

Building institutional capacity for climate policy integration: lessons from the city of Groningen



Colophon

Title

Building institutional capacity for climate policy integration: lessons from the city of Groningen

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Preface

Dear reader,

Right in front of you is my master thesis ‘Building institutional capacity for climate policy integration’. This master thesis forms the final part of the master program Environmental and Infrastructure Planning at the University of Groningen. Thereby, it marks the end of my time as a student at the University of Groningen and the Faculty of Spatial Sciences.

During my studies, the necessity of integrated approaches has been elaborated upon. However, research and examples from planning practice show that this is not always the easy way to go. This fascinated me and has been the major driver exploring the topic and writing this research. I am looking forward to further developing my insights and knowledge in the field of planning practice!

A few persons have been very important in writing this thesis. First and foremost, I would like to express my gratitude to dr. Margo van den Brink for the profound feedback. Her enthusiasm about my research topic motivated me to keep improving my academic writing. Secondly, I would like to thank all the participants that were willing to talk to me about the topic of climate adaptation, climate mitigation, and climate policy integration. I am grateful that they were willing to share their knowledge, opinions, and experiences with me. Without them I could not have completed this thesis. Last but not least, a great thanks goes to my family and friends for their encouragement and countless support.

For now, enjoy reading my thesis!

Welmoed Claus

Katlijk, 14th of January 2021

Summary

To cope with the effects of climate change, many scholars and policymakers have considered climate mitigation and adaptation to be necessary. Given the complexity of the problem there is a convincingly need for climate policy to be integrated with other policy areas. Traditionally, climate mitigation and adaptation have been viewed as two independent actions by policy makers. In academia, most studies still analyse climate mitigation and adaptation in isolation. An increasing body of literature shows that the challenges related to climate policy integration are not only technical in nature, but in particular institutional. It can be argued that the divide between climate mitigation and adaptation is mainly a mental construct, which is enhanced by the different ways of framing the problem of climate change and how to solve the problem accordingly. It is the current institutional fabric as a result of this historic dichotomy that makes an integrated approach in urban planning difficult, not the incompatibility of the actions. This dichotomy between the mitigation and adaptation domains has resulted in contrasting ways of working, i.e. different policy concepts, rules, and perspectives.

In this research, a focus on institutional capacity building is recommended to overcome these institutional barriers and to make the transition towards an integrated approach. The build-up of institutional capacity is important because it determines the ability of people to perform effectively its tasks and to be able to cooperate with other stakeholders. This is especially relevant to the issue of climate policy integration, because of its cross-sectoral nature and the various actors involved. Institutional capacity can be considered a fuzzy and multi-interpretable concept. Research providing recommendations and insights into how institutional capacity can be built for the topic of climate policy integration remains scarce. Institutional capacity is operationalized by using three dimensions: intellectual capital, social capital, and political capital. This research focuses on what these three capitals mean in the context of climate policy integration. To bridge the gap, an analytical framework is developed which can be used to study how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning.

The aim of this research is to gain insight in how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning. The aim leads to the following main research questions: *How can medium-sized cities build institutional capacity in order to facilitate the integration of climate mitigation with adaptation in urban planning?* To be able to answer this research question a single embedded case study design is adopted. This means that both data on a strategic level and an operational level is gathered. The selected case is the city of Groningen. Within the city of Groningen, the area-based planning project Paddepoel climate-proof has been selected. In the neighbourhood Paddepoel, the construction of a heat grid was linked to objectives to make Paddepoel climate-proof.

The results of the analysis show the main activities employed by the municipality of Groningen and the project organization Paddepoel climate-proof in relation to the build-up of intellectual, social, and political capital for climate policy integration. Institutional capacities at the strategic level shaped the conditions for implementing a project such as Paddepoel climate-proof. For instance, challenging existing world views and current ways of working appeared to be difficult at the strategic level. Therefore, during the project Paddepoel climate-proof integrating climate mitigation with adaptation has not always been self-evident. Lessons and best practices have been transferred towards a comparable in the neighbourhood of Selwerd. Here, it is clear from the start why a heat grid should be linked with objectives to make the neighbourhood climate adaptative and what the expected benefits are. In that sense, the

municipality has built institutional capacities on a strategic level by implementing a project. This research showed the importance of a dynamic view on institutional capacity. Research about climate policy integration should therefore not be limited to the analysis of the outcomes of integrated approaches.

Recommendations for Groningen and other medium-sized cities are quantifying climate adaptation, stimulating financial innovation, investing in new type of civil servant, carefully selecting market parties, developing a climate policy integration narrative, and stimulating knowledge exchange.

The main contribution to planning theory is the translation of the fuzzy concept of institutional capacity into an analytical framework that can be used to study institutional capacity for in particular integrating climate mitigation with adaptation. Further research could focus on the translation of this analytical framework into a policy tool to guide planning practitioners. Other suggestions are studying more projects in medium-sized and small-sized Dutch cities by testing the presented analytical framework, analysing how lessons are being institutionalized, and taking a longitudinal perspective on integrating climate mitigation with adaptation in urban planning.

Key words: climate policy integration, climate mitigation, climate adaptation, institutional capacity building, communicative planning.

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Chapter 1: Introduction

1.1 Increasing climate change impacts

Today, the impacts of climate change are increasingly becoming visible. It is expected that over the coming decades, weather patterns will become more extreme, resulting in longer periods of heat and drought and more intense rainfall. Especially urban areas are facing the consequences of climate change. In 2006, around half of the world's population was living in cities and this proportion has even risen in the last few years (Hunt & Watkiss, 2011). Furthermore, cities are the center of political and economic activity. Climate change affects the urban environment in multiple ways. On the one hand, floods may cause traffic disruption, nuisance, and damage (Runhaar et al., 2012). In extreme situations, flooding impacts are injuries and deaths, mental health impacts, and economic damages. On the other hand, exposure to heat stress is a global threat to human health and well-being, affecting the liveability of cities (Harlan et al., 2006). Overall, urban flood, heat, and drought hazards will increase in the future (Liang, 2019).

In order to reduce the undesirable consequences of climate change the focus has been in the first place primarily on mitigating climate change. Internationally, several countries around the world have shown their commitment to mitigate greenhouse gasses. In the so-called Paris Agreement in 2015, a temperature goal of holding the increase in the global-mean temperature below 2 degree Celsius is agreed upon (Mengel et al., 2018). Often climate mitigation is considered a global issue (Qi et al., 2008). However, it can be argued that climate mitigation is a multi-level issue (Lee & Koski, 2015), i.e. measures at the local level are part of this. To fulfil this international commitment, the Dutch government has the ambition for 7 million houses and 1 million buildings to be free of natural gas by 2050 (Ministerie van Binnenlandse Zaken, 2020).

However, to cope with the increasing impacts of climate change, next to mitigation efforts intensified adaptation is needed (Runhaar et al., 2018; Biesbroek et al., 2009; Dang et al., 2003). Attention is now turning to the consideration of the impacts of climate change itself. On a local scale, in particular adaptation to these increased climate change impacts is needed (Castán Broto, 2017; Pasquini et al., 2013). In the Delta Program on Spatial Adaptation, the ambition for the Netherlands to be climate-proof in 2050 is expressed by the Dutch Government (Rijksoverheid, 2019).

1.2 A need for climate policy integration

Many scholars and policymakers have considered climate mitigation and adaptation to be necessary in policy sectors such as agriculture, public health, critical infrastructure, and urban planning (Runhaar, et al., 2018; Root et al., 2015). According to Tasan-Kok et al. (2013) it is widely accepted that urban planning has a critical role in building urban climate resilience. The spatial configurations of urban areas have significant implications for both mitigation and adaptation measures. Given this complex cross-sector nature of the climate problem, there is a convincingly need for climate policy to be integrated with other policy areas (Adelle & Russel, 2013). Stand-alone approaches to climate mitigation or adaptation addressing specific climate risks are considered ineffective, because they ignore the ways in which local and wider contexts determine people's vulnerability (Ayers et al., 2014). The expected benefits from climate policy integration are multitude, e.g. increased coherence among policies (Rauken et al., 2015), more

effective measures (Kok & de Conink, 2007; Uittenbroek, 2016), resource efficiency (Runhaar et al., 2018; Uittenbroek, 2016), increased opportunities for innovation (Uittenbroek et al., 2013), and creation of synergy effects.

Despite the benefits, the progress of policy integration in general and climate policy integration specifically has been limited on a global scale (Kok & de Coninck, 2007; Hartmann & Spit, 2014). Although, the Netherlands is well-known for its experience with the integration of environmental objectives within other policy sectors (Uittenbroek et al., 2013). According to Runhaar et al. (2009) a gradual change from sectoral, generic, and norm-based planning towards more integrated approaches can be observed in the Netherlands. However, policies that do include climate change impacts tend to focus on either mitigation or adaptation rather than a combination of these two approaches (Biesbroek et al., 2009). Traditionally, climate mitigation and adaptation have been viewed as two independent actions by policy makers (Berry et al., 2015).

The Delta Program on Spatial Adaptation expresses the need to combine climate adaptive measures with other objectives such as the energy transition (Rijksoverheid, 2019). At the moment, there is no national policy on how to undertake the integration of climate mitigation with adaptation in urban planning. This means that it is up to the Dutch cities to figure out how to give meaning to the ambition set by the Dutch national government. This implies a major challenge for Dutch cities in the upcoming decades to accelerate this transition towards integrated solutions. Until now there is a limited number of projects in the Netherlands as successful examples that integrate climate mitigation with adaptation.

Also, in academia, most studies still analyse climate mitigation and adaptation in isolation (Grafakos et al., 2020). Especially, the interactions between climate mitigation and adaptation have rarely been researched (Di Gregorio et al., 2017; Swart & Raes, 2007). According to Duguma et al. (2014) there is limited knowledge about how to move from the current dichotomized approach to an integrated approach, i.e. barriers and opportunities, potential challenges, and steps that need to be taken. In-depth research is needed on how to undertake (Adelle & Russel, 2013) and how to achieve (Meijers & Stead, 2009) climate policy integration. In their research Biesbroek et al. (2009) indicate several institutional barriers as reasons why integrating climate mitigation with adaptation in urban planning appeared to be difficult. Key barriers include differences in scientific approaches, differences in measurements of effectiveness, and differences in policy concepts. It can be argued that those barriers are mainly a mental construct, which is enhanced by the different ways of framing the problem of climate change and how to solve the problem accordingly, i.e. institutional barriers (Biesbroek et al., 2009). It is the current institutional fabric as a result of this historic dichotomy that makes an integrated approach in urban planning difficult, not the incompatibility of the actions. This dichotomy between the mitigation and adaptation domains has resulted in contrasting ways of working. In this regard, existing institutions condition the process of climate policy integration.

An increasing body of literature advocates that an understanding of institutional barriers is required in achieving mitigation or adaptation (Næss et al., 2005; Brown & Farrelly, 2009). More related to this research, Storbjörk and Hedrén (2011) argue that increased knowledge is needed on how institutions enable or limit the integration of climate objectives in policymaking. For instance, according to Cuevas et al. (2016) building institutional capacity is crucial to the integration process. Research of Restemeyer et al. (2015) show that in particular

urban climate policy integration requires capacity building among private as well as public stakeholders. However, empirical research needs to be done in order to understand how institutional capacity can be built for integrating climate mitigation with adaptation in urban planning.

Considering the predictions of further growth in cities in terms of economic activities, inhabitants, and related consumption patterns, cities are of importance in developing strategies to mitigate and adapt to climate change. According to Hoppe et al. (2016) the scientific debate on local climate policy integration has largely focused on large-sized cities. In comparison, little attention has been given to medium-sized or small cities. On the contrary, one may argue that medium-sized or small cities are more constrained in the resources they have compared to larger cities, e.g. leadership capacities, financial resources, and staffing (Grafakos et al., 2020; Hoppe et al., 2016). Therefore, this observation stresses the relevance of researching medium-sized cities, as limited resources may hinder the process of building institutional capacity.

1.3 Problem statement

The aim of this study is to gain insight in how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning. The aim of this research leads to the following main research questions:

How can medium-sized cities build institutional capacity in order to facilitate the integration of climate mitigation with adaptation in urban planning?

Secondary research questions are set up to be able to answer the main research question.

1. How can institutional capacity building for climate policy integration be conceptualized and developed into an analytical framework?

An analysis of existing scientific literature will result in an analytical framework. This is relevant for the other secondary questions, as this analytical framework will be used to study institutional capacity building activities. This analytical framework is shown in Chapter 2.6.

2. Which activities are undertaken by the municipality of Groningen for building institutional capacity on a strategic level to integrate climate mitigation with adaptation in urban planning?

Information for this secondary question will be derived from documents and interviews with relevant stakeholders (described in Chapter 3). This will provide information in particular on the current municipal context. The results are discussed in Chapter 4.

3. Which activities are undertaken by the Paddepoel climate-proof project organisation for building institutional capacity on an operational level to integrate climate mitigation with adaptation in urban planning?

Information for this secondary question will be derived from documents and interviews with relevant stakeholders (described in Chapter 3). This will provide information in particular on the current operational context. The results are discussed in Chapter 5.

4. Which lessons can be drawn about building institutional capacity from the selected case study?

Information for this secondary question will be derived from documents and interviews with relevant stakeholders (described in Chapter 3). Recommendations for Groningen and other medium-sized cities on how to build institutional capacity for climate policy integration are presented in Chapter 6.

