeauftragter can also delegate certain responsibilities to the buildings' Hausmeister (concierge). For example, an interviewed resident of the HafenCity, who is also the Flutschutzbeauftragter of is his building, has delegated the contact with the BSH to the Hausmeister. The Hausmeister is reachable 24 hours a day and is in direct contact with the BSH through the Hochwasser Hotline. In case a storm surge is expected, the Hausmeister is contacted and can subsequently take the appropriate measures. What the aforementioned shows is that the concept of Flutschutzgemeinschaften works differently than expected. Mainly because it does not stimulate interaction between residents, and responsibilities are outsourced to other parties.

A possible explanation can be sought in the fact that the creation of bonding social capital networks in the form of institutionalising Flutschutzgemeinschaften was not a deliberate choice, but rather a consequence of the political agenda for the HafenCity. As Restemeyer et al. (2015) point out, the city wanted to put Hamburg on the map as a harbour metropolis. Therefore, it was politically vital to develop the HafenCity as quickly as possible. This is expressed in the fact that the HafenCity has its own development agency (The GmbH), and given that legal changes were made possible (Restemeyer et al., 2015). Given the need for quick development, the involvement of residents in the form of Flutschutzgemeinschaften is partly because of the political and economic considerations that favoured the dwelling mound solution over the dike solution. Therefore, the involvement of residents can be perceived more as a consequence of the political and economic agenda, rather than a deliberate decision. Since the concept seems to be working thus far, there is little need and/or willingness to take on matters such as an absence in information provision among residents themselves and the outsourcing of responsibilities.

Another way to increase the flood risk awareness of residents in the HafenCity is by informing them on previous flood disasters. When trying to build the collective memory of residents by using previous flood disasters as examples, it can contribute to the general flood risk awareness of the group. For the wider Hamburg area, there are some clear examples in where previous disasters are used to increase citizens' flood awareness. The 1962 flood plays a particularly important role in this. As already mentioned, the flood learned the authorities of Hamburg a lot and brought about various institutional changes. It is also used to remind the citizens of Hamburg about flood risk. On the website of the City of Hamburg a permanent webpage is dedicated to the storm surge of 1962. This page contains a section on personal memories that people have about the flooding (BSU, n.d.) Moreover, in 2012, 60 years after the 1962 flood, a big exhibition by the BSU in cooperation with the LSBG was held in Hamburg's town hall to commemorate the event (Interview BIS, 2014; BSB, 2012). The exhibition was titled 'Die große Flut – Katastrophe, Herausforderung, Perspektiven', and was accompanied by the publication of a book that used knowledge, experience and memories of various people involved during the flood (e.g. volunteers and dike associations) to describe what happened

(BSB, 2012). Also, the exhibition was supported by broad media coverage. Websites of newspapers, magazines, authorities, and the University of Hamburg paid attention to the exhibition.(see for example: BSB, 2012; BSU, 2012; Die Welt, 2012; Universität Hamburg, 2012). Besides the 1962 flood in Hamburg, the BIS also uses other global flood examples to increase flood awareness of citizens of Hamburg. The examples of international flood events are projected on the current Hamburg context, to illustrate the similarities and differences and show how measures taken will prevent such catastrophes (Interview BIS, 2014).

However, since the HafenCity redevelopment is relatively new and there have been few cases of flood related problems in the area, it is difficult to increase residents' awareness on the basis of previous flood disasters. So far, only one actual flood event happened in the HafenCity. This flood took place in Am Sandtorkai (a neighbourhood in the HafenCity) in 2007. One of the problems that arose during this flood was that a Flutschutzbeauftragter (external company) arrived too late to close a company's floodgates. As a result, the entire parking garage of the building was flooded (Interview BIS, 2014). This example shows that outsourcing the Flutschutzbeauftragter's responsibility to a private company, which does not reside in the building that it has to protect, can cause serious problems. However, this incident only concerned private stakeholders, no residents were involved. Thus, it is difficult to use this incident as an example to increase residents' awareness. In addition, as one of the HafenCity residents mentioned, residents in the HafenCity are predominantly tenants. Having tenants in the area often means having a high turnover of people, which makes it difficult to build a collective memory. Another way that authorities try to increase awareness and participation is through annual flood drills, which are organised by the Hamburg Port Authority. However, these drills take place in areas outside the HafenCity.

Bridging social capital: stimulate interaction between different groups

Within a flood risk context, the different residential buildings can be seen as separate groups. Every Flutschutzgemeinschaft is responsible for its own building. The fact is that the different Flutschutzbeauftragten of the individual buildings do not know each other (Interview Resident / Flutschutzbeauftragter, 2014). They do not meet on a regular basis and each individual is only responsible for its own building. It can be assumed that this type of bonding social capital, which is inward looking, has a negative effect on the adaptive capacity of the larger community. This is due to the fact that local knowledge is not regularly shared amongst the different communities within the HafenCity. It also affects the transformability capacity of the larger HafenCity community for the same reason; the sharing of ideas and knowledge to get ahead is hindered. It is surprising that the Flutschutzbeauftragten of the different buildings do not interact, all the more because the HafenCity Hamburg GmbH (who also initiated the Flutschutzgemeinschaften concept, Interview Resident / Flutschutbeauftragter, 2014) developed a special strategy to stimulate interaction between different groups in the HafenCity. This social mixing strategy included, among other things, hiring an urban socialist to provide information to citizens and stimulate the emergence of informal networks, which in turn fostered the forming of residents' or public institutions on a variety of topics (e.g. the sports club, cultural club, playhouse club) (Bruns-Berentelg, 2012). It shows that the GmbH has put thought into how to increase interaction between different groups in the HafenCity. Yet, increasing the interaction between the different Flutschutzgemeinschaften and their Flutschutzbeauftragten does not appear to be part of the GmbH's strategy.

4.4 Conclusion

All in all, the HafenCity redevelopment shows some promising signs of resident involvement by means of building and stimulating different social capital networks. Especially, the exhaustive information provision of authorities to the citizens and the institutionalisation of Flutschutzgemeinschaften are signs that within the HafenCity a move is being made towards forming a flood risk management arrangement with citizens as an integral part of the arrangement. Still, at the same time, the strong top down information flow has not led to an increase in flood risk awareness of the HafenCity residents, nor has the institutionalisation of Flutschutzgemeinschaften resulted in an increase in citizen participation. This lack of awareness and participation among citizens is due to a variety of reasons. Firstly, because of the top down information provision, citizens feel safe and hence do not feel the need to actively participate.

Secondly, the HafenCity exists predominantly of tenants. This group often lacks awareness, because of their high turnover rate; meaning that residents are constantly moving out, thereby taking their knowledge with them, and new ones are moving in who do not have the knowledge yet. Furthermore, as the cooperation between the Flutschutzbeauftragter and the authorities works well, residents again, do not feel the need to actively participate. Additionally, although residents are given a task in the implementation phase, the hierarchical character of the governance arrangement, which resulted from the 1962 flood in Hamburg and other recent floods in Germany, obstructs their involvement in policy-making processes. Many Hamburgers remain aware of the 1962 flood, and authorities often use it as a reminder of what happened and to show what the city has done to increase their flood protection. Still, the HafenCity is a newly developed area where few flood related incidents have occurred. Therefore, combined with the fact that the citizens of the HafenCity are predominantly tenants who are uninvolved, it remains difficult to build a collective memory with the help of previous flood disasters.