1.4 Theoretical approach

Climate policy integration is a much-debated topic by many scholars (Adelle & Russel, 2013; Lenschow, 2002; Urwin & Jordan, 2008). Nevertheless, according to Adelle and Russel (2013) climate policy integration has received insufficient attention in the academic debate. In particular, only a few scholars have explained the process of climate policy integration (Uittenbroek et al., 2013). In this research climate policy integration is defined as “the integration of climate change considerations in existing and/or new policies – as well as concrete planning and decision-making practices – at different administrative and political scales as well as in different geographical settings” (Storbjörk and Hedrén, 2011, p. 265). Explicit reference is made to integrating the two climate change objectives, i.e. climate mitigation and adaptation. This research elaborates on the work of Uittenbroek et al. (2013). They suggest that it is important to enlarge research on opportunities and barriers for integrating climate change objectives in order to expand the understanding of the process. Drawing on the work of Biesbroek et al. (2009), this research is built on four institutional barriers, namely a difference in scientific approach, a difference in perspective on time, a difference in spatial scale, and a sectoral approach with regard to involving stakeholders.

In this research, a focus on institutional capacity building is adopted to overcome these institutional barriers to be able to move towards integrated approaches. Institutional capacity is considered important because it determines the ability of people to perform effectively its tasks and to be able to cooperate with other stakeholders (Brown & Farrelly, 2009). The concept of institutional capacity can be considered multi-interpretable and abstract. Operationalizations of the concept have been done by Laeni et al. (2020) for the context of international flood resilience programs and by Breukers and Wolsink (2007) for the context of ecological modernization. However, research providing recommendations and insights into how institutional capacity can be built for the topic of climate policy integration remains scarce. Drawing on research of Cars et al. (2017), Khakee, (2002), and Healey (1998), institutional capacity is operationalized by using three dimensions: intellectual capital, social capital, and political capital. This research focuses on what these three capitals mean in the context of climate policy integration. Therefore, these capitals are linked with solutions put forward in research on climate policy integration (e.g. Hartman & Spit, 2014) and Swart et al. (2013), research on sustainable development in general (e.g. Polk, 2011; Payne & Shepardon, 2015), and research on the mitigation-adaptation dichotomy (e.g. Willbanks, 2005; Biesbroek et al., 2009; Laukkonen et al., 2009; Grafakos et al., 2019; Duguma et al., 2014; Klein et al., 2009; Berry et al., 2015). To bridge the gap, an analytical framework is developed which can be used to study how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning.

1.5 Research design

A single embedded case study design is adopted to understand how institutional capacity can be built for integrating climate mitigation with adaptation in urban planning. In an embedded case study design, there are multiple units of analysis (Yin, 2009). In this research, data has been collected both at a strategic level and operational level, i.e. on a municipal level and project level. Institutional capacity at a strategic level is needed to be able to develop integrated practices, i.e. policy formation. And thereby setting the institutional context for implementing projects. On the contrary, implementing projects can be regarded as a way to build institutional capacity at the operational level, which can also stimulate institutional capacity building at the strategic level.

The selected case is the city of Groningen. Groningen has been selected because it is positioning itself as a frontrunner in both climate mitigation and adaptation. Recently, the Global Centre on Adaptation has been established in the city of Groningen and a Climate Adaptation Week is being organized. Within the city of Groningen, the area-based planning project Paddepoel climate-proof has been selected. In the neighbourhood Paddepoel, the construction of a heat grid was linked to objectives to make Paddepoel climate-proof (Gemeente Groningen, 2020). The selected project has been labelled as a pilot project. This implies a focus on learning and acquiring knowledge, which makes the project an interesting case to be researched.

Primary data is collected by conducting semi-structured interviews and doing observations. Secondary data consists of documents, including policies, newspapers, and articles. The data obtained by the semi-structured interviews, observations, and the documents is analysed by coding the data using the Atlas.ti software.

1.6 Societal and scientific relevance

The results of this research are valuable both theoretically (i.e. how the build-up of institutional capacity for climate policy integration is understood) and in practice (i.e. a better integration of climate mitigation with adaptation in urban planning). Regarding planning practice, the results can be used by (Dutch) medium-sized cities to improve their performance regarding climate change measures. According to Santhia et al. (2018) municipalities often have difficulties with integrating climate change perspectives into urban planning. According to Storbjörk and Uggla (2015) local authorities are in need of recommendations for how to act. Based on the findings lessons for institutional reform can be formulated for medium-sized cities. In addition, there is no framework for climate policy integration in both planning practice and academia (Uittenbroek, 2016; Urwin & Jordan, 2008). Especially the concept of institutional capacity has remained fuzzy for the topic of climate policy integration. To answer this call, this research can provide insights in what should be part of an analytical framework for building institutional capacity. This analytical framework can be used to study institutional capacity for in particular integrating climate mitigation with adaptation.

In general, the results of this research can facilitate an acceleration in the transition towards urban climate resilience. Resilience of complex systems, such as urban areas, is often conceptualized as the ability to resist, recover, adapt, and transform from shocks (Laeni et al., 2019; Restemeyer et al., 2015; Davoudi, 2012). Mitigation can increase the robustness of an urban system, whereas adaptation can increase the acceleration for recovering from a shock

(Tasan-Kok et al., 2013). It is also argued that the institutional capacity of individuals is closely connected to resilience (Tyler & Moench, 2012). Building institutional capacity contributes to the capacity for innovation and learning in order to foster transformation of a system. Therefore, the capacity of social agents covers an important part of urban climate resilience.

1.7 Outline of the thesis

In this chapter the scope of this research has been explained and motivated. Also, the main research question and secondary questions are presented. In Chapter 2 institutional capacity building is operationalized using literature on integrating climate mitigation with adaptation, resulting in an analytical framework. Chapter 3 contains the research design, consisting of the selected case, methods for data collection and analysis, and research ethics. The findings about the strategic level are presented in Chapter 4. The findings about the operational level are presented in Chapter 5. Lastly, conclusions, discussion points, and recommendations are given in Chapter 6. The references used in this research can be found in Chapter 7.

Chapter 2: Institutional capacity building for climate policy integration

This chapter provides an overview of relevant theories, which enables the researcher to operationalize key concepts. First, the concept of urban climate resilience is introduced. Subsequently, the complexity of integrating climate mitigation with adaptation is examined, including the institutional barriers. Then, the necessity of building institutional capacity is elaborated upon. Thereafter, institutional capacity has been operationalized for the topic of climate policy integration. As a result, an analytical framework with activities on how to build institutional capacity for integrating climate mitigation with adaptation in urban planning is shown.

2.1 Urban climate resilience

Climate change is expected to result in more extreme weather events (Dieperink et al., 2016). Therefore, the probability of extreme weather events is increasing. However, climate change impacts do not only concern the probability, but also the impact it has on society. In that sense, climate change impacts are the function of on the one hand the climate hazard and on the other hand the consequences of the impacts (Vis et al., 2003). The consequence factor is exacerbated by socio-economic changes, such as economic growth, population growth, terrestrial changes, and urbanization (Mitchell, 2013; Sörensen et al., 2016). In general, urbanities are highly populated and densely built (Uittenbroek, 2016). Rapidly urbanizing cities are experiencing increasing hazards due to the consequences of climate change in combination with increasing value of existing assets (Hunt & Watkiss, 2011). Thus, climate hazards are increasing because of an increase in the chance (as a result of climate change) plus an increase in the impacts (as a result of continuous urbanization).

In order to anticipate and prepare for environmental challenges there is an increasing demand for cities to become resilient (Laeni et al., 2019). Resilience for complex systems, such as urban areas, is often conceptualized as the ability to resist, recover, adapt, and transform from shocks (Laeni et al., 2019; Restemeyer et al., 2015; Davoudi, 2012). Generally, two strategies can be distinguished to reduce the undesirable consequences of climate change: climate mitigation and climate adaptation (Swart & Raes, 2007). Urban climate resilience is the overarching goal, whereas climate change mitigation and adaptation are the methods to achieve this objective of reducing vulnerability (Hamin & Gurran, 2009). Mitigation can increase the robustness of an urban system, whereas adaptation can increase the acceleration for recovering from a shock (Tasan-Kok et al., 2013). In first instance, climate mitigation and adaptation seem to be two separate approaches. However, in the next sub-section the interrelatedness of climate mitigation and adaptation is explained.

2.2 The complex relation between climate mitigation and adaptation

Climate mitigation refers to “implementing policies to reduce greenhouse gas emissions and enhance sinks (Boucher et al., 2014, p. 24). Therefore, climate mitigation strategies are directly focused on the causes of climate change. In the international debate, the focus has been considerably on mitigating climate change (Klein et al., 2005). Today, however, there is growing recognition that mitigation measures alone are not sufficient to combat the impacts of climate change (Runhaar et al., 2018). Considering the lag times in the global climate

system, mitigation strategies are not going to prevent climate change from happening (Klein et al., 2005). Therefore, next to mitigation efforts intensified adaptation is needed. Climate adaptation can be defined as “initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects (Boucher et al., 2014, p. 25). Nevertheless, reliance on climate adaptation only would ask very high social and economic costs for effective adaptation considering the magnitude of climate change (Klein et al., 2005). Therefore, still intensified mitigation efforts are also needed. According to Wilson & Piper (2010) effective climate policy is aimed at reducing the risks of climate change and therefore requires both climate mitigation and adaptation actions. Where mitigation strategies focus on reducing the probability of a climate hazards, adaptation strategies aim to reduce the consequences of climate hazards. As Laukkonen et al. (2009, p. 288) put it: ‘mitigation aims to avoid the unmanageable and adaptation aims to manage the unavoidable’.

Often climate mitigation is considered a global issue (Qi et al., 2008; Swart & Raes, 2007; Laukkonen et al., 2009). International regimes generally target on one particular issue (Gustavsson et al., 2009), for example reducing emissions by restrictions on polluting airplanes. However, it can be argued that mitigation is a multi-level issue (Lee & Koski, 2015), i.e. measures at the local level are part of this. Swart & Raes (2007) add to this that concrete mitigation actions involve decisions made at the local level. According to Sharp et al. (2011), an increasing number of local governments are addressing global climate change by setting up mitigation policies. This is surprising, since those cities are addressing a transboundary environmental problem (Zuidema, 2016). When a city is reducing greenhouse gas emissions and nearby cities do not, the overall greenhouse gas emissions in an area may not change considerably, making the mitigation debate highly controversial (Laukkonen et al., 2009). Despite the spill over effect, it is increasingly becoming clear that climate change will have an impact on cities (Holgate, 2007; Grafakos et al., 2020). Simultaneously, urban areas contribute greatly to greenhouse gas emissions (Grafakos et al., 2020; Grafakos et al., 2019). Examples of measures on a local scale that may reduce greenhouse gas emissions are the installation of alternative heat suppliers, the cascading of energy in a smart way, the spatial adjustment of a traffic system, and the saving energy by considering the location of new urban areas (Wende et al., 2010). These mitigation strategies are considered by many scholars as insufficient to avoid the climate change impacts, which further increase the need for adaptation measures (Runhaar et al., 2018; Biesbroek et al., 2009).

To differing extents, governments have developed adaptation strategies at both the national level and local level (Dannevig et al., 2012). Although, national policies on climate adaptation are the minority compared to its local variants. Climate adaptation is usually framed as a local issue (Castán Broto, 2017; Pasquini et al., 2013), reflecting the fact that climate change impacts are experienced locally. Since climate change impacts show local variations, it is assumed that much adaptation measures are best managed locally (Rauken et al., 2015). In the context of this research, adaptation strategies can be characterized as: all pro-active measures taken aiming to reduce climate hazards, directly or indirectly. It is a planning action to limit unwanted impacts of intensifying and increasing precipitation patterns. Although the seemingly contrasting scales in which climate mitigation and adaptation actions operate, these strategies are intrinsically interlinked (Laukkonen et al., 2009).

Research by many scholars has shown that often both above-described strategies are considered as separate approaches for dealing with climate change (Biesbroek et al., 2009;

Berry et al., 2015; Duguma et al., 2014). This is generally referred to as the mitigation-adaptation dichotomy (Biesbroek et al., 2009). A dichotomy can be described as classification or separation into two categories. Today, climate mitigation and adaptation are still implemented independent from each other, being addressed by different actors at different scales (Duguma et al., 2014). It is recognized by multiple researchers that this mitigation and adaptation divide needs to be closed (Laukkonen et al., 2009). To illustrate, a higher level of climate mitigation could demand less adaptation measures and vice versa (Duguma et al., 2014; Swart & Raes, 2007). Striking the balance between climate mitigation and adaptation will be challenging, because the options vary per location and time (Klein et al., 2005). As a result, there is no single best mix of climate mitigation and adaptation.

The interrelationship between climate mitigation and adaptation can be considered a complex relationship. It is important to unravel this complexity to be able to avoid conflicts, consider trade-offs, and capture potential synergies (Berry et al., 2015). Moreover, considering this complex relationship between climate mitigation and adaptation a holistic approach is required, i.e. a synergy approach (Berry et al., 2015). According to Duguma et al. (2014) it is in particular land use planning that transcends the mitigation and adaptation divide, as both climate mitigation and adaptation have a spatial dimension (Biesbroek et al., 2009). As Laukkonen et al. (2009, p.289) express: “within the built environment, incorporating both mitigation and planning structures (roads, parks, buildings shells and structural integrity) can last at least 50-150 years and are defined by functionality and spatial planning”.