The institutionalisation of the Flutschutzgemeinschaften and the designs of the residential buildings, suggest an intention of the institutional structure to help build a strong residential network that shares information on flood risk among its members and the Flutschutzbeauftragter. Yet, in practice this relation is found to be less strong, due to the outsourcing of the flood protection responsibilities of the community to an external Flutschutzbeauftragter, who is not part of the residential community. Furthermore, as the economic and political agendas were dominant in the HafenCity redevelopment, and the configuration authorities – Flutschutzbeauftragter works, there is no need/willingness to try and strengthen the relation between Flutschutzbeauftragter and residents and between residents themselves.

Nonetheless, the current FRMA seems to be working, since there have not been any major accidents and involved stakeholders are content with their cooperation. The previous chapter, however, illustrated that although the arrangements are adequate, much more can be gained. The current arrangement leads to opportunities being lost, as information between residents and between Flutschutzbeauftragten is not shared and residents are largely uninvolved in the policy making process. This, in turn, negatively affects the adaptive capacity of the whole arrangement.

5. The Royal Docks London

5.1 Contextualisation: the Royal Docks redevelopment & flood risk

Just like Hamburg, the Royal Docks in London is one of the biggest inner city redevelopments in Europe. Covering over 250 hectares of land, with a waterfront of 18,4 kilometres, the former harbour area is planned to be developed into a large residential, commercial and recreational area. (Mayor of London & Newham London, 2011b). So far, the Royal Docks has resisted numerous attempts to regenerate, due to political tensions, failed policies, and physical limitations such as its remote location and bad transportation links (Brownill, 1990). One such an example was in 1981, when the Docks became a particular focus of attention with the setting up of the London Docklands Development Corporation (LDDC) (Brownill, 1990). The LDDC was an urban development corporation set up by the right wing to try and regenerate inner city areas through minimal public sector involvement and maximal private sector involvement. They established, among other things, the Docklands Light Railway (DLR) to increase accessibility of the area, London City Airport and Canary Warf. Yet, the LDDC was based on the Thatcher ideology), as it used vast amounts of public money to accelerate the restructuring process (Florio & Brownill, 2000).

Since the closing of the LDDC in 1997, the Royal Docks has seen several projects being built. In 2000 the Dockland campus of the University of East London opened, housing over 1200 students on site. Also in 2000, an international exhibition and convention centre named 'ExCel London' (Exhibition Centre London) was built. In 2011, 122 hectares of waterfront land in the Royal Docks was appointed an enterprise zone status, which meant that in those area policies are now of affect that have as their goal to offer a range of incentives for businesses, such as simplified local authority planning or business rate discounts, to start up or expand (DCLG, 2012b). The current redevelopment took shape in 2011. With the Olympic Games of 2012 as a catalyst, the Mayor of London in collaboration with the Mayor of Newham had set up a vision document for long-term regeneration. The vision for the Royal Docks' trading past by transforming the

area into a world class business centre; leading in high technology, green enterprise and research, and an international forum for the exchange of knowledge and ideas (Mayor of London & Newham London, 2011a). Moreover, the regeneration plays a vital role in London's challenge to deal with the massive population growth³ and the subsequent need for jobs, housing and infrastructure.

The redevelopment is divided into different sections, each having an individual profile. For example 'Silvertown', an area of 24 hectares in the Royal Docks, will become a hub of creativity, innovation and learning aimed at the intelligence economy and growth industries. It will provide up to 21.000 jobs and 3.000 new homes. Other examples are The Royal Albert Dock and the Royal Albert Basin, covering respectively 14 and 20 hectares. The first is aimed at developing a new business district, thereby providing over 20.000 jobs. The latter is a mixed used area, which will offer up to 1600 new homes. There is no clear phasing strategy in place for the redevelopment. Besides the projected jobs, homes and people for the redevelopment area, there are also already existing communities in the Royal Docks, for example in West Silvertown and North Woolwich. Approximately 9500 people currently inhabit the area (Mayor of London & Newham London, 2011a), which is relatively small compared to its size.

Flood risk

The Royal Docks lies alongside the tidal river Thames. The Thames estuary is subjected to three types of flooding: inundation of the flood-plains by river water, local flooding due to overwhelming drainage network by intense rain, and flooding because of tidal surges (Lavery & Donovan, 2005). The intense rainfall and extreme sea levels of the Thames, due to climate change, are likely to increase with 10 to 20 times compared with the current situation as described by Lavery & Donovan (2005). The close proximity of the river Thames and Lea gives rise to the potential risk of tidal and river flooding in the Royal Docks (Mayor of London & Newham London, 2011b). The area is assessed as lying within three types of flood zones: flood zone 3 (high probability), flood zone 2 (medium probability), and flood zone 1 (low probability)

³ According to the Greater London Authority (GLA), London's population is estimated to grow from approximately 8.2 million inhabitants in 2011 to 9.6 million in 2031 (GLA Intelligence, 2013).

(Mayor of London & Newham London, 2011b)⁴. Figure 8 shows these flood zones. It shows the borough of Newham of which the Royal Docks is part. The purple colour is synonymous for flood zone 2, and the blue colour for flood zone 3. As the figure points out, much of the Royal Docks is situated in flood zone 3.

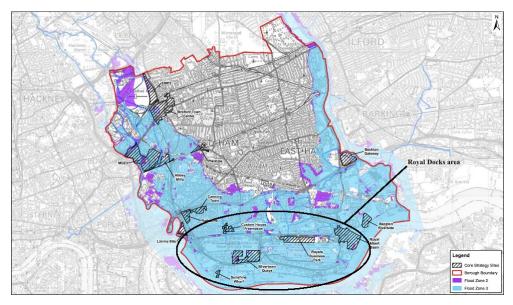


Figure 8: Flood zones in the Royal Docks (Capita Symonds, 2010). Modified by author.

But despite it partly being in high and medium flood probability areas, an assessment made by the Environmental Agency in 2008 showed that due to the level of protection provided by the existing flood defences such as the Thames Flood defences (that give a standard protection of 1 in 1000 years until 2030), the actual risk of flooding from tidal and river surges is low. Still, the borough of Newham has assessed the residual risk of flooding caused by a breach in existing defences during a tidal surge event, and although the probability of such an event happening is low, the consequences of a breach are potentially high (Capita Symonds, 2010). Some areas in Newham are even classified as extremely dangerous in case of a breach event (Capita Symonds,

⁴ Flood zone 3 is an area of land assessed as having a 1 in 100 or greater annual probability of river flooding or a 1 in 200 or greater annual probability of flooding from the sea. Flood zone 2 means having between 1 in 100 and 1 in 1000 annual probability of river flooding or between 1 in 200 and 1 in 1000 annual probability of sea flooding (Mayor of London & Newham London, 2011b).