2.3 Towards a synergy approach for climate policy integration

Climate policy integration is a much-debated topic by many scholars (Adelle & Russel, 2013; Lenschow, 2002; Urwin & Jordan, 2008). In related strands of the climate policy integration literature, the terms proofing and mainstreaming are used instead or alongside integration (Adelle & Russel, 2013). Storbjörk and Hedrén (2011, p. 265) define climate policy integration as “the mainstreaming of climate change considerations in existing and/or new policies – as well as concrete planning and decision-making practices – at different administrative and political scales as well as in different geographical settings”. Lafferty and Hovden (2003) developed the idea of policy integration along two dimensions, i.e. horizontal and vertical policy integration. Horizontal policy integration refers to sectoral integration. Whereas vertical policy integration refers to intergovernmental integration. In this research explicit reference is made to integrating the two climate change objectives, climate mitigation and adaptation, in urban planning, i.e. horizontal policy integration. It should be noted, however, that the importance of the relationship between the vertical and the horizontal dimension of policy integration is acknowledged (Lafferty & Hovden, 2003). Effective policy integration is being pursued when a combination of both vertical and horizontal policy integration is in place. Today, the importance of integrating climate mitigation and adaptation in urban planning is stressed by both academia and planning practice (VijayaVenkataRaman et al., 2012). In their 5th Assessment Report, the Intergovernmental Panel on Climate Change calls for the need of a form of development that combines climate mitigation and adaptation in order to pursue sustainable development (Di Gregorio et al., 2014). Roof gardens provide such an example (Laukkonen et al., 2009). Green roofs can help mitigating climate change by providing cooler inner buildings and sinking carbon. Next to that, they help slowing down flooding during heavy rainfall.

The expected benefits from climate policy integration are multitude, e.g. increased coherence among policies (Rauken et al., 2015), more effective measures (Kok & de Conink, 2007; Uittenbroek, 2016), resource efficiency (Runhaar et al., 2018; Uittenbroek, 2016), increased opportunities for innovation (Uittenbroek et al., 2013), and creation of synergy effects (Adelle & Russel, 2013; Brouwer et al., 2013). Duguma et al. (2014, p. 421) defined synergies as “combined or co-operative effects – literally, the effects produced by things that operate together (parts, elements or individuals). Classically, it has the context that effects produced by the wholes are different from what the parts can produce alone”. Such measures additional benefits, producing win-win situations (Klein et al., 2005). According to Uittenbroek et al. (2013) synergies become most obvious at the local level. The degree of synergy effects can be placed along a continuum (Duguma et al., 2014):

1. Policies and strategies that promote climate mitigation measures with adaptation benefits *or* adaptation measures with mitigation benefits (referred to as co-benefits by Grafakos et al., 2020).
2. Policies and strategies that promote both climate mitigation *and* adaptation measures, however not in an integrated way. It is important to notice that in this approach also co-benefits can become visible.
3. Policies and strategies that promote the integration of climate mitigation with adaptation measures.

Today’s practices show that there is limited attention to the last point. However, this last point is fundamental to progress along the synergy continuum (Duguma et al., 2014). Although, the provision of co-benefits is considered a necessary step towards synergy, a synergy approach goes further as it considers the interconnections and interaction between the different measures.

In general, two different approaches can be distinguished, i.e. the complementarity approach and the synergy approach. The differences between both strategies are shown in Table 1.

	The complementarity approach	The synergy approach
Goal	Reducing the negative consequences of climate change by addressing climate mitigation and adaptation in such a way that either of the two measures is used as an entry point providing the other measure as a co-benefit	Reducing the negative consequences of climate change by addressing climate mitigation and adaptation within a holistic framework without prioritizing one of the two measures
Approach	The parts are prioritized and therefore the focus is on stand-alone interventions	The whole is more important than the parts and therefore the focus is on an integrated approach
Design	Often a top-down approach is used	Multiple stakeholders should be involved in the design

Table 1 Differences between the complementarity approach and the synergy approaches to climate mitigation and adaptation in land use planning (Duguma et al., 2014)

It should be noted however, that climate mitigation and adaptation actions do not always complement each other but can be counterproductive as well (Laukkonen et al., 2009). Especially, when these strategies are not coordinated under a shared vision. In research of Grafakos et al. (2020) a distinction is made between negative (trade-offs and conflicts) and positive (synergies and co-benefits) interrelationships. A conflict is a measure that undermines or counteracts another measure (Grafakos et al., 2019). An example of a conflict is provided by Laukkonen et al. (2009). High density urban areas give the opportunity to cascade energy and stimulate the use of slow mobility in order to reduce emissions. At the same time, a dense-built environment increases the likelihood of urban flooding. And in addition, high densities in urban areas reduce the possibility to incorporate urban greenery. Conversely, climate adaptation measures can also be in conflict with mitigation measures (Klein et al., 2005). To illustrate, the construction and manufacturing of infrastructural adaptive measures causes an increase in greenhouse gas emissions. Trade-offs includes the balancing of climate mitigation and adaptation measures, when for example it is for example not possible to carry out due to financial obstacles (Grafakos et al., 2019). These measures can be conflicting sometimes.

In this research, the above-described synergy approach is taken as a basis, because this approach considers the complex relationship between climate mitigation and adaptation. To move along this continuum, ranging from the complementarity approach to the synergy approach, the process of integrating climate mitigation with adaptation in urban planning is faced with multiple barriers. Especially institutional barriers are considered an obstacle when integrating climate objectives into other policy domains, as it would lead to greater institutional complexity (Locatelli et al., 2015).

2.4 Institutional barriers to climate policy integration

North (1991, p. 97) defines institutions as “the humanly devised constraints that structure political, economic and social interactions”. Shortly, institutions consist of the structure that humans impose in their dealing with each other (North, 1990). In other words, institutions are the informal and formal rules that condition human interactions (Brown & Farrelly, 2009). Formal institutions consist of laws, plans and programs of action, organizations, and regulations (Alexander, 2005). Informal rules include conventions, norms and behaviour, and self-appointed codes of conduct (North, 1990). Helmke & Levitsky (2014, p. 727) define these informal rules as “socially shared rules, usually unwritten, that are created, communicated, and enforced outside of officially sanctioned channels”. This means that informal institutions are seen as social constructs that are re-created by means of interaction between actors. According to Helmke & Levitsky (2004) the performance of formal institutional arrangements is often shaped by informal structures in unexpected ways. Together these formal and informal institutional arrangements comprise the rules of the game (North, 1990). Organizations can be regarded as the players. Drawing on the work of Biesbroek et al. (2009) the remainder of this section discusses four main institutional barriers related to the integration of climate mitigation with adaptation in urban planning.

The first institutional barrier to climate policy integration is the difference in scientific approach (Biesbroek et al., 2009). To illustrate, strategies for mitigation are mainly formulated on the basis of information from a limited number of scientific bodies of thought, e.g. economics and technology. This sectoral perspective influences the framing of the problem.

For formulating mitigation strategies quantitative models are used to produce highly specialized knowledge. According to de Roo (2017) this can be referred to as a technical-rational approach to understanding and solving the problem. It could be questioned whether such a positivistic approach is a valuable approach to combat climate change, as it takes the actual problem out of the broader socio-economic context. To the contrary, adaptation strategies require context specific information to be able to tailor made measures (Biesbroek et al., 2009). This is needed because of the heterogeneity of actors involved in the process, i.e. different values and perspectives of stakeholders. It needs the inclusion of various groups to require not only local knowledge, but also the translation of information into a learning process (Laukkonen et al., 2009). In general, it can be said that for adaptation strategies a social constructionist approach is adopted, where in contrast to positivism, reality is socially constructed (Gergen & Gergen, 1991). According to de Roo (2017) this can be referred to as a communicative-rational approach to understanding and solving the problem, which can be regarded as the opposite of the technical-rational approach. At the moment, the different scientific approaches and the related contrasting ways of producing knowledge strengthens the barriers to successful integration (Biesbroek et al., 2009).

What adds to the difficulty of integrating climate mitigation strategies with adaptation strategies is the lack of knowledge. First of all, land-use planners have to deal with uncertainties related to the topic of climate change (Werritty, 2002). Over the last years knowledge regarding causes and effects of climate change have increased. However, much uncertainty is remaining about the time, the degree and the manner in which local communities will be affected (Hartmann & Spit, 2014). Furthermore, it is difficult to predict consumption patterns (Klein et al., 2005), and demographic and socio-economic shifts (Laukkonen et al., 2009). Hesitation to act can be a result of these uncertainties. How to cope with and react upon these uncertainties differs per rationality, either technical or communicative.

The second institutional barrier that reinforces the mitigation-adaptation dichotomy is the difference in perspective on time (Biesbroek et al., 2009), as the perspective on time conditions the effectiveness of the measures. The reducing of greenhouse gasses tends to focus attention on long-term mitigation whilst adapting to climate change is considered a short-term solution (Swart & Raes, 2007; Landauer et al., 2015). Climate mitigation actions must be pursued to combat the causes of climate change in the long run. The benefits of climate mitigation actions will be evidenced in a couple of decades, as a result of the long residence time of greenhouse gases in the atmosphere (Klein et al., 2005; Wilbanks et al., 2003). On the short-term, climate adaptation measures are needed to reduce the expected impacts from climate change. Climate adaptation actions would be effective immediately (Klein et al., 2005; Wilbanks et al., 2003). From a temporal perspective, the divide between climate mitigation and adaptation has been aggravated due to the fact that mitigation strategies predominantly are proactive or anticipatory whereas adaptation strategies most of the time are considered reactive (Biesbroek et al., 2009; Wilbanks et al., 2003). This indicates that both strategies follow a different time path. As the effects of climate change often become visible on the long-term, measures for mitigation or adaptation can quickly transform into a so-called weak interest in urban planning decisions (Hartmann & Spit, 2014). According to Zuidema (2016) such a weak profile tends to constrain willingness of decisionmakers to pursue proactive, ambitious and hence integrated policies.

The third institutional barrier that influences the integration process is the difference in spatial scale. Climate mitigation is mostly focused on resolving a global problem, whereas climate adaptation is mostly focused on addressing a local problem (Berry et al., 2015; Biesbroek et al., 2009, Swart & Raes, 2007). Often climate mitigation actions are associated with top-down implementation approaches and agreements (Wilbanks & Sathaye, 2007). Since many adaptation actions are implemented locally, bottom-up approaches are associated with climate adaptation. What also widens the gap between mitigation and adaptation is the difference of beneficiaries per spatial scale, whilst implemented at the same scale (Swart & Raes, 2007; Klein et al., 2005). Climate mitigation actions mainly benefits others, i.e. an altruistic vision, since many beneficiaries of mitigation actions are external to the region. On the contrary, climate adaptation mainly benefits those who implement it, i.e. an egoistic vision. Adaptation benefits are more likely to be localized (Wilbanks et al., 2003). Integrating measures of different scale levels is a complex exercise, considering each geographical level has its own characteristics determining the development and formulation of actions, e.g. socio-economic contexts, cultural values, and political discourses (Biesbroek et al., 2009). In essence this global-local division is true, however, concrete measures for mitigation do exist on the local level. Hence, the dominant geographical levels for climate mitigation and adaptation measures differ in general, but at all spatial scales, adaptation and mitigation both play a role (Swart & Raes, 2007). The implementation of climate mitigation and adaptation strategies at the local level can result in a competition with other issues in the spatial planning domain (Hartmann & Spit, 2014), as often these measures require space.

The fourth institutional barrier that complicates the divide between climate mitigation and adaptation is the sectoral approach with regard to involving stakeholders. In the last years, a shift from government to governance has taken place in spatial planning in the Netherlands (Rhodes, 1996). This implies the involvement of a myriad of stakeholders that give impetus to the planning process. It is the outcome of multi-level and multi-actor forms of coordination (Cars et al., 2017). According to Dewulf et al. (2015) the integration of climate mitigation with adaptation in urban planning is a multi-sector and multi-actor challenge. However, mitigation and adaptation strategies involve different types of stakeholders (Biesbroek et al., 2009). Stakeholders involved in mitigation actions are often from energy, agriculture, and mobility departments. Furthermore, mitigation strategies usually involve actors from the transport sector or industry. In comparison to climate adaptation, the number of stakeholders involved is limited. Contrasting, stakeholders involved in adaptation actions are often from green, water management, tourism and recreation, human health, urban planning, and nature conservation departments (Klein et al., 2005). To cope with the impacts of climate change a variety of both public and private stakeholders are involved (Trell & van Geet, 2019). Besides public actors, the involvement of private actors is crucial for the implementation of climate change measures in urban areas, because mitigation and adaptation measures are also needed on private property (Mees, 2017). According to Landauer et al. (2015) privately owned land can hinder the possibilities for public administrations to implement integrated climate mitigation and adaptation measures. Examples of private actors are citizens, housing associations, project developers, and businesses. Each actor group, both public and private, may have different rationales and responsibilities, such as efficiency, legitimacy, fairness or effectiveness, which can hamper the integration process (Mees, 2017; Dewulf et al., 2015; Termeer et al., 2012). Hitherto, most of these actors bear no direct responsibility for reducing climate change risks (Runhaar et al., 2016).