2010). Furthermore, There is a serious risk of pluvial and urban drainage flooding, as much of the ground level in the Royal Docks is low (1 m AOD or less), whereas the ground levels at the docks are high (3 to 5 m AOD) (Environment Agency, 2012). This means that there would be great difficulties in evacuation floodwater should flooding or intense rainfall occur.

5.2 Description of London's FRMA: content and organisation

Content: visions and concepts

The existing flood risk management system in place to address these flood risk issues in the Royal Docks is:

- The Thames Barrier, to manage surge tide water levels;
- River edge flood defences upriver of the Thames Barrier to manage daily water levels;
- Tidal flood defences downriver of the Thames Barrier;
- Floodgates on lock entrances to the docks at King George V lock and Gallions locksluice;
- Four combined sewer overflows (CSOs) for urban drainage flood mitigation and;
- Flood forecasting and warning (Environment Agency, 2012).

Moreover, flood plans and recovery plans should assist in planning for flood events, and humanitarian assistance, emergency housing and clear up operations should help in dealing with the consequences of a flooding (Environment Agency, 2012). Still, as shown by the foregoing summary of the flood risk management system, the system exists largely of technical measures. This is recognized by authorities, as they state that they have been very successful in building defences, but less so in managing the consequences of flooding (Environment Agency, 2012). Moreover, the authorities in London acknowledge that future challenges and changes, such as; climate change, ageing flood defences, changes in the physical environment and in socio-economic development require rethinking on how they want to manage flood risk. Therefore, the intention to focus on *adaptability* in flood risk management is expressed by numerous leading documents on flood risk management in London and the Royal Docks (DCLG, 2012a; Environment Agency, 2012). An example is the Thames Estuary plan 2100 (TE2100), which sets

out London's strategy to protect itself from tidal flooding, thereby having climate adaptation at its core (Environment Agency, 2012, p.1), or the National Planning Policy Framework (NPPF)⁵ and the London Plan (LP), both important planning documents that emphasise the importance of climate change adaptation as well. Several actors compiled these documents. Moreover, within these documents, a variety of measures are mentioned that should contribute to this adaptability. Thereby, a number of actors are appointed who are responsible for implementing these measures. To these actors and their responsibilities will be turned to now.

Organisation: actors, authority, and rules

Flood risk management in London exists of two main components, namely; flood and water management, and land use planning. From a flood and water management perspective, the important governmental decision-making bodies are the Department for Environment Food & Rural Affairs (Defra) and the Environmental Agency (EA). From a land use perspective, important bodies are the Department for Communities and Local Government (DCLG) and the Greater London Authority (GLA). The London Borough of Newham (LBN) plays an important role in both domains.

Defra has the overall national responsibility for policy on flood risk management and provides funding for flood risk management authorities (Defra & EA, 2013). One of these authorities is the Environmental Agency (EA). The EA is a non-departmental public body and responsible for taking a strategic overview of all the sources of flooding in the Royal Docks (Defra & EA, 2013). This includes drafting strategic plans that set the direction for managing flood risk, provide advice and data on flood risk to others such as governments, local authorities and citizens, thereby supporting the development of the risk managing skills of those groups. Furthermore, the EA has the operational responsibility for managing the risk of flooding in the Royal Docks from main rivers, estuaries, reservoirs and the sea (Defra & EA, 2013). The direction taken by the EA for the Royal Docks is one that focuses on adaptability. For parts of the Royal Docks, the floodplain management strategy established by the EA involves 'building

⁵ The NPPF replaced an enormous amount of planning documents in the UK to simplify planning and make procedures more transparent.

resilience' (see figure 9). Land use planning has an important role to play to enhance the adaptive capacity of the FRMA. The EA states:

'There are extensive areas of redevelopment planned in this policy unit including much of the area to the south of the Royal Docks. This provides opportunities to improve flood risk management arrangements, including floodplain management, to achieve safer floodplains, and defences that enhance the riverfront environment' (Environment Agency, 2012, p.124).

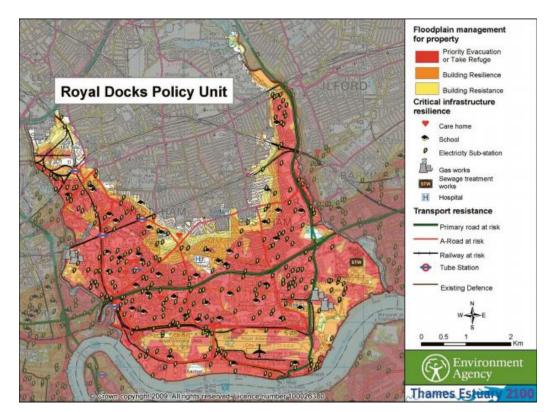


Figure 9: Royal Docks Policy Unit

The actors responsible for land use planning in the Royal Docks are: the Department for Communities and Local Government (DCLG), the Greater London Authority (GLA), and the London Borough of Newham (LBN). The DCLG sets out UK's policy on planning. The DCLG's policy framework is designed so that local governments have plenty of leeway to give their own interpretation to plans, so that the local context can be taken into account (DCLG, 2012a). However, the DCLG has a number of key points where each local government has to comply with, also with regards to addressing flood risk through land use planning. For example, when new developments are brought forward, local authorities have to first, try and plan these developments in areas of low flood risk, so to avoid increasing the vulnerability of the area. This is called a 'Sequential Test'. When this is not possible, for example due to a shortage of available space in the area, the local planning authorities need to ensure that care is taken that flood risks can be managed, for both the wider community as for the users of the specific scheme, through suitable adaptation measures. This is called the 'Exception Test'. Furthermore, these developments are not allowed to increase flood risk elsewhere (DCLG, 2012a). For the Royal Docks, the local authority appointed to comply with these terms and conditions, is the London Borough of Newham (LBN). However, between the national governmental body DCLG and the local LBN, there is another important authoritative body for London: the Greater London Authority (GLA). The GLA thus holds a special position in the institutional structure of the UK. It was set up in 2000 to test regional government in London (Interview GLA, 2014). The GLA sits in between the national and local level, and is the only regional government left in the UK. They are afforded several strategic coordinative tasks, such as land use planning, strategic development and transport. A key challenge of the GLA is to make London a sustainable city. They have to deal with the massive population growth and the subsequent need for housing and jobs that London is facing. Unsurprisingly, the Royal Docks is appointed as one of the key areas in London that has to accommodate part of this growth (Interview GLA, 2014). This, despite the fact that the Royal Docks area is low-lying and therefore has a potentially high risk from pluvial and urban drainage flooding, as well as serious residual risks in case of a breach of defences. To ensure that the people who are going to live in these areas have the capacity do deal with these flood risks, their capacities have to be built up, as currently public awareness is low due to fact that the focus of attention has been on keeping the defences in good condition, and less on increasing public awareness of flood risk (Environment Agency, 2012).