The responsibility for implementing climate change measures can be related to the equitability of mitigation and adaptation actions. It can be argued that mitigation actions are more equitable than adaptation actions, considering the fact that those who emit are those bearing the responsibility (Wilbanks & Sathaye, 2007). Wilbanks et al. (2003) point out that the costs of adaptation are more localized on particular populations and areas where climate adaptation strategies are implemented. In comparison, the cost of climate mitigation measures is often widely distributed across national populations of industrialized countries. One of the reasons why most actors do not consider mitigation or adaptation measures is that often those measures are considered costly (Hartmann & Spit, 2014). Consequently, integrating those measures in spatial planning is interpreted as an extremely weak interest, because there is no economic incentive. Measures for reducing climate risks in spatial planning are considered as an extra cost for an issue of lower priority. However, according to Laukkonen et al. (2009) the effectiveness of responses to climate change will depend also on the inclusion of a comprehensive approach that includes all stakeholders from all social scales, i.e. stakeholders related to both climate mitigation and adaptation. Biesbroek et al. (2009) argues that for climate adaptation mitigation it is more easily to measure the effectiveness compared to climate mitigation adaptation. For the effectiveness of climate adaptation measures there are no quantified objectives or predefined targets that determine the success rate (Klein et al., 2005). This often concerns human lives, material damage, and damage to culture or nature. In addition, because of the local nature of climate adaptation measures, the benefits will be valued differently, considering different economic, social, and political structures (Klein et al., 2005). As a result, insights in the benefits and costs of climate adaptation strategies are far more limited than for climate mitigation strategies.

To conclude, it can be argued that the divide between climate mitigation and adaptation is mainly a mental construct (Biesbroek et al., 2009), which is enhanced by the different ways of framing the problem of climate change and how to solve the problem accordingly. Coming back to North's (1991) definition of institutions, it is the humanly devised constraints that structures interaction. According to Biesbroek et al. (2009) it is the current institutional fabric as a result of the historic dichotomy that makes an integrated approach in urban planning difficult, not the incompatibility of the actions. This dichotomy between the mitigation and adaptation domains has resulted in contrasting ways of working, i.e. different policy concepts, rules, and perspectives. This is what Wiering & Immink (2006, p. 424) describe as policy arrangements, which is 'the consequence of a temporary stabilization of the organization and content of a specific policy domain at a certain level of policy implementation'. To illustrate, where the climate mitigation domain is focused on norms and targets, the climate adaptation domain is more concerned with pilot projects. To bridge the gap between climate mitigation and adaptation in urban planning, the earlier-identified institutional barriers must be met. These institutional barriers are summarized in Table 2. There is a growing need for processes and institutions that can facilitate cross-sector governance to be able to better address the long-term protection of complex systems (Polk, 2011). In order to overcome these institutional barriers and to make the transition towards a synergy approach, there is a need for institutional capacity building, i.e. a pluralist challenge (Cars et al., 2017).

Institutional barrier	Subtopic	Mitigation	Adaptation
Difference in scientific approach	Aim measures	Directly combatting causes	Indirectly reducing consequences
	Knowledge production	Highly specialized knowledge, with a focus on technical knowledge	Context specific knowledge, transdisciplinary knowledge
	Managing uncertainties	Technical-rational approach	Communicative-rational approach
Difference in perspective on time	Temporal scale	Long-term	Short-term
Difference in spatial scale	Spatial scale	Global	Local
	Benefits	External to region of implementation	Beneficiaries are locally
Sectoral approach with regard to involving stakeholders	Involvement stakeholders	Limited number of sectoral interests, mostly governmental	High number of stakeholders
	Measuring effectiveness	Targets and quantified objectives	Qualitative objectives
	Implementation approaches	Mostly top-down	Mostly bottom-up

Table 2 Summary differences of the climate mitigation and adaptation domains as underlying reason for institutional barriers based on Biesbroek et al. (2009), Swart & Raes (2007), Landauer et al. (2015), Klein et al. (2005), Wilbanks et al. (2003) & Hartmann & Spit (2014)

2.5 Institutional capacity building

The concept of institutional capacity building finds its origin in the communicative approaches of the collaborative planning (Healey, 1998). The ability of stakeholders to work together and to solve a collective problem is shaped by institutional capacity (Abreu & Ceglia, 2018). Institutional capacity is important because it determines the ability of people to perform effectively its tasks and to be able to cooperate with other stakeholders (Brown & Farrelly, 2009). According to Cars et al. (2017) institutional capacity can be described as the web of relations involved in urban governance that intertwine government organizations, private stakeholders, and community organizations. According to Polk (2011, p. 187) it consists of “the ability to make relational links, across cultural barriers, organizational divisions and fractures in the distribution of power”. This is especially relevant to the issue of integrating climate change objectives in urban planning, because of its cross-sectoral nature and the various actors involved. Institutional capacity can be operationalized by using three dimensions: intellectual capital, social capital, and political capital (Khakee, 2002). Often the terms knowledge resources, relational resources, and capacity for mobilization are used interchangeably by

many authors (Healey, 1998; Abreu & Ceglia, 2018; Wang et al., 2017; Cars et al., 2017; Polk, 2011). Below these three dimensions are elaborated upon (see also Figure 1).

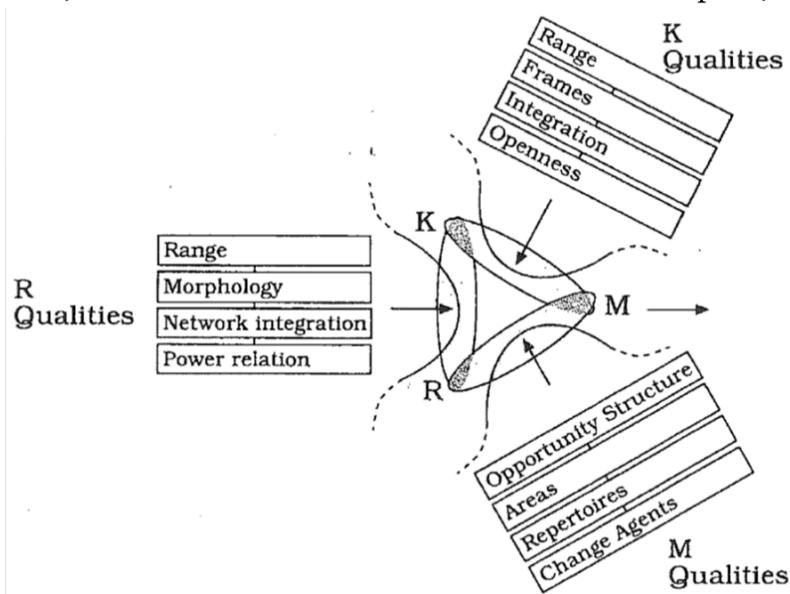


Figure 1 Dimensions of institutional capacity (Cars et al., 2017)

According to Khakee (2002, p.55) intellectual capital refers to “various knowledge resources built on previous experiences, scientific investigations and understanding of people, places and issues”. Collective action among stakeholders is based on the quality of knowledge and experience, either formal or tacit, i.e. the range of knowledge (Wang et al., 2017). Furthermore, the existence of a common understanding of problems and solutions is enabling the capacity to act collectively (Abreu & Ceglia, 2018). This is also called the frame of reference, i.e. the underlying conceptions that shape the interpretations and meanings given to knowledge (Cars et al., 2017; Polk, 2011). The extent to which these frames of references are shared among stakeholders is determining the intellectual capacity, i.e. integration of frames of references. Therefore, building knowledge resources depends on the access to knowledge, the way in which this knowledge is used, and the conscious reflection on frames of reference (Cars et al., 2017). Another element related to intellectual capital is the capacity to absorb new ideas and to start learning from these ideas, i.e. the openness to new ideas (Khakee, 2002; Abreu & Ceglia, 2018; Polk, 2011). Intellectual capital is about the flow of these knowledge resources of multiple stakeholders, and the learning process that takes place when knowledge is exchanged (Cars et al., 2017). Hence, knowledge production can be regarded as a process of social interaction.

Social capital is defined by Khakee (2002) as social network capacities that facilitate collaboration between a broad range of stakeholders in order to be able to coordinate actions and decisions and to achieve support for those actions and decisions. Polk (2011) distinguishes two types of social capital, i.e. bridging social capital (building links between groups) and bonding social capital (building links within a group). The capacity to act collectively can be explained by the quality of relationships (Abreu & Ceglia, 2018). The quality of relationships is assumed to be higher in contexts within which there is sufficient trust, appreciation, reciprocity, and space for stakeholders to give their voice and listen (Healey, 1998). When this is the case, knowledge, understandings, and information can flow easily around among stakeholders (Healey, 1998). Also, the nature and the range of networks is constituting the institutional capacity of the actors involved (Cars et al., 2017), including the morphology, density, power relations, and architecture. Some of the networks will focus on a few nodes,

whereas others are more dispersed. Furthermore, some of the networks are diffuse, while others have clear boundaries. The ability to build up relational resources is linked to the existence of integration between networks.

Political capital can be described as the willingness and commitment among stakeholders to take action collectively (Khakee 2002). Hence, the ability of stakeholders to explore ideas, rules, structures and resources in an attempt to act collectively (Cars et al., 2017). Wang et al. (2017) refer to the capacity to activate the intellectual and social capitals to achieve collectively set goals. The presence of actors that are willing and able to take the lead and the existence of a shared vision is positively affecting the political capital dimension (Abreu & Ceglia, 2018). From research of Storbjörk & Ugglå (2015) it became clear that key agents play a crucial role in driving change. However, too much emphasis on strong singular actors can act as a barrier when integrating climate policy. Such change agents should be able to identify the right arenas and windows of opportunity for mobilizing institutional capital (Cars et al., 2017). Those arenas are places where regulatory power and key resources lie, i.e. opportunity structures with a rich repertoire of mobilization techniques.

To conclude, the three capitals discussed can be seen as a set of abilities for institutional capacity (Cars et al., 2017). Although, the focus should not be on the persistence of the three capitals, but rather on the process of its formation, i.e. institutional capacity building. Institutional capacity building is a process by which humans develop abilities to solve problems, achieve objectives, and perform functions (Tadele & Manyena, 2009). Cars et al. (2017) define the process of building institutional capacity as the transformation, mobilization, and creation of institutional capital in a collective effort. With regard to the topic of this research, building institutional capacity is important in order to conflate the framing of problems and solutions. An analytical framework on how to build institutional capacity among stakeholders for integrating climate mitigation with adaptation in urban planning is presented in the next paragraph (summarized in Table 3).

2.6 Institutional capacity building for climate policy integration

The concept of institutional capacity can be considered multi-interpretable and abstract. There is limited research on how institutional capacity can be built for the topic of climate policy integration. In that sense, to be able to make the transition towards a synergy approach (e.g. a holistic and integrated approach, Table 1). Therefore, the presented analytical framework aims to fill this gap. Drawing on research of Cars et al. (2017), Khakee, (2002), and Healey (1998), institutional capacity is operationalized by using three dimensions: intellectual capital, social capital, and political capital. This research focuses on what these three capitals mean in the context of climate policy integration. In the following, these capitals are linked to solutions put forward in research on climate policy integration, e.g. see Hartmann & Spit (2014) and Swart et al. (2013), research on sustainable development in general, e.g. see Polk (2011) and Payne & Shepardon (2015), and research on the mitigation-adaptation dichotomy, e.g. see Wilbanks (2005), Biesbroek et al. (2009), Laukkonen et al. (2009), Grafakos et al. (2019), Duguma et al. (2014), Klein et al. (2005), and Berry et al. (2015). To develop this analytical framework, the institutional barriers presented in Table 2 are used as an entry point. The actions needed to build institutional capacity presented below are challenging the four main institutional barriers, i.e. the difference in scientific approach, the difference in perspective on time, the difference in spatial scales, and the sectoral approach with regard to involving stakeholders.

2.6.1 Building intellectual capital

The first activity for building intellectual capital proposed by Hartmann & Spit (2014) is the use of urban climate maps for providing information for analysis about the effects of climate change in a particular urban setting. The understanding of the potential effects of climate change by stakeholders might also be increased by the use of virtual reality or augmented reality to illustrate, visualize, and clarify the effects of climate change and the impact of potential solutions (Sørensen et al., 2016). A promising feature in planning practice is the use of a vulnerability analysis (Swart et al., 2013). A vulnerability analysis gives information about the spatial distribution of climate change impacts in a city. The underlying idea is that these vulnerability analyses act as an invitation for risk dialogues among the stakeholders involved with the aim to make the city more climate-proof. This first activity is seen as a starting point for building intellectual capital, as it provides information for a common starting point at the beginning of the process.

After establishing a common starting point, the second activity is raising awareness about the multi-sector, multi-level, and multi-actor nature of climate policy integration (Polk, 2011; Wilbanks, 2005). According to Gupta et al. (2010, p. 463) issues such as climate policy integration can only be addressed through variety, implying that there is “no single appropriate ideological framework, no unique optimal policy strategy or set of mutually consistent solutions, but there are many”. In other words, at the start of the process one should not sort on a particular solution or approach. Therefore, it is important to include both frames of reference (mitigation and adaptation) and its involved variety of stakeholders during the solution formulation process in order to generate tailor-made solutions.