So far, the analysis shows that the existing FRMA relies for a large part on technical measures in place (e.g. the different flood defences). However, the analysis also shows that an

attempt is being made to move towards more adaptive measures. Higher governmental authorities such as the EA and the DCLG initiate this shifting perspective. In the next section, it will be analysed how efforts within the policy arrangement are being taken to involve citizens more prominently as part of the adaptive measures proposed, and more importantly how it ensures that these Royal Docks residents (who are largely not there yet, as much of the area is still undeveloped) will have the capacity to be part of the FRMA.

5.3 Explanation of citizen involvement: social capital networks

Before starting to analyse citizen involvement in the Royal Docks, it is important to highlight that the emphasis in this part of the analysis lies on the intentions of the policy arrangement to involve citizens, and not on studying how citizens are already involved. Reason being is that, unlike the HafenCity, the Royal Docks redevelopment area is still largely uninhabited. This implies that when discussing the intentions to involve citizens, the emphasis will lie on documents and plans for the Royal Docks and initiatives elsewhere when the interviewed actors explain how citizens are going to be involved in the Royal Docks.

Linking social capital: top down and bottom up information provision

Creating and stimulating linking social capital networks is about trying to increase the flood risk awareness of citizens and using their local knowledge to increase the adaptive capacity of the whole arrangement. This is recognised by authorities, as for the Royal Docks area the EA states:

'New development should be safe, particularly in areas where the ground level is low and flood depths could potentially be high. *Public awareness* should be raised to facilitate emergency planning and response' (Environmental Agency, 2012, p. 124, emphasis added).

There are several ways to try and achieve this. In the Royal Docks, the approach most notable for creating and stimulating linking social capital networks is through so-called 'community engagement programmes'. According to the EA, for the Royal Docks: 'these programmes should

be carried out to ensure that the public, businesses and other groups understand, are involved in and supportive of the flood plans' (Environment Agency, 2012, p.125). The GLA did some of these pilot community engagement programmes elsewhere in London; a governmental official of the GLA explains:

'So we did a range of community flood plans [...]. Basically it was about trying to understand how do you approach a community and get them to care about something they prefer not to think about' (Interview GLA, 2014, p. 28).

This was more than just informing citizens top down. Members of the community also had to tell the GLA what was locally important to them, whereafter the GLA worked together with the community to manage those assets (Interview GLA, 2014). Through such programmes, not only are the authorities providing information to citizens, local knowledge is also used as a means to identify valuable assets of the community. It fosters governance responsiveness and transparency, because as the community is made aware of community issues with the help of the GLA, interaction is taking place with the intention to tackle those issues together. Therefore the GLA has to be responsive and transparent, in order to maintain a sustainable bond with the community. These pilots show promising signs of creating and stimulating linking social capital networks. However, specifically for the Royal Docks area, there are some discrepancies between views on who is actually responsible for engaging with the community and inform them on flood risk. According to the GLA, with future developments it is up to the local authority to engage with the communities and make them aware of flood risks. As a governmental official of the GLA states:

'Well, I would like to think that that the local authority will engage and make them [citizens] aware [...]. So we would work with the borough to support them if necessary, but really this sort of level [pointing at Royal Docks] is the borough's responsibility [...]. So we did a number of pilots, we shared that information with the borough, we've got a little bit of money that we can help them with if necessary, but basically it's for the local authorities to deal with' (Interview GLA, 2014, p. 28).

The reason why the GLA indicated that it is the London Borough of Newham's responsibility to engage with their communities in the Royal Docks lies in the fact that the borough has the responsibility for managing surface water flood risk and heavy rains. In addition, the EA has the responsibility for managing flood risk from tidal rivers. So according to the GLA, it is up to those two parties to work together and identify where they have communities in the Royal Docks who are exposed to flood risk, and if community engagement programmes are suitable. A planning officer of the LBN partly agrees with the GLA's explanation. He points out that the borough can indeed do more to inform residents and involve them in flood risk management processes. Yet, according to this same planning officer, the primary responsibility lies with the developer and estate agent. When people are going to buy the property it is up to those parties to inform the people and make sure that they are fully aware of flood risks in the area (Interview LBN, 2014). In turn, a developer that has put forward a residential scheme in the Royal Docks also acknowledges that some sort of education is necessary to make citizens aware of flood risk, yet is reserved when it comes to their responsibility for doing so. When asked if a developer has a responsibility to create awareness among residents, he answers:

'Any new residents moving into our units will be provided with quite a lot of information about the scheme; about the particulars of the scheme, you know, how things work, how to get around, how to use their homes. And I imagine an element of that will contain some information about flood risk. But at the same time it's...we don't want to scare people away [...]. It's a 1 in 200 year risk on the site' (Interview Housing Association, 2014, p. 5).

The architectural firm affiliated with the redevelopment scheme confirms this. According to the architect, informing and creating awareness through discussing the practicalities such as the use of the parking garage will be part of the management plan, but it will be unlike that residents will be actively involved in managing the flood risk on site. This is partly due to the risk averse nature of how the site is being managed (Interview Architectural Firm, 2014). It seems like the existing flood defence system hinders the advancement of more adaptive measures, as the

developer refers to the 1 in 200 year risk on site and the architect states that residents will not be actively involved due to the risk adverse nature of how the site is being managed. The development scheme example shows that developers and architects have to comply with a flood risk management framework that still largely relies on the existing flood defences. Therefore, real integration with more adaptive measures is still largely absent. Adaptive measures *have* been taken by the interviewed developer in combination with the architect, but these refer mostly to design measures and not to building up the adaptive capacity of future residents. For their development scheme, they proposed the following resistant and resilient mitigation measures in order to comply with the flood risk management strategy set forth by the LBN in combination with the EA:

- No basement levels;
- No habitable rooms at ground floor (only parking, commercial uses or non-habitable rooms);
- Flood risk management plan for the commercial units and community areas;
- Sign up to flood warning of Environmental Agency;
- Set back development so the Environmental Agency can maintain flood defences, and;
- Safe access and egress routes (Interview Housing Association, 2014; Interview Architectural Firm, 2014).

All in all, the several actors interviewed recognise the importance of creating linking social capital networks; citizens need to receive information in order for them to be aware of flood risk. Noticebly, the analysis also shows that there are discrepancies between views on who is responsible for doing so. This begs the question; 'what causes this discrepancy?'. Currently, many changes are occurring within the institutional structure of London's FRMA. As the description of London's FRMA (section 5.2) has shown, traditional approaches are seen as inadequate to deal with future challenges. Therefore, plans are revised and responsibilities are redistributed. Now, both the TE2100 plan and the NPPF are the leading documents on how to deal with flood risk. Within these plans, ambitious and progressive statements are made when it

comes to taking adaptive measures and raising the flood awareness of citizens (e.g. carrying out community engagement programmes). Flood risk management strategies of local boroughs have to be in general conformity with these plans. However, the current flood risk management strategy of the LBN predates both the TE2100 and NPPF. Logically, LBN's current strategy therefore does not emphasize adaptability and resident involvement as much as those two leading documents do. However, this does result in a situation where higher authoritative bodies demand from their local councils to take adaptive measures, local councils in turn are currently trying to develop their own framework that is in conformity with the vision set forth in the TE2100 and NPPF, and developers who are still using the old flood risk management strategy of the borough as a frame of reference for their plans. A strategic manager of the GLA states:

'Now I think in developing these local flood risk strategies, the boroughs are going to have to have to do it more; they've got to start identify where they've got communities at risk, where they can do stuff and where they can't do stuff. They've got to identify what are they going to do about risk in a soft sense, so community empowerment, that sort of thing' (Interview GLA, 2014, p. 30).

It seems like the LBN is still searching for ways to make this vision their own.

Bonding social capital: communal information provision and collective memories

Apart from top down and bottom up information provision, the community engagement programmes in the Royal Docks proposed by the EA are also aimed at creating and stimulating bonding social capital networks. The pilots that were already done by the GLA in other areas of London stimulated information provision between residents themselves. Through the programme, 'local champions' and 'flood wardens' were appointed who are part of the community and who are well informed on flood risk in their area. They are the ones who are willing to invest time in up skilling their capacities, who in turn become people that other community members look up to. They are also the ones who talk to their community about flood risk and know which people and which assets in their community are most vulnerable (Interview

GLA, 2014). In case of an extreme weather alert, they will check with these people to see if they are OK, and will help local shops to move their stock and so on if necessary (Interview GLA, 2014). By and large, the programme wants to invest in building up the community's capacity, and not only provide information (Interview GLA, 2014). In their description of the purpose of the programme the GLA touches upon a key issue, namely that information provision alone is often not sufficient to ensure that communities will participate in flood risk management. In their experience, when someone has not been flooded, turning up and demanding to talk about flood risk does not work. Before the Thames defences were in place, people received regular flood alerts and therefore new what to do (Interview GLA, 2014). When this is not the case, people often do not see the urgency, as they have not experienced flooding themselves. This is an important point to consider for the Royal Docks, as future residents of proposed development schemes could not have experienced flooding in the area, and therefore do not have a collective memory by which flood risk awareness and participation can be increased. Through the anticipated community engagement programmes in the area, their lack of flood experience is obviated as a prerequisite for flood risk awareness and participation.

However, despite the expressed intention to initiate community engagement programmes in the Royal Docks (see TE2100, p.125), it is also recognized by London authorities that it will be difficult to appoint flood wardens and local champions. This is due to the fact, that London has a very high turnover of people especially in rapidly regenerating areas such as the Royal Docks. Therefore, it is difficult to keep a core of knowledge in the community (Interview GLA, 2014).

Bridging social capital: stimulate interaction between different groups

Having a core community capacity to respond to flood risk is identified by the GLA as an ideal resilient measure for the Royal Docks (Interview GLA, 2014). Yet, although a community response would be ideal, the GLA recognizes that there also members within a community who are more vulnerable. These are the *socially isolated people*, irrespective of income and so on (Interview GLA, 2014). Their capacities have to be built up. The GLA tries to map where they

have communities that need attention on the basis of 'triple jeopardies'. These are communities with a high probability of a flood related issue happening, a high vulnerability and a low adaptive capacity. However, the GLA's experience has shown that this is the point where it also becomes more difficult. It is problematic to identify where there are communities who have members with a low adaptive capacity, as it is very easy to make stereotypical assumptions about communities, and assessing social networks and social ties takes really in-depth data (Interview GLA, 2014). Nonetheless, the GLA is supporting the local boroughs to identify these communities. For the Royal Docks, the LBN has to identify these communities with the help of their yet to be compiled local flood risk strategy (Interview GLA, 2014). Under the European Flood Directive (Directive 2007/60/EC), such strategies have to be produced by the end of 2015.

Other issues to consider when thinking about stimulating and creating bridging social capital to enhance the adaptive capacity of people living in the Royal Docks, have to do with the small but existing communities present. With previous regeneration attempts in the Royal Docks, parties responsible for the regeneration received large amounts of criticism, as the regenerations did not benefit local communities (Florio & Brownill, 2000). These communities where for example, physically isolated due to bad transport links, socially excluded and had little access to employment (Mayor of London & Newham London, 2011b). Relating this to the flood risk management context, new developments that are put forward in the area are developed in such a way that they should be able to cope with flood risk. As seen with the development example earlier in this section, there are for example no habitable rooms on ground floor and no basement levels. Moreover, the newly developed London Plan, which sets out the overall strategic plan for London (also has to be in general conformity with the NPPF), dictates that new developments in areas of flood risk should accommodate 24 hours survival in case of a flooding. This means that, for example, water pumps, electricity, sewage pumps and lift gear are not allowed in the basement so that toilets can be flushed, lights can be turned on, and water can be pumped. However, for existing communities, and thus existing houses, Newham's core strategy recommends: 'Encouraging the local community in flood risk areas to take up opportunities to improve resilience and resistance of existing homes and buildings' (London Borough of Newham, 2012, p.142). Subsequently, nothing is said in the core strategy on how to encourage the local community. What is more, again an inequality seems to be arising in the Royal Docks. On the one hand, new residents move into ready-made resilient homes, whereas on the other, existing communities should take the opportunity to make their homes resilient by themselves. This is interesting, considering that in the redevelopment plans made by the London authorities, much emphasis is placed on tackling socio-economic inequalities in the Royal Docks. Yet, little is said about how to tackle inequalities between existing and new communities with regards to flood risk.

5.4 Conclusion

As evidenced by the foregoing analysis, many different departments, plans and documents play a role in the flood and water management and planning domain. This contributes to a confusing policy arrangement, with overlapping responsibilities and plans. Fortunately, this is also recognised by authorities as they are trying to simplify the planning system. Now, leading strategic documents for the area's regeneration are the TE2100 and NPPF. Ambitious and progressive statements are made when it comes to addressing flood risk. Generally speaking, an emphasis lies on enhancing adaptability. Higher authorities initiate this shifting perspective; it is up to the lower authorities to implement these visions into practice. However, it is clearly visible that both policy domains are in a transition. And even though ambitious statements are made, local authorities responsible for the Royal Docks, such as the LBN, are still searching for ways to make these visions their own. At the same time a massive regeneration is taking place in the Royal Docks. This leads to confusion regarding the involvement of future residents in flood risk management. On the basis of the interviews, it turns out that it is unclear who is responsible for creating and stimulating linking social capital. Parties involved point at each other when it comes to who is responsible for engaging with the communities and informing them about flood risks. Moreover, although adaptability is preached, flood risk management still largely relies on technical defences in place, therefore hindering the take-off of integrating adaptive measures in flood risk management.

Nonetheless, the Royal Docks shows some promising signs of future resident involvement, if the community engagement programmes proposed in the TE2100 are anything to go by. Both bonding and bridging social capital is stimulated by such programmes, as it is aimed at building up the adaptive capacity of whole communities, including the more vulnerable by stimulating communal information provision through appointing local champions and flood wardens. More alarming is the ostensible deficiency of integrating the existing Royal Docks communities into the flood risk management arrangement, as it is not really clear how they will be encouraged to take up opportunities to improve the resilience of their homes.