As mentioned earlier, both climate mitigation and adaptation strategies have developed their own knowledge frame and perspective on the problem over time. This means that the frame of reference should be broad when integrating climate mitigation with adaptation (Wilbanks, 2005). Hence, a third activity is the use of a shared knowledge base to bridge the gap between the different scientific approaches (Hartmann & Spit, 2014). Therefore, Biesbroek et al. (2009) stress the importance of transdisciplinary knowledge production and exchange in order to facilitate climate policy integration. According to Payne & Shepardson (2015) it is transdisciplinary knowledge that can account for the complexity of an integrated approach. This is where the social, technical, physical, and economical knowledge of the different domains interacts. This entails the interaction of the knowledge from the mitigation sector (e.g. knowledge from economics and technology) and the adaptation sector (e.g. socially oriented knowledge). These interactions include amongst others: a joint problem definition, mutual learning, and the creation of emergent knowledge (Payne & Shepardson, 2015). Without agreement about language between the stakeholders, there is no chance of an integrated solution (Hartmann & Spit, 2014). For instance, the use of Geographic Information Systems (GIS) is an effective tool for accomplishing learning across spatial scales (Sørensen et al., 2016). Therefore, GIS may be helpful in overcoming the different perspectives on spatial scales. Furthermore, sufficient reflection on the assumptions underlying the frames of reference and openness to new frames of reference is needed (Polk, 2011).

Considering the context-dependency of climate policy integration, a specific kind of knowledge needs to be touched upon as a fourth activity, namely local knowledge in order to be able to make tailor-made decisions (Laukkonen et al., 2009). One-size-fits-all approaches for

integrating climate mitigation and adaptation may not work effectively (Lee & Painter, 2015). It is these specific physical and socio-economic characteristics and conditions of a city that should be reflected upon in policy formation. Interaction and cooperation between policy makers and a local community would enhance the understanding of the challenges faced in that particular area. The urban climate maps and stress tests mentioned as the first activity offer a local understanding of the problem. However, local knowledge also includes perspectives, visions, experience, and knowledge from local communities, especially regarding social and physical vulnerabilities.

Learning is an important fifth activity for building intellectual capital, as learning allows for a changed understanding (Gupta et al., 2010). In the case of climate policy integration this entails reflection on the assumptions underlying the existing frames of reference and the ability to build new frames of reference. Gupta et al. (2010) and Leising et al. (2018) make a distinction between single loop learning (the improvement of existing routines, beliefs, norms, solutions and patterns) and double loop learning (a fundamental change in norms and basic assumptions by challenging world views). Changes within the existing frames of references are more common, i.e. single loop learning. According to Adelle & Russel (2013) for climate policy integration the latter, more complex, form of learning is needed, i.e. a reframing process.

2.6.2 Building social capital

The integration of frames of reference can be considered inherently a social process. According to Laukkonen et al. (2009) the transformation of information into a learning process is important, requiring the inclusion of all stakeholders. Triggering learning between involved stakeholders can generate useful strategies for integrating climate change mitigation with adaptation in urban planning (Payne & Shepardson, 2015). To ensure learning, it is essential that the access to these databases and the outcomes of the analyses are available for all stakeholders involved. In order to facilitate learning, the creation of arenas for knowledge exchange, as a first activity, is important, building a strong networking capacity (Storbjörk & Uggla, 2015; Sörensen et al., 2016). In reference to climate policy integration, the focus here should be on the common ways of working and relationships that are established between stakeholders in different sectors and different scales (Polk, 2011). Therefore, it is important that the participating stakeholders sufficiently cover the different sectors, levels, and scales that are relevant to climate policy integration. In attempting to involve all relevant stakeholders, a suggested approach is a communicative approach. This approach facilitates the opportunity of stakeholder participation (Healey, 1996), where voice is given to all the stakeholders concerning climate mitigation and adaptation. In such an inclusive approach the aim is to find a joint storyline and shared values through communication.

The quality of relationships can be explained by the existence of shared values, which enable space for trust, appreciation, and reciprocity (Healey, 1998). Therefore, the second activity for the build-up of social capital is encouraging shared values. Shared values can be described as common needs, common goals, and a sense of the common good (Parkhill et al., 2015). Laeni et al. (2020) stress the importance of a holistic perspective, which takes into account ecological, economic, and social values for coalition-building towards a change in climate policy. The creation of shared values makes it easier to reach agreement between stakeholders (Badahur et al., 2013).

Lastly, in the Netherlands, policies are often assessed on the basis of the traditional administrative framework of municipalities, provinces, and states (Biesbroek et al., 2009). However, the regions impacted by climate change do not match these traditional administrative boundaries, complicating the mainstreaming process. Spatial planners should look beyond this traditional administrative framework and take the dynamics of systems as a starting point for new institutional arrangements. This implies the need for transboundary networks as a third activity. Such a transboundary network could emerge from existing networks that integrate. Moreover, new networks can arise based on new ideas, i.e. based on new frames of reference.

2.6.3 Building political capital

As explained before, the presence of change agents is an important first activity in building political capital, i.e. leadership. Leadership should be stimulated during the process. According to Gupta et al. (2010, p. 463) “leadership is a driver for change, showing a direction and motivating others to follow”. It can be argued that leadership may affect variety, however, good leaders should be able to provide enough space for variety. For instance, a change agent could play a crucial role in raising awareness on the different perspectives on the problem. Different roles of leadership could be distinguished, such as entrepreneurial or collaborative leadership. Entrepreneurial leaders advocate for policy change and subsequently try to get those specific policy solutions adopted (Meijerink & Stiller, 2013), i.e. a policy focused on climate integration. Collaborative leaders encourage collaboration between actors, i.e. different stakeholders involved in both climate mitigation and adaptation (Gupta et al., 2010). Moreover, leaders or change agents should be able in stimulating the translation from vision to concrete action.

In the case of climate policy integration, the financing scheme is a crucial second activity (Duguma et al., 2014). To implement multifunctional initiatives budget allocations should not be designated to specific practices that do not enclose the whole spectrum of creating synergies. This means that budgets in spatial planning should not be allocated to either adaptation or mitigation, but it should encompass both. Grafakos et al. (2019) point out that financing adaptation measures could be in competition with financing mitigation measures. Therefore, the establishment of a shared funding body or budget might be an efficient way to best allocate budgets. Restemeyer et al. (2015) suggest the financial support for transdisciplinary and informal networks. According to Klein et al. (2005) the current budget arrangements for climate policy have not been designed to promote mainstreaming. Historically, sectoral policies have already formulated their available funds for their own objectives (Biesbroek et al., 2009).

The third activity is the creation of a climate policy integration narrative. According to Davoudi (2012, p. 50) “environmental narratives in planning are selective abstractions which amplify one meaning of the environment and marginalize others”. The establishment of a climate policy integration narrative shapes planners’ conception of integrated practices and how it might be achieved. According to Leising et al. (2018) narratives are important for making the transition towards a synergy approach of climate mitigation and adaptation, in particular in the take-off phase when demonstration and pilot projects are started. Restemeyer et al. (2018) add to this that a narrative can create an agenda for driving change and can stimulate the exploration of new practices and test the unknown. As a result, the creation of a narrative could turn ambitions on a strategic level to policy implementation. A narrative provides coordination

among a heterogeneous group of actors and provides orientation and guidance for joint action (Leising et al., 2018). The proposed dialogue-based communicative approach therefore facilitates the search for core values of the narrative (Healey, 1996). The question here is in which narrative do both the climate mitigation and adaptation discourse find a place and embrace each other. The formation of a climate policy integration discourse can have a profound impact on urban planning (Davoudi, 2012). According to Laeni (2020, p. 6) it is the narrative that “can connect, put on the agenda, activate, attract funding, convince decisions makers, and strengthen collaboration across sectors and levels”.

A fourth activity to build institutional capacity, is the inclusion of assessment tools and evaluation methods in planning procedures. Laukkonen et al. (2009) point out that the inclusion of climate change impacts as inputs of area-based planning project will prioritize climate change objectives strategies in urban planning. Many researchers stress the importance of the use of integrated assessment tools, such as a multi-criteria analysis and integrated modeling, enabling the assessment of multiple objectives and criteria (Grafakos et al., 2019; Wilbanks., 2005, and Sørensen et al., 2016). When the effectiveness and the benefits of an integrated approach becomes clear stakeholders possibly feel mutual responsibility and ownership. According to Berry et al. (2015) many synergies between climate mitigation and adaptation are not acknowledged or unrecognized, because often there is a lack of evidence on the effectiveness and the wider impact. Understanding the interactions between climate mitigation and adaptation is key to minimize the costs of climate policy (Duguma et al., 2014) and to improve the cos-effectiveness and reduce the resource competition (Grafakos et al., 2019). Furthermore, the inclusion of interim evaluation methods in planning procedures can facilitate through enabling modifications and improvements through feedback processes. A one-time analysis is of limited value, because both learning and decision-making practices are sequential in nature (Wilbanks, 2005). It is important to respond in an adaptive way to new experience and information.

Institutional capacity	Activities	Description of activities	Key references
Intellectual capital	Using urban climate maps	Providing information for a common starting point at the beginning of the process	Swart et al. (2013); Hartmann & Spit (2014)
	Addressing variety of actors, levels, and scales	Incorporating multi-actor, multi-level, multi-scale perspectives, to ensure that during the process one should not sort on a particular solution or approach	Polk (2011); Wilbanks (2005); Gupta et al. (2010)
	Creating transdisciplinary knowledge base	Reflecting on the assumptions underlying the frames of reference and problem perspectives, and openness to new frames of reference to bridge the gap of different scientific approaches	Hartmann & Spit (2014); Biesbroek et al. (2009); Payne & Shepardon (2015)
	Using local knowledge	Including knowledge from local communities, especially regarding social and physical vulnerabilities	Laukkonen et al. (2009); Lee & Painter (2015)
	Stimulating double loop learning	Challenging existing norms and basic assumptions, i.e. a reframing process	Gupta et al. (2010); Adelle & Russel (2013); Leising et al. (2018)
Social capital	Creating arenas for knowledge exchange	Applying a communicative approach to stakeholder involvement to give voice to all the involved stakeholders in order to find shared values and a joint storyline through communication	Storbjörk & Uggla (2015); Polk (2011); Healey (1996)
	Encouraging shared values	Applying a holistic perspective on value creation for coalition building	Laeni et al. (2020); Parkhill et al. (2015); Badahur et al. (2013)
	Creating transboundary networks	Integrating existing networks or creating new networks based on new frames of reference	Biesbroek et al. (2009)

Political capital	Stimulating leadership and change agents	Driving change, showing a direction, and motivating others to follow to be able to make the translation from vision to concrete action.	Storbjörk & Uggla (2015); Cars et al. (2017); Gupta et al. (2010); Meijerink & Stiller (2013)
	Allocating shared budget	Establishing a shared funding body or budget to avoid competition between objectives and policy domains	Duguma et al. (2014); Grafakos et al. (2019); Klein et al. (2005); Biesbroek et al. (2009); Restemeyer et al. (2015)
	Developing a climate policy integration narrative	Creating a discourse where both climate mitigation and adaptation can find its place	Davoudi (2012); Leising et al. (2018)
	Including assessment tools and evaluation methods	Enabling the assessment of multiple criteria to bridge the gap of different perspectives on measuring effectiveness	Grafakos et al. (2019); Berry et al. (2015); Duguma et al. (2014); Wilbanks (2005)

Table 3 Analytical framework for building institutional capacity for climate policy integration

2.7 Conclusions: the importance of institutional capacity building

Many authors recognize the separated approach to climate mitigation and adaptation in academia and practice, i.e. the mitigation-adaptation dichotomy. Previous research on this dichotomy advocate for the integration of these two approaches, as the produced effects are higher than the sum of its parts. However, this process of climate policy integration is rather a complex one. This can partly be explained by the difference in aim, knowledge production, management of uncertainties, temporal scale, spatial scale, benefits, involvement of stakeholders, measurement of effectiveness, and implementation approach. It can be argued that the divide between climate mitigation and adaptation is mainly a mental construct, which is enhanced by the different ways of framing the problem of climate change and how to solve the problem accordingly. Therefore, these barriers to climate policy integration can be considered as institutional barriers. In this research, a focus on institutional capacity building is recommended to overcome these institutional barriers. To be able to answer the main research question how medium-sized cities can build institutional capacity in order to facilitate the integration of climate mitigation with adaptation in urban planning, the first step is to look at municipal policy regarding climate policy, i.e. a strategic level. Subsequently, research will be done on the project level, i.e. an operational level. The analytical framework presented can be used to study institutional capacity. How this exactly will be done is explained in the next chapter.

Chapter 3: Methodology

In this chapter, the methodology of this research is presented. In the previous chapter, an analytical framework based on scientific studies is presented. This theoretical background is used for the empirical research to further develop the analytical framework and to study institutional capacity building activities in the city of Groningen. The activities for building institutional capacity employed at a strategic level and operational level will be analysed. In order to achieve this goal a well-structured research design is important. According to Clifford et al. (2016) a well-structured research design is needed to produce convincing and meaningful results. Furthermore, having a well-structured research design is crucial in linking data collection, methods, techniques, and data analyses.

3.1 Research methodology

Clifford et al. (2016) make the distinction between an intensive and an extensive research design. In an extensive research design, the focus is on regularity and patterns in the collected data. Contradictory, in an intensive research design, the focus is on describing a single case or a small number of cases in detail. In this research, an intensive research design is used. As the integration of climate objectives into other domains is context dependent and complex (van den Berg & Coenen, 2012), the focus of this research is on describing a small number of cases in detail. As the aim of this research is to gain an in-depth understanding of the complexity of climate policy integration, a case study is a suitable research method. Taylor (2016, p. 582) defines a case study as “a form of naturalistic research, where the case is studied in its normal context”. According to Adelle & Russel (2013) the everyday practices of climate policy integration are characterized as situational and context dependent. This means that the phenomenon and the context this phenomenon is studied are related. More specifically a single embedded case study design is the approach in this research. In an embedded case study design, there are multiple units of analysis (Yin, 2009). In this research, data has been collected both at a strategic level and operational level, i.e. on a municipal level and project level. Institutional capacity at a strategic level is needed to be able to develop integrated practices, i.e. policy formation. And thereby setting the institutional context for implementing projects. On the contrary, implementing projects can be regarded as a way to build institutional capacity at the operational level, which can also stimulate institutional capacity building at the strategic level.

Furthermore, Yin (1994) makes the distinction between explanatory, descriptive, and exploratory case study research. Here, an explanatory approach will be adopted, because this approach is in particular appropriate for answering why and how questions. More specifically, a qualitative research approach will be adopted within this case study approach. In a broad sense, this is an approach that allows for examining people’s experiences in detail, i.e. social processes such as climate policy integration (Hennink et al., 2020).

3.2 The embedded case: the city of Groningen

The unit of analysis, or the case, can be defined by determining the theoretical scope, the time frame, and the spatial boundary (Yin, 1994). The theoretical scope of this research is determined based on a literature study. Key concepts related to this research are climate policy integration, urban climate resilience, climate mitigation and adaptation, mitigation-adaptation dichotomy, and institutional capacity building.

Defining a time frame is especially relevant when analysing institutional capacity, because institutional capacity is continually evolving (Khakee, 2002). According to Wang et al. (2017) institutional capacity is rather dynamic than static. The time frame of this research is from April 2020 until January 2021. The data collection of both the primary and the secondary data is done in September 2020, October 2020, November 2020, and December 2020. However, it is important to take in mind that the time span of the case is longer than the data collection period, e.g. the documents can be written before the data collection period. Therefore, the data collection period of the primary data and the time span of the written documents determine the time frame of the case.

The spatial boundary of the case is the defined boundary of the medium-sized city Groningen. Groningen has been selected because it is positioning itself as a frontrunner in both climate mitigation and adaptation. Recently, the Global Centre on Adaptation has been established in the city of Groningen and a Climate Adaptation Week is being organized. Furthermore, the researcher has easy access to potential participants, because of the researcher's involvement in the Climate Adaptation Week. Bigger Dutch cities such as Amsterdam or Rotterdam are often part of international networks and hotspots, such as 100 Resilient Cities. It can be assumed that these cities are better able to build institutional capacities, because they have more resources compared to medium-sized cities. It is therefore interesting to research how medium-sized or smaller cities can build institutional capacities with fewer resources. Furthermore, these cities have already been researched extensively.

As explained before the case consists of two units of analysis, i.e. the municipal level and the project level. In order to be able to make robust conclusions it is important that the selected project is not in the starting phase. The selection of the case is done with prior knowledge about the case. It appeared to be rather difficult when searching for relevant projects in Groningen on the internet that take the synergy approach as a starting point, i.e. the ambition to integrate climate mitigation with adaptation. At the same time, this stresses the relevance of this research, as climate policy integration apparently appears to be difficult to be realised. To get access to additional information about potential cases, an exploratory interview is done with an expert on this topic. Within the city of Groningen, the area-based planning project Paddepoel climate-proof has been selected. In the city of Groningen, the former Suiker Unie terrain will be transformed. The municipality of Groningen expresses the aim to integrate climate change mitigation with adaptation here. However, this project has not been selected because it is still in the starting phase. Furthermore, the project Paddepoel climate-proof has been labelled as a pilot project which a focus on learning and acquiring knowledge.

3.2.1 Municipality of Groningen (strategic level)

The city of Groningen is a mid-sized Dutch city in the northern Netherlands. The city is populated with more or less 200.000 citizens (Os-Groningen, 2018). Both climate mitigation and adaptation are issues that the municipality of Groningen is trying to tackle. For example, the municipality of Groningen aims to be gas-free by 2035 (van Loon & Kattouw, 2019). The municipality has mapped the most urgent locations with regards to the effects of climate change, of which one is Paddepoel (Gemeente Groningen, 2016). Furthermore, from the climate adaptation vision of the municipality of Groningen it becomes clear that collaboration, integrative and future-oriented thinking, and playing an exemplary role are corner stones to make Groningen climate neutral in 2050 (Gemeente Groningen, 2020). All those four pillars demonstrate the importance of building institutional capacity.

3.2.2 Paddepoel climate-proof (operational level)

The project that is selected is situated in the neighbourhood Paddepoel in the city of Groningen. This neighbourhood has been built in the 1960's (van Loon & Kattouw, 2019). Paddepoel is a neighbourhood which suffers from pluvial flooding because large parts of the area consist of stone (RTV-Noord, 2019). Furthermore, the stress test shows that heat stress is a serious problem in the neighbourhood. Also, inhabitants of the neighbourhood indicated that the lack of attractive public space is a key issue (van Loon & Kattouw, 2019). In the project Paddepoel climate-proof, the construction of a heat grid was linked to objectives to make Paddepoel climate adaptive (Gemeente Groningen, 2020). The streets in this neighbourhood have been broken up during the construction of the heat grid. To be more specific, this project focused on the following three streets: Plutolaan, Antaresstraat, and the Pleiadenlaan (Kennispoortaal Ruimtelijke Adaptatie, 2020). According to the municipality of Groningen, this offered opportunities for the redevelopment of these streets (Stadszaken, 2019). In that sense, the municipality tried to combine the energy-transition (i.e. climate mitigation) with climate adaptation. Measures related to climate adaptation that are taken will increase the sponge capacity of the neighbourhood, such as the construction of a wadi and the addition of greenery (Gemeente Groningen, 2020). This entails locally buffering of water in order to be able to temporarily store water in times of heavy rainfall.

In 2019 this project has been labelled as a pilot project by the Dutch ministry of Infrastructure and Management (Stadszaken, 2019). To be able to implement the climate adaptation measures, the municipality of Groningen received funding from the national government (Rijksoverheid, 2019). The purpose of such pilot projects is to acquire knowledge about the process and the effectiveness of the measures. Above all, the municipality of Groningen explicitly addresses that they want to learn from this project (Gemeente Groningen, 2020). The ambition is to provide other municipalities with best practice examples. The focus on learning and acquiring knowledge makes this project a good case to be researched. In this project the following stakeholders are relevant for this research: heat grid installation company WarmteStad, departments within the municipality of Groningen concerned with climate mitigation and adaptation, and neighbourhood organization Co-Creatie Paddepoel (van Loon & Kattouw, 2019).

At the moment, the heat grid constructed in the neighbourhood Paddepoel will be extended towards the neighbourhood Selwerd. Similar to Paddepoel climate-proof, the construction of the heat grid is linked to objectives to make the neighbourhood climate-proof (WarmteStad, 2020). Furthermore, both Paddepoel and Selwerd are post-war neighbourhoods, i.e. semi-detached, uniform residential blocks. Currently, the project in Selwerd is in the starting phase. This comparable project has been relevant for this research, because it offers opportunities to ask about transferring lessons and best practices. Furthermore, the researcher has attended project meetings of this comparable project to get a feeling with the topic of integrating climate mitigation with adaptation in practice.

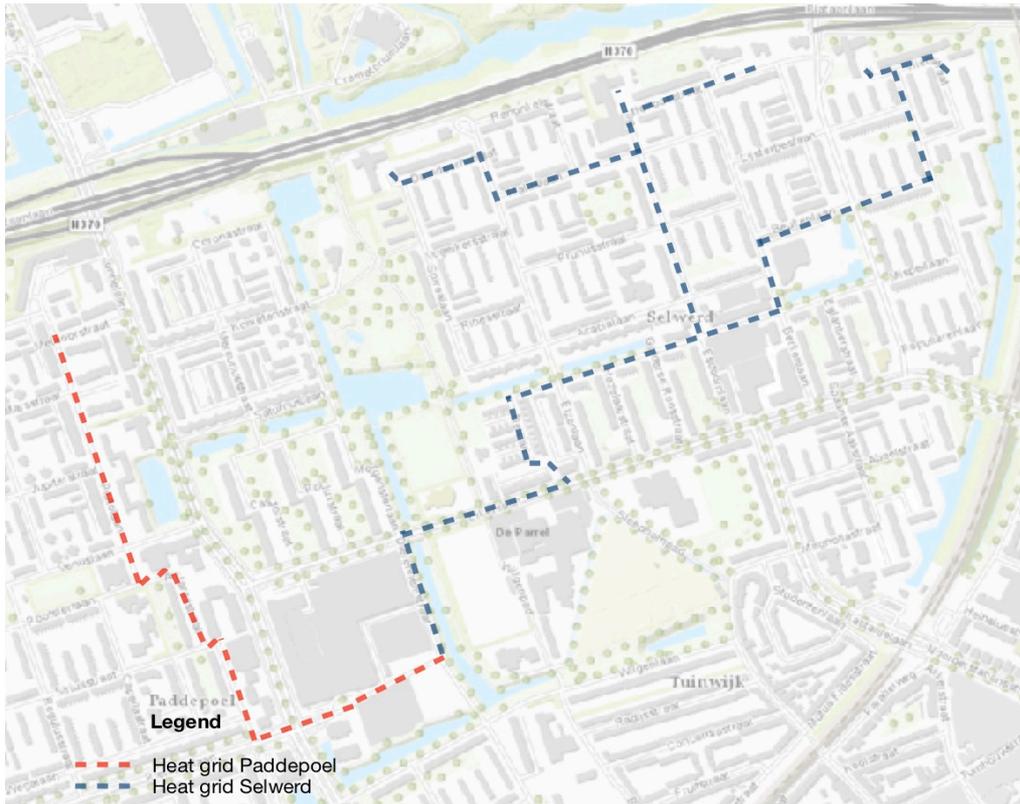


Figure 1 spatial layout planned heat grid in neighbourhoods Paddepoel and Selwerd based on WarmteStad (2020a) & WarmteStad (2020b)

3.3 Data collection

A case study as a research methodology encompasses various methods of data collection and methods of analyses (Taylor, 2016). In this research, both primary and secondary data are gathered to gain an in-depth understanding of the case. A mixed method approach can widen the understanding and strengthen the validity of the results (Tyrrell, 2016; Mills et al., 2010). The term 'mixed method approach' often refers to the use of both qualitative and quantitative data collection methods. However, the term 'mixing research methods' is considered broader and can therefore also encompass the combination of several qualitative research methods in a case study (Hennink et al., 2016). In this research, qualitative data collection methods are used. According to Longhurst (2016) qualitative data collection methods are particular suitable for examining social processes.

3.3.1 Interviews and participatory observations

The primary data is collected by conducting semi-structured interviews and doing participatory observations (see Table 5 and 6). Semi-structured interviews have some degree of predetermined order but still allow for flexibility in addressing issues (Longhurst, 2016). The interviews are semi-structured by using an interview guide inspired by the operationalizations made in the analytical framework (see Appendix). Key topics included (institutional) barriers, intellectual capital, social capital, and political capital. Furthermore, questions have been asked about lessons learned and what the participant would have done

differently. In that sense, the concept of double loop learning has been asked in a way that the participant is able to understand.

Conducting the semi-structured interviews can be considered a process in itself, as after each interview the interview guide is adjusted to new insights, i.e. an iterative process. The amount of semi-structured interviews is determined by the moment that the researcher did not obtain any new information, i.e. data saturation (Longhurst, 2016). Potential participants have been contacted via e-mail, telephone or Linked-In. Subsequently, other potential participants were also put forward by participants, the so-called snowball effect (Bailey et al., 2011). Flynn (1973) indicates that the snowball effect can have a positive effect on recruiting participants. The Table below shows the characteristics of the interviews. As explained before data has been gathered about both the strategic level and operational level. The Table below shows the type of information that has been gained during each interview.

Participant	Function interviewee	Organization	Strategic/operational	Form	Date
P0	Climate adaptation expert	Hanze University of Applied Sciences	Both	Unstructured, explorative	29/05/2020
P1	Climate adaptation expert	Hanze University of Applied Sciences	Both	Semi-structured	01/10/2020
P2	Consultant urban water management	Municipality of Groningen	Operational	Semi-structured	08/10/2020
P3	Consultant spatial development and implementation	Municipality of Groningen	Operational	Semi-structured	20/10/2020
P4	Policy officer urban development & climate adaptation	Municipality of Groningen	Both	Semi-structured	22/10/2020
P5	Communications advisor & manager realization	WarmteStad	Operational	Semi-structured	03/11/2020
P6	Project leader urban development and energy transition	Municipality of Groningen	Both	Semi-structured	05/11/2020

P7	Citizens' representative	Co-Creatie Paddepoel	Operational	Semi-structured	10/11/2020
P8	Consultant sustainable design	Municipality of Groningen	Both	Semi-structured	11/11/2020

Table 5 Characteristics interviews

Due to the COVID-19 pandemic all the interviews have been conducted online via Google Meet. Furthermore, the researcher explored the possibilities to attend meetings that could contribute to the understanding of the case. The researcher has done so-called naturalistic observations, i.e. the aim is not to influence the context. The attended meetings all have been organized online via Microsoft teams by the municipality of Groningen. The Table below shows the characteristics of the attended meetings and the type of information that has been gained.