6. Conclusions and reflection

This final chapter provides insight in the central research question: *How are social capital networks created and stimulated within flood risk management arrangements to enhance flood resilience in the HafenCity in Hamburg and the Royal Docks in London?* Firstly, the chapter briefly looks back on the problem that led to the main research question. Secondly, the theoretical framework is discussed. Thirdly, the findings of both cases are summarized and compared, and practical recommendations are given. Fourthly, the chapter reflects on the theories and methods used in this research. Lastly, the chapter ends with some concluding remarks and recommendations for further research.

6.1 Recapitulate

In chapter 1 this thesis started with rapid urbanisation processes and climate change that set difficult challenges for cities located along major water bodies. It can no longer be assumed that future climate can be predicted on the basis of historical data, and at the same time the population in cities located near major water bodies grows. As a result, flood risk is increasing. To address this increasing flood risk, the concept of a flood resilient city seems promising. A flood resilient city not only has mitigation measures in place to keep the water away, but also takes the consequences of a flood event into account by being adaptive (e.g. controlled flooding) and transformative (e.g. change based on new insights). Aiming for resilience requires broader stakeholder involvement; citizens now also have to be involved so that they know what to do in case of a flood event and can participate in flood risk management.

The policy domains responsible for managing flood risk, such as water management, disaster management and spatial planning, therefore have to be arranged in such a way that they can accommodate citizen involvement. However, not only should there be room for citizen involvement, citizens themselves also need to have the capacity to deal with their new role and responsibility within the arrangement. Otherwise, a state counts on the risk awareness and preparedness of its citizens, while at the same time citizens count on their government to deal with flood risk. By creating and stimulating social capital networks, citizens' capacities can be

built up as social capital networks provide information, increase awareness, enhance collective action, and so on, of members of social capital networks. This thesis focused on how these networks are created and stimulated to enhance the capacity of citizens to deal with flood risk. It thereby identified the concept of policy arrangements as a means to study these efforts within responsible policy domains.

6.2 Social capital, pre-disaster resilience, and policy arrangements

A conceptual framework has been developed to study the enhancement of citizen involvement in flood risk management. This framework builds on the concepts of resilience, social capital, and policy arrangements. Through the years, social capital has been (and still is) a concept studied frequently by many disciplines. In the social sciences, most studies are aimed at clarifying its role in facilitating collaborative and collective actions after the fact, focussing on how communities pull together after disaster; rebuilding their homes, infrastructure and resources. This study tries to take the discussion on social capital further and set out to use the concept as a means to increase a city's pre-disaster resilience. It argues that the creation and stimulation of social capital prior to a flood event can contribute to the adaptive capacity of a city in case of a flood event, as it can be used to increase the awareness and participation of citizens in a flood risk management domain.

In chapter 2 it is illustrated that a flood risk management domain can be arranged in several ways. Such an arrangement can exist out of multiple policy domains responsible for flood risk management, such as water management, disaster management and spatial planning. A framework is developed by which flood risk management arrangements can be studied, and analyse the attempts within an arrangement to involve citizens in flood risk management (see Figure 5). The framework builds on the concepts of policy arrangements to identify the dominant visions and concepts (content), involved actors, responsibilities, and rules (organisation) in a specific FRMA. In this way, the structure in where the creation and stimulation of social capital networks may unfold is mapped. The second part of the framework explains how citizens are involved in flood risk management. It builds on the network view of social capital in the form of bonding, bridging and linking, which allows for studying the attempts within a FRMA of a city

to involve citizens in flood risk management. Thus, furthering the discussion on social capital in flood risk management by enabling the possibility to study social capital in relation to flood resilience *a priori*. Two cases were selected to add practical insight into social capital networks as a means for increasing resident involvement within FRMAs. These cases are the redevelopment projects in the HafenCity in Hamburg and the Royal Docks in London. The main findings are summarized in the following two sections.

6.3 Hamburg's FRMA and citizen involvement in the HafenCity

Hamburg's FRMA: content

Since the HafenCity redevelopment lies outside the main dike line of Hamburg, two solutions were proposed to protect the HafenCity from the river Elbe. The first was to build a dike around the area, the other was to build the buildings on dwelling mounds which have the same height (7.5m) as the dike line. Because of political and economic reasons, the authorities in Hamburg favoured the dwelling mound solution, where the ground floors and basement levels function as the flood protection. In the event of a flood, temporary floodgates are installed on these levels so that the functions on ground level are not damaged. The dwelling mound solution shows that within the HafenCity a move is being made from the one dimensional resistance strategy towards a more holistic approach that both tries to mitigate flood risk and adapt to flood events. However, although the dwelling mound solution can be seen as adaptive for the time being, because it can still largely function when a flood event occurs, in newer areas of the HafenCity, dwelling mounds are being built higher than the 7.5 meters, due to changing predictions in climate change. As the existing dwelling mounds in the HafenCity have buildings on them, it will be difficult to raise those dwelling mounds in the future.

Hamburg's FRMA: organisation

Based on the empirical findings, Hamburg can be characterised as having a well-organised flood risk management arrangement. With regard to the HafenCity, it is clear who is responsible and in what stage. The disaster management organisation shows this clearly. In case of a disaster,

the Ministry of Interior has the authority to make decisions without the senate and to instruct all other authorities. This same ministry has the responsibility to inform citizens on flood risk, and does so exhaustively. Other signs that show the structured character of the HafenCity can be sought in the fact that the redevelopment of the HafenCity has a phasing strategy and the redevelopment progress is regularly updated. This structured and hierarchical manner of organising can also be seen in the way in which the authorities in Hamburg try to involve resident of the HafenCity in flood risk management. As a result of the dwelling mound solution discussed in the previous section, citizens are assigned a role within the FRMA. Their responsibilities are institutionalised in so-called Flutschutzgemeinschaften, which are civic communities responsible for operating the floodgates of their buildings. Their responsibilities are established by law. All residents within a residential building are automatically part of the Flutschutzgemeinschaft, and every Flutschutzgemeinschaft has a Flutschutzbeauftragter who is the main contact person of the building and responsible for operating the floodgates of the building. This illustrates that also within the composition of actors in the HafenCity a transformation can be seen.

Involving citizens in the HafenCity: linking, bonding and bridging social capital networks

The HafenCity redevelopment shows promising signs of citizen involvement in flood risk management through creating and stimulating different social capital networks. Efforts are made to create and stimulate linking social capital. The empirical results show that authorities provide citizens with extensive information on flood risk. But be that as it may, the well-organised and hierarchical structure in the HafenCity does lead to a loss of important information, as the information provision has a top down character. What the HafenCity case also shows, is that exhaustive information provision does not necessarily lead to an increase in awareness and participation of citizens, nor does institutionalising citizens' responsibilities. Even though the Flutschutzgemeinschaften concept works well, only few residents are actually aware of HafenCity's flood risks. The empirical results show that reasons for this lack of awareness and participation can be sought in the fact that public responsibility for flood risk management is still

dominant in Hamburg, citizens are only being involved by authorities in the implementation phase, not in the policy making process; citizens feel safe in the HafenCity and therefore are indifferent towards flood risks; the HafenCity exists predominantly of tenants who are regarded as uninvolved; and the configuration authorities – Flutschutzbeauftragte works well and therefore citizens do not feel the need to participate.