Organization	Topic	Organization	Strategic/operational	Date
Municipality of Groningen	Preparing tendering specifications	Project team Selwerd	Operational	19/10/2020
Municipality of Groningen	Final design Selwerd South	Project group Selwerd	Operational	20/10/2020
National delta-congress	Integrating mitigation with adaptation	National government	Both	12/11/2020

Table 6 Characteristics attended meetings

3.3.2 Content analysis of documents

The secondary data is consisting of documents, including policies, newspapers, and articles (see Table 4). The collection of the secondary data was done before the collection of the primary data. In this way, the researcher is prepared when conducting the interviews. The following search terms were used in Google to find appropriate documents (translated from Dutch to English):

- Paddepoel climate-proof
- Integrating climate mitigation with adaptation Paddepoel
- Paddepoel heat grid and climate adaptation
- Energy transition vision municipality of Groningen
- Climate adaptation vision municipality of Groningen

Furthermore, if certain (not yet selected) documents come up during the interviews, they may also be considered relevant for the analysis. The Table below shows the analysed documents and the type of information that has been found.

Title	Document type	Strategic/ operational	Author
Klimaatbestendig Groningen 2020-2024. Een uitvoeringsagenda op klimaatadaptatie	Policy document	Both	Gemeente Groningen
Drie klimaatbestendige straten in de aardgasvrije wijk Paddepoel	Website	Operational	Kennisportaal Ruimtelijke Adaptatie
Integrale pilot: in Groningen gaan warmtenet en klimaatadaptatie hand in hand	News article	Operational	Stadszaken
Op weg naar een lerende community voor klimaatadaptatie	Research report	Operational	Kennisland
Het succes van de integrale wijkaanpak	Website	Operational	Citydeal klimaatadaptatie
Handuitreiking slim koppelen klimaatadaptatie voor gemeenten	Research report	Both	Nationaal Kennis- en innovatieprogramma Water & Klimaat
Stap voor stap naar aardgasvrije wijken en dorpen	Policy document	Both	Gemeente Groningen
Groningen klimaatbestendig	Policy document	Strategic	Gemeente Groningen
Wijkenenergievisie aardgasvrij Paddepoel	Policy document	Operational	Gemeente Groningen

Table 4 Characteristics analysed documents

3.4 Data analysis and interpretation

To produce convincing and meaningful results systematic analysis and interpretation of the collected data is required (Cope and Kurtz, 2016). First of all, the semi-structured interviews have been recorded and transcribed. These transcripts and the documents are analysed by coding the data using the Atlas.ti software. Coding is the procedural function of assigning specific and concise values to data elements collected. Atlas.ti is a tool for testing expected relationships between theoretical concepts and the obtained data (Dey, 1993), and for structuring the data (Tesch, 1990). Also, codes are used to analyse and structure the observations. The codes are based on the concepts and operationalizations made in Chapter 2, resulting in a codebook (see Appendix). For instance, the institutional barriers, the capitals, and the activities for building institutional capacity.

Next to those deductive codes, inductive codes are added after the conducted interviews. Examples of inductive codes are shared values, human resources, tender, and the Environmental Planning Act. By adding inductive codes, aspects are included that were not considered before conducting the interviews. After analysing the data, the researcher had to interpret the coded data to produce results. The tool code groups has been used to organize the codes.

3.5 Research ethics

Awareness of ethical issues is part of the final decisions of the research design (Clifford et al., 2016). Especially, when conducting interviews ethical issues need to be considered. In this research, ethical issues have been addressed in various ways. First of all, the privacy of the participant has to be guaranteed. By protecting privacy, participants are unconsciously or consciously willing to provide the researcher with more information (Hay, 2010). Participants will be made anonymous by only mentioning the characteristics of the participant, i.e. what kind of stakeholder. In advance of the interview, the purpose of the research is explained and permission to record the interview was asked. Second, after the data collection, the raw data has been treated carefully. The raw data, i.e. the recordings and the transcripts, is stored offline on a computer with a password rather than storing it on an USB-stick or online storage space. The researcher is the only one who has access to the computer. Only the interpreted outcomes are communicated to the outside world. Furthermore, quotes from participants that are used in the final version of this research are sent to the participant in question for approval. Because of all the points raised above, ethical issues will be diminished, and the validity of the research will be increased. All the ethical aspects mentioned above are included in an informed consent form, which has been signed by the participants before conducting the interview. Furthermore, a researcher from the Hanze University of Applied Science has shown his interest in the collected data. To be able to share data, the interest of this researcher has been included in the informed consent. This sharing of data has also explicitly been stressed once again at the start of the interview.

Chapter 4: Institutional capacity building for climate policy integration in the city of Groningen

In this chapter the results of the collected data about the undertaken activities by the municipality for building institutional capacity on a strategic level are described. The findings are presented by discussing them according to the analytical framework presented in Chapter 2. In Table 7 key the activities are outlined in relation to the building of intellectual, social, and political capital by the municipality of Groningen. First, an overview is given about the current situation in the city of Groningen.

In the municipality of Groningen, the climate mitigation and adaptation discourses have evolved separately by following their own trajectory. Historically, climate mitigation has been one of the cornerstones of the municipal policy. The municipality of Groningen has positioned itself as a frontrunner with regard to climate mitigation (Gemeente Groningen, unknown). To illustrate, the municipality aims to be energy neutral by 2035 (Gemeente Groningen, unknown). Recently, the topic of climate adaptation has become a popular theme. The municipality aims to be climate adaptive by 2050 (Gemeente Groningen, 2020). The establishment of the Global Centre on Adaptation (GCA) in 2018 in the city Groningen offered opportunities for positioning climate change adaptation on the agenda. This internationally oriented knowledge institute works as a solutions broker to accelerate action and support for climate change adaptation solutions. The municipality has even expressed the ambition to position itself as a frontrunner in climate adaptation (Gemeente Groningen, 2020). In this sense, the municipality is trying to catch up with the yet underdeveloped theme of climate adaptation in comparison to climate mitigation. Although the municipality has outlined two different time paths for either climate mitigation or adaptation, the municipality also acknowledges the need to integrate climate mitigation with adaptation to be able to combat climate change.

Considering the separate worlds of climate mitigation and adaptation, institutional capacity building is important to make the transition towards an integrated approach. In the remaining of this chapter the activities employed by the municipality for bridging these separate worlds are described by focusing on the three elements of institutional capital: intellectual, social, and political capital.

4.1 Intellectual capital

Based on the presented analytical framework activities for building intellectual capital are using urban climate maps, addressing variety, creating a transdisciplinary knowledge base, using local knowledge, and stimulating double loop learning.

4.1.1 Using urban climate maps

In collaboration with multiple external parties the municipality of Groningen has visualized the effects of climate change for their municipality by executing a so-called stress test (Gemeente Groningen, 2020; van Loon & Kattouw, 2019). With a stress test the possible vulnerabilities of a changing climate are identified, including topics such as heat stress, drought, and pluvial flooding. The stress test can be seen as a dynamic document, which needs to be updated every now and then. All the effects are assessed according to the degree of

urgency by the municipality. According to Snep et al. (2020) this contributes to greater awareness of the problem by different municipal departments. In this sense, executing this stress test can be seen as a first step in building intellectual capital.

Even more important for this research, the results of the stress test also accelerated the transition towards integrated approaches. Based on the stress test a great amount of potential problem areas for heat stress, pluvial flooding, and drought has been identified in the city of Groningen. As indicated by many interviewees, the municipality of Groningen is not able to make those potential problem areas climate adaptive within an acceptable time frame due to capacity issues. The integration of climate adaptation with other activities such as maintenance or the energy transition offers opportunities to speed up the implementation of climate adaptation measures. In this sense, awareness raised about the size of the actual problem by the outcomes of the stress test stimulated climate policy integration within the municipality.

4.1.2 Addressing a variety of actors, levels, and scales

The results of the stress test are analysed together with regional strategic partners, such as the safety region, the municipal health service, the province of Groningen, and regional water authorities. Other stakeholders, such as housing associations and hospitals, have also been invited by the municipality to discuss in particular climate adaptation measures on the basis of this stress test. In this sense, the policy formation for climate adaptation measures has been a joint process with stakeholders from different levels and scales. Furthermore, risk dialogues based on the outcomes of the stress test have also been organized for multiple departments of the municipality with the aim of achieving a common strategy (Citydeal klimaatadaptatie, 2020). In this sense, the stress test functions as a basis for understanding the problem in a specific context while addressing variety. However, as became clear from the interviews, stakeholders invited for these discussions are mostly involved in climate adaptation and not in climate change mitigation.

Furthermore, several interviewees indicated that the focus of climate adaptation is mostly on solving water related issues in the municipality of Groningen. This means that stakeholders involved in heat stress are less included in the process. A climate adaptation expert from the Hanze University of Applied Sciences illustrated the importance of integrating pluvial flooding, heat stress, and drought as follows:

“The focus of the departments that incorporates the stress test into the implementation agenda is water, water, and water. And I think that is too bad. Because you want water, heat stress, and drought to be tackled at the same time. Because the solutions are similar to each other. [...] But it is focused on water. They do not have a design matrix which shows the linkages between the problems. So, you only have to spend a little more money and solve two problems at the same time. It is all water and as cheap as possible.”
(*Climate adaptation expert – Hanze University of Applied Sciences*)

Furthermore, most of the interviewees of the municipality pointed out the importance of early consultation of stakeholders responsible for the maintenance of climate adaptation measures. This is important because in the long run climate adaptation measures are expensive because of the costs related to maintenance. To illustrate, to maintain permeable pavement a special vacuum cleaner is needed. Contrastingly, a sweeper is used for measures such as a wadi. Maintenance becomes especially difficult when there is a combination of multiple climate adaptation measures. At the moment, this early consultation is not always the case.

Knowledge institutes in Groningen play an important role in providing knowledge and support for accelerating the transition towards integrated approaches. Especially the Hanze University of Applied Sciences and the Global Centre on Adaptation are often involved in strategy formulation.

4.1.3 Creating a transdisciplinary knowledge base

In this research a transdisciplinary knowledge base has been defined as the integration of multiple knowledge frames. These interactions include amongst others: a joint problem definition, mutual learning, and the creation of emergent knowledge.

On a municipal level a transdisciplinary knowledge base has not yet been developed. As became clear from the interviews, climate mitigation and adaptation can still be considered as two separate blocks of knowledge. This means that innovations mostly take place within these separate knowledge blocks. Even though all the interviewees acknowledged climate mitigation and adaptation are two sides of the same coin, integration of knowledge between these two worlds is still lacking. This can be explained by the fact that climate policy integration has gained attention only recently by policymakers and is still underdeveloped compared to climate mitigation. Furthermore, a project leader urban development and energy transition explained that knowledge about climate mitigation and adaptation are very different in nature. To illustrate, knowledge about climate mitigation is often generic and highly specialized, whereas knowledge about climate adaptation is mostly context dependent. This complicates the creation of a joint problem definition and mutual learning.

Furthermore, climate adaptation needs to integrate knowledge from various fields of expertise, such as ecology, urban water management, soil science, urban planning, and disaster management. Up to this point, the integration of the various theme's related to climate adaptation such as drought, pluvial flooding, and heat stress is considered difficult by multiple interviewees. Therefore, integrating the knowledge frames of climate mitigation and adaptation can be considered a next step.

Nevertheless, the establishment of the Global Centre on Adaptation in the municipality of Groningen offers opportunities for creating such a transdisciplinary knowledge base. In their implementation agenda the municipality of Groningen also expresses the aim to be a knowledge hub of the Global Centre on Adaptation. Recently, a brainstorm activity has been organized for multiple departments by the municipality with the aim of exploring synergies between climate mitigation and adaptation in the city of Groningen.

4.1.4 Using local knowledge

One of the cornerstones of the climate policy of the municipality of Groningen is to involve the local community (Gemeente Groningen, 2020, Gemeente Groningen, unknown). Firstly, to gain knowledge about the local context, the municipality has in collaboration with the University of Groningen run a survey among inhabitants about climate change. This survey included questions such as which areas should be transformed in order to mitigate the effects of climate change. This contributes to the understanding about the effects of climate change on a local scale by the municipality of Groningen (Gemeente Groningen, 2020).

Furthermore, to gain local knowledge the municipality has established so-called field teams (*in Dutch: gebiedsteams*), which operate on the neighbourhood level. As explained by a

consultant sustainable design of the municipality, most of the local knowledge is gained by interaction of the field team with neighbourhood organizations and the district alderman. Those neighbourhood organizations and district aldermen are better able in knowing the local issues and inhabitant wishes. This leads to an in-depth understanding of social vulnerabilities that are derived from climate change in a certain context. By integrating this local knowledge into existing programs or activities, it is possible to formulate and co-create integrated practices. To illustrate, sewage replacement could be combined with the addition of greenery in a street.

4.1.5 Stimulating double loop learning

As explained in Chapter 2 double loop learning means a fundamental change in norms and basic assumptions by challenging world views. With regard to climate policy integration the adoption of new, more integrated working styles is key. In their climate policy the municipality of Groningen advocate for an approach where multiple objectives are integrated (Gemeente Groningen, 2020). This policy strategy formulated by the municipality of Groningen builds around four pillars: adopting a working style that focuses on integration and collaboration, that is future-oriented, and that fulfils an exemplary role for other projects within and outside the municipality of Groningen (Gemeente Groningen, 2020). All those four pillars demonstrate the importance adopting a new, more integrated working style.

In order to increase communication and collaboration between different municipal departments field teams have been established (van Loon & Kattouw, 2019; Citydeal klimaatadaptatie, 2020; Snep et al., 2020). These field teams consist of a diverse set of employees regarding expertise and knowledge. A project leader urban development and energy transition employed at municipality explained this new, more integrated working style within the municipality of Groningen as follows:

“Each district has its own district-alderman assisted with a small group of people, who together actually try to connect programs within the municipality on the one hand. Integrating different programs. And on the other hand, also look for the connection with what is happening in the neighbourhood. And the residents’ perspective.” (*Project leader urban development and energy transition– municipality of Groningen*)

In that sense, the field teams of the municipality are actively experimenting with a new, more integrated working style. Integrated initiatives arise on the basis of what is happening in the neighbourhood. Based on that local knowledge, connections with other activities and programs within the municipality are actively being searched for by the members of the field team. Nevertheless, double-loop learning also entails experimenting with integrating objectives beforehand on a more strategic level. Recently, a brainstorm activity has been organized for multiple departments by the municipality with the aim of exploring how to work differently within the municipality. According to a consultant sustainable design of the municipality the aim is to organize such brainstorm sessions more often. At the moment this is still in its infancy. Many interviewees from the municipality argued that adopting a new, more integrated working style appears to be rather difficult. In other words, communication and knowledge exchange between different departments and programs is limited. This can for example be explained by the force of existing political structures. In the municipality of Groningen, the division of municipal departments and programs is also reflected in the responsibilities of the

aldermen. To illustrate, an alderman is responsible for the energy transition, whereas another alderman is responsible for quality of life, e.g. climate adaptation, greenery, and ecology. How this task division of aldermen affects climate policy integration is explained by a consultant sustainable design from the municipality:

“Well, it is difficult anyway, because there are two different aldermen you have to serve. [...] They want to score oftentimes. The more unifocal, the clearer a particular message. For example [...] planting trees. Or realized that many square meters of green roofs [...]. An alderman is able to score with these messages. [...] It would be great if we had just one alderman who is responsible for sustainability aspects, or the combination of the energy transition and climate adaptation. That simply has climate in its portfolio.”
(Consultant sustainable design – municipality of Groningen)

To illustrate, the province of Groningen already has a deputy with a portfolio called climate, which covers the topics climate mitigation, climate adaptation, and circular economy. To create a portfolio that includes all the topics of climate change, coalition building during the next elections is considered important by the consultant sustainable design from the municipality.

4.2 Social capital

Based on the presented analytical framework activities for building social capital are creating arenas for knowledge exchange, encouraging shared values, and creating transboundary networks.

4.2.1 Creating arenas for knowledge exchange

On a municipal level, arenas for knowledge exchange do not really exist. Nevertheless, the organised risk dialogues based on the outcomes of the stress test with multiple stakeholders both within and outside the municipality can be considered as arenas for knowledge exchange. However, these risk dialogues are focussed on sharing knowledge about climate adaptation and most often not in combination with climate mitigation.

In collaboration with the Global Centre on Adaptation, the province of Groningen, and knowledge institutes in the city of Groningen, the municipality has taken the initiative to create an arena for knowledge exchange. In January 2021 the Climate Adaptation Week will take place in the city of Groningen. During this week experts and non-experts are invited to share knowledge or experiences and raise awareness about in particular climate change adaptation. Although this event is focussing on climate adaptation, this event might contribute to knowledge exchange between multiple stakeholders in the field of climate change.

4.2.2 Encouraging shared values

Although climate mitigation and adaptation are considered as two sides of the same coin, their embedded values differ. For instance, for climate mitigation strategies the financial value is strongly embedded. To illustrate, for climate mitigation measures there is often a clear business case. In the long run, money invested in these measures can easily be earned back. For climate change adaptation measures, as also a consultant sustainable design of the

municipality explained, such a business case is less clear. This can partly be explained by uncertainty about the effect of climate change in the long run:

“The reason why the collaboration is sometimes complicated [...] One could earn back money while investing in energy. So, if one switches to sustainable energy or actually initiating the energy transition, there is always some kind of business case behind it. Which does not exist for adaptation. At least, one could of course calculate if we have to deal with this kind of rain showers in 50 years’ time what it will mean for the amount of damage. By investing in adaptation, one could prevent this damage. But that is backwards reasoning. Which is always a little bit speculative, because it does not have to happen [...] those rain showers which could take place in 50 years’ time. [...] So, this is [...] just a different way on how to deal with the costs.” (*Consultant sustainable design – municipality of Groningen*)

Furthermore, several interviewees from the municipality mention that within the municipality Groningen it is still unclear how much climate adaptation measures might potentially cost. This doubtfulness is illustrated by a consultant urban water management employed at the municipality:

“It has already been shown that about 10 houses will expect water damage. Well, that could potentially cost 2,5 tons. The damage. Does that mean that a measure, for example the construction of a large sewer may costs a maximum of 2,5 ton? That is actually something we are trying to find answers for. [...] How much should the measures actually cost to solve something?” (*Consultant urban water management – municipality of Groningen*)

The implementation agenda of the municipality of Groningen does provide part of the answer on how much climate adaptation measures in the city might cost. Integrating climate adaptation measures with other strategies in other domains is seen as a way to finance climate adaptation, because of its cost efficiency (Gemeente Groningen, 2020). However, it might be the case that activities in other domains are often planned in the far future. Therefore, the municipality aims to find a balance between urgency and integrating climate adaptation measures with measures in other domains. Nevertheless, this does not provide an actual answer on how much climate adaptation measures might cost.

As explained in Chapter 2 insights in the benefits and costs of climate adaptation are far more limited, because there are no quantified objectives or predefined targets that determine the success rate of climate adaptation. As became clear from the implementation agenda of the municipality, climate adaptation measures accommodate more services rather than only coping with the effects of climate change, e.g. sociological, ecological, and psychological values. In that sense, the values for climate adaptation are more holistic compared to values for climate mitigation.

As became clear from the climate strategy of the municipality of Groningen, the municipality is trying to quantify climate adaptation measures, which is illustrated by the following quote:

“Insights into how public space can be arranged in a climate-adaptive way are still regularly changing. That is why it is difficult to formulate exact standards for the ultimate climate-adaptive design. On the other hand, we can no longer wait. We use the

guidelines that we have drawn up as input for our (urban) designs and for our discussions with developers and other users/stakeholders in public space. This makes climate adaptation part of the discussion in all spatial and physical measures that we or developers take. The possibilities of climate adaptive measures are therefore being explored more than before.” (Gemeente Groningen, 2020, p. 73 & 74)

This illustrates the encouraging of shared values, i.e. shared financial values. This might facilitate overcoming the mitigation-adaptation dichotomy.

4.2.3 Creating transboundary networks

The municipality of Groningen is participating as a member in amongst others the City Deal Climate Adaptation, Climate Adaptation Network Northern-Netherlands, and the Network Climate Adaptation Medium Sized Cities (KANS-network). Furthermore, some networks even have become institutionalized such as the Global Centre on Adaptation (GCA) that is situated in Groningen. The objective of the GCA is to bring governments, companies, organizations, and knowledge institutes together in order to accelerate climate adaptation. The municipality clearly sees the importance of sharing and acquiring knowledge about climate adaptation within these networks (Gemeente Groningen, 2020). Therefore, these networks act as arena's for knowledge exchange. However, the foundation of those existing networks is climate adaptation. Social capital might be built when new networks arise that are founded on the basis of both climate mitigation and adaptation. However, the GCA can act as a platform where also climate mitigation topics in relation to climate adaptation can be discussed. This is also expressed by the municipality in their implementation agenda on how to become a climate proof city:

“The arrival of the GCA offers (economic) opportunities for the region to further develop our 'leading role' in the field of energy and climate” (Gemeente Groningen, 2020, p. 83).

Besides, the establishment of the GCA in Groningen offers the opportunities for creating an international network.

4.3 Political capital

Based on the presented analytical framework activities for building political capital are stimulating leadership and change agents, allocating a shared budget, developing a climate policy integration narrative, and including assessment tools and evaluation methods.

4.3.1 Stimulating leadership and change agents

As pointed out by several interviewees integrating climate mitigation with adaptation asks for people with different kind of skills, so-called boundary spanners. This is illustrated by a policy officer urban development and climate adaptation from the municipality as follows:

“If you have the right people in the field teams, then integration is done in the right way. [...] However, it has to be part of you. You need to be talented. And I don't know

whether they selected the people from the field teams based on that quality.” (*Policy officer urban development and climate adaptation – municipality of Groningen*)

At the moment, the municipality of Groningen has to deal with capacity issues, which complicates the search for people that have the so-called talent for integrated thinking. Moreover, differences in capacity are also visible between the climate mitigation department and the department that is concerned with climate adaptation. The municipality of Groningen is positioning itself as a frontrunner with regards to climate mitigation. Although, the municipality expresses the ambition to position itself also as a frontrunner in climate adaptation (Gemeente Groningen, 2020). However, this is not yet reflected in the amount of people working at the department concerned with climate adaptation. Climate adaptation is still experienced as a relatively new field with less people working on the topic.

4.3.2 Allocating a shared budget

In order to achieve the goals set in the policy strategy for climate action, the municipality of Groningen is trying to use existing budgets to ensure efficiency of the available resources (Gemeente Groningen, 2020). Some of these budgets have a destination or have clear substantive frameworks when using these budgets. One could argue that the use of existing budgets might play a limiting role when it comes to integrating climate mitigation with adaptation in urban planning. Especially, considering the specific purposes these budgets are serving. A project leader urban development and energy transition of the municipality pointed out the difficulty of having multiple budgets:

“In the end, it is also about money. [...] You need to rake in different budgets. And those budgets also need to come together at the same time. And sometimes it might be the case that a budget is actually for this year. And another budget for another year. However, because of an arising opportunity you sometimes have to shift a little bit in programs and budget to make sure it will fit. If you want to collaborate, you need this flexibility in different programs. Or create this flexibility. [...] I would say for the common interest.” (*Project leader urban development and energy transition – municipality of Groningen*)

This separation between climate mitigation and adaptation is also reflected in the subsidies from the national government. To illustrate, subsidies to make neighbourhoods gas-free coexist with subsidies for climate-proofing neighbourhoods. Here, a separation between the climate mitigation and adaptation is made, which might complicate overcoming the mitigation-adaptation dichotomy. Furthermore, budgets for climate adaptation seem also be divided, as illustrated by a consultant urban water management of the municipality:

“There is actually a clear distinction. It is clear how much money is reserved for flooding, which is independent from for example heat stress.” (*Consultant urban water management – municipality of Groningen*)

However, both consequences of climate change can potentially be solved with the same measures. Reviewing budgets and financing schemes would offer opportunities for building political capital on a strategic level. Establishing a shared funding body could avoid competition between climate mitigation or adaptation objectives and related policy domains.

It is important to mention, however, that integrating climate change objectives will not always be the most cost-efficient way. This point was raised by a consultant sustainable design employed at the municipality:

“We have received about a million subsidy from the national government for the climate adaptive measures. So, that is a considerable amount. When it comes to integration, you think you can just add. And that it does not have to cost so much extra. But what struck me is that if you really want to do that right, there is also a considerable amount of costs involved. It could be an illusion that we can solve everything with integration. However, that is not really positive. [...] Well, that still takes a lot. And especially, a very large budget is still needed to get that done.” (*Consultant sustainable design – municipality of Groningen*)

In terms of implementation integrating climate mitigation with adaptation can be cost effective. However, at the moment it is considered costly since this is a relatively new way of working with extra process-related costs involved. This also underlines the need for institutional capacity building in order to reduce the costs involved.

4.3.3 Developing a climate policy integration narrative

As explained in Chapter 2, having a climate policy integration narrative is important as it can shape planners' conception of integrated practices and how these integrated practices might be achieved. As became clear from the interviews, such a narrative has not yet been created. However, the importance of having such a climate policy integration narrative is often stressed by the participants. Awareness of the importance of a climate policy narrative can be seen as a first step in building social capital. A narrative can be valuable at multiple levels. For example, on a European or national scale a narrative can be valuable in the application for subsidies. On a local scale a narrative can create residential support. This is illustrated by a policy officer urban development and climate adaptation of the municipality:

“Our multiple-years maintenance program shows we need to replace the asphalt next year. Yes, it is incomprehensible for inhabitants. [...] We really need to do that differently. It is incomprehensible for inhabitants, if you more often have to cut into the street because of multiple chores. And that is why we need to integrate.” (*Policy officer urban development and climate adaptation – municipality of Groningen