Nonetheless, the concept of Flutschutzgemeinschaften remains a promising sign of citizen involvement. The concept of Flutschutzgemeinschaften is established by law, and buildings in the HafenCity are designed to facilitate the concept. This seems to show that authorities in Hamburg tried to create bonding social capital networks in the HafenCity. As a group, residents of the Flutschutzgemeinschaft are responsible for managing part of the flood risk in for their building. In the end, the Flutschutzbeauftragte has the final responsibility. Yet, the empirical results have shown that residents that are part of the Flutschutzgemeinschaft do not regularly meet with the Flutschutzbeauftragte on flood risk management related matters. For this reason, the concept does not strengthen the residential network. One of the reasons why little interaction takes place, is due to the fact, that the role of the Flutschutzbeauftragte is often outsourced by the Flutschutzgemeinschaft to an external company or a Hausmeister, which do not reside in the residential building.

The empirical results of the HafenCity also shows that when trying to build up the capacity of communities, it is difficult to keep a core of knowledge in that community, due to a high turnover of people. This makes it difficult to build a collective memory by which flood risk awareness can be raised, as people are constantly moving in and out, taking their knowledge with them. In addition, the difficulty with newly developed areas such as the HafenCity is that new inhabitants cannot have experienced a flood event in the area, thereby making it difficult to show residents the importance of flood risk awareness and participation.

Furthermore, every Flutschutzgemeinschaft is responsible for protecting its own building during a flood event, and can therefore be seen as an individual group within the HafenCity. However, information between the different Flutschutzbeauftragten, and thus individual buildings in the HafenCity is not shared. This type of inward looking bonding social capital network can have negative effects for the adaptive capacity within the whole arrangement, as bridging social capital networks are not stimulated. Therefore, within a flood risk management context, opportunities for increasing the adaptive and transformative capacity are lost, as there is no sharing of knowledge and ideas between residents of the different buildings in the HafenCity. However, so far no major flood related accidents have occurred in the HafenCity, and parties involved in the FRMA are content with the way in which flood risk management in the HafenCity is organised.

6.4 London's FRMA and citizen involvement in the Royal Docks

London's FRMA: content

Like the HafenCity, the Royal Docks, which is located near the Thames, is a former harbour designated to become a large commercial, recreational and residential area. But, unlike the HafenCity, much of the area is still undeveloped. To deal with flood risks, the Royal Docks still largely relies on technical defences in place. The area benefits from the Thames Barrier defences. However, in case of a breach of defences, serious problems may arise in the Royal Docks due to the low-lying nature of the area. More recently, the authorities in London responsible for managing flood risk have expressed their intention to focus more on adaptability in flood risk management, as they have recognised that only having defence measures in place will not be sufficient to deal with future challenges such as climate change, ageing flood defences, and changes in the physical environment and in socio-economic development.

London's FRMA: organisation

What the empirical study learned is that many different departments, rules, plans, and documents play a role in managing flood risk in the Royal Docks, which causes overlapping responsibilities and untransparent processes. Moreover, there is no clear phasing strategy, and it is unclear how the redevelopment is progressing.

Since the focus of attention was on keeping the flood defences in good condition, public awareness is currently low in London. This has been recognised by authorities, and leading strategic documents that set out the flood risk management course, have made several ambitious statements that show the intention to increase citizen awareness and participation in flood risk management. Higher authorities initiate this shifting perspective, and it is up to lower authorities to implement these visions in practice. The empirical results of this study show that these lower authorities are struggling with making these visions their own.

Involving citizens in the Royal Docks: linking, bonding and bridging social capital networks

Within London's FRMA, several initiatives are taken to enhance future citizen involvement. It may be concluded that the approach most notable for creating and stimulating linking and bonding social capital networks is through proposed 'community engagement programmes', which are aimed at building a sustainable bond between authorities and communities. Top down and bottom up information provision is stimulated with these programmes, as such programmes entail that authorities together with (future) residents of the Royal Docks will assess where there are vulnerable community members and assets.

Moreover, London authorities recognise that in most instances information provision alone is not sufficient to increase citizen awareness and participation. Therefore, through the community engagement programmes, local people (so-called 'local champions') within communities will be appointed that are willing to invest time and money in building up their own capacities. Pilots done elsewhere in London illustrated that these people subsequently talk with their community about flood risk and know which people and assets in their community are most vulnerable. However, the empirical study learned that the untransparent FRMA in combination with the massive regeneration project in the Royal Docks causes discrepancies about who is responsible for implementing these programmes in practice. Furthermore, keeping a core of knowledge in the future Royal Docks communities is a difficult challenge, due to the fact that London has a high turnover of people. This makes it difficult to appoint local champions.

With regards to creating and stimulating bridging social capital, one of the most challenging issues in the Royal Docks has to do with inequalities that may arise. The existing and future communities are not provided with the same capacities to deal with flood risk. Residents that will move in newly developed homes, will move into homes that are made resilient by developers (no habitable ground floor uses, and water pumps, electricity, lift gear and so on are not built in basements), whereas existing communities have to take up opportunities themselves to increase the resilience of their homes.

On the basis of the findings and conclusions, in the next section several comparisons are made and practical recommendations given.

6.5 Comparison and practical recommendations

Comparison

The empirical study learned that within the FRMAs of both Hamburg and London, there is recognition for the fact that governmental authorities can no longer manage flood risk on their own, and that citizens need to be involved in flood risk management. Steps are taken to translate this recognition into practice. However, both cases show that there are differences between intentions and implementation. Hamburg shows this in the form of Flutschutzgemeinschaften, where the role assigned to residents has not led to more participation. London shows this in the expressed intention within the FRMA to engage with the community and the subsequent ambiguity with regard to who is responsible to engage with these communities in practice.

Furthermore, inherent to this study is the argument that a resilient approach to flood risk management requires a redistribution of roles and responsibilities; shifting the perspective of flood risk management being solely a public responsibility, towards the notion that also citizens need to be involved. Both cases learn that traditional public stakeholders are finding it difficult to progress with this shift. Public responsibility with regard to flood risk is dominant in Hamburg, therefore the redistribution of roles and responsibilities towards citizens is only done in the implementation phase, not in the policy making process. Authorities in London still largely rely on the technical defences in place. As a result, integration of real adaptive measures is still limited.

Moreover, the HafenCity and the Royal Docks cases show that when trying to build up the capacity of communities, it is difficult to keep a core of knowledge in that community, due to a

high turnover of people in such large cities. In addition, the difficulty with newly developed areas, which both cases are, is that new inhabitants cannot have experienced a flood event in the area, thereby making it difficult to show residents the importance of flood risk awareness and participation.

Furthermore, both have in common that within the flood risk management context opportunities are lost. For the HafenCity this is a less pressing issue as the Flutschutzgemeinschaften concept works, even though, to an extent, it hinders the adaptive and transformative capacity within the arrangement. But for the Royal Docks regeneration it is a matter of concern, because previous regeneration attempts have shown that existing communities were neglected. Now, with regard to socio-economic equality, parties responsible for the regeneration in the Royal Docks are making promising statements to ensure that with this regeneration existing communities reap the benefits. However, when it comes to equality in a flood risk management context, the fact that local communities are 'recommended' to take up opportunities to improve the resilience of their existing homes themselves, but with new developments developers present ready-made resilient homes, shows that inequality still lurks.

Practical recommendations

On the basis of the framework, it is argued that the initial steps taken within the two cases to involve citizens in flood risk management are there, now actors should push through to benefit fully from those measures taken. The following practical recommendations are proposed:

- As both cases show that there are differences between intentions and implementation, monitoring of citizen involvement is suggested. Due to the fact that monitoring can help identify the problems that come with a proposed flood risk management scheme. Authorities in the HafenCity can monitor the workings of the Flutschutzgemeinschaften. In doing so, they can identify who are actually involved, whereafter the question can be posed if this amount of involvement is satisfactory for managing flood risk. Currently, the actors involved are content with the Flutschutzgemeinschaften, but this research has also shown that the

concept has the potential to involve more citizens. For authorities in the Royal Docks, monitoring can help to map how responsibilities of different actors with regards to citizen engagement are carried out in practice. It also allows for mapping overlapping and neglected responsibilities.

- Achieving citizen awareness and participation takes more than mere top down information provision and top down enforcement of participation. To increase awareness and participation, it is therefore recommended for authorities to also engage with communities and involve them in policy-making processes. In this way it is possible to build a sustainable bond between the city and its citizens. The community engagement programmes proposed within the Royal Docks are a good example.
- To be able to increase awareness and participation in newly developed areas such as the HafenCity and the Royal Docks, periodical flood drills are proposed. The empirical findings have shown that for the harbour communities in Hamburg, such drills are already periodically done, and within the Royal Docks, before there were the Thames Barriers, citizens also had regular flood alerts and therefore knew what to do. These types of measures are therefore recommended within newly developed areas such as the HafenCity and the Royal Docks. In this way, even if these residents have not been flooded, they can gain experience through these exercises, and governmental institutions and citizens are in direct contact with each other, which makes it easier for authorities to convey the importance of awareness and participation to citizens.
- A final recommendation is aimed at equality in the Royal Docks regeneration. It is important for authorities to be mindful of inequalities that may arise due to the regeneration. Promising statements are made by authorities to tackle socioeconomic inequalities in the Royal Docks area. On the basis of the findings it is also recommended to be mindful of any inequalities between existing and new citizens and their possibilities to cope with flood risk. Some of the socio-

economic benefits affiliated with the regeneration can be used to support existing communities with making their homes resilient, and the community engagement programmes can prevent that the more vulnerable people in the Royal Docks communities are neglected.

6.6 Reflection on theory and methods

Theoretical reflection

The developed theoretical framework has proven to be useful to study citizen involvement in flood risk management. The empirical findings showed that using the different social capital networks in combination with the concept of policy arrangements indeed allowed for studying how citizens are involved in flood risk management. Therefore, it has proven to be useful, not only for the HafenCity and the Royal Docks, but also for other cases. Reason being is that the first part of the framework makes an assessment of the context; it studies the way in which flood risk management is arranged for the specific case. From there, the framework zooms in on the coalition of actors and analyses how within the specific arrangement, citizens are involved. Thus, these two steps can be deployed on many other cases that need evaluation of citizen involvement in flood risk management. Thereafter, conclusions can be drawn about the status of citizen involvement in the specific case and how this contributes to the case's flood resilience. Not only can the framework be used to evaluate citizen involvement, it can also be used as a tool to enhance citizen involvement. The different social capital networks and their criteria identified, allow for the possibility of stimulating citizen involvement by policy makers and researchers alike. Thus, the framework pre-defines a way to study social capital in relation to flood risk management, and grants policy makers and researchers the opportunity to increase citizens' adaptive capacity to flood risks.

The three theoretical concepts also brought about theoretical challenges. Due to the ambiguous nature of the theory of social capital, it was a challenge to frame the concept for this research. Furthermore, developing a framework that combined social capital with the concept of policy arrangements required time and patience, because there was no literature I could build on

that combined the two concepts. As for the concept of resilience, I not only identified the need for broader stakeholder involvement as more involvement of citizens, but also as more involvement of private parties. Both types of stakeholders were initially included in my research. However, during the course of the research, I found that focussing on both types of stakeholders was not feasible within the amount of time. Therefore, I decided to exclude private parties and solely focus on citizens, a topic I discover to be broad and challenging enough in itself.

Methodological reflection

Methodologically, being able to visit both cases has been invaluable. As I visited both Hamburg and London, it allowed me to analyse different flood risk management arrangements in their respective contexts. It provided me with a sense of the scale of the redevelopments that are taking place in the areas. However, being from the Netherlands, choosing to study two international cases: one in the UK and one in Germany, also brought about some methodological challenges. Trying to set up interviews has proven to be difficult, because my (in)formal network does not reach that far, and for the German case, the language barrier was sometimes an issue. This, and the time and money constrains affected my options and possibilities. Eventually, I have therefore only held two in-depth interviews in Germany, as opposed to five in London. Nonetheless, those two interviews have provided me with important and ample insights. One was on a strategic level with a governmental official, the other on a local level with a resident, allowing me to analyse intentions and practice. In addition, the interviewed resident was also a flood protection officer, which provided me with the opportunity to ask the interviewee questions in his capacity as a resident, as well as, in his capacity as a flood protection officer. Moreover, besides interviews, I also analysed documentation, which supported and complemented the data gathered with the interviews. Using multiple sources of evidence: site visits, in-depth interviews, and documentation, contributed to the validity of my research.

6.7 Concluding remarks and recommendations for further research

This research is a first step in researching the possibility to increase pre-disaster resilience with the help of social capital. Hopefully, many other studies may follow. Such studies can focus on

how to include other stakeholders, such as private parties, and how to stimulate their involvement. The emphasis in such studies can lie on the connection between the coalition of actors and other forms of capital such as political capital and intellectual capital (e.g. Healey, 1997; Khakee, 2002), depending on which stakeholder the research focuses.

Another suggestion for further research is to examine citizen involvement in the Royal Docks and the HafenCity when both cases are in a later stadium of redevelopment. Then, for example, it can be examined if the community engagement programmes in the Royal Docks are implemented, and if the concept of Flutschutzgemeinschaften in the HafenCity still works.

To conclude, the criteria identified to analyse citizen involvement cover a broad range of issues relevant for enhancing flood resilience, but further development of the framework is also needed. What the practical recommendations showed, is that awareness not necessarily leads to an increase in participation. While I was able to make this conclusion on the basis of the framework, as a tool, the framework can include more criteria that can be used to stimulate participation. Further research is needed so that modifications to the framework can be made that incorporate the stimulation of participation.

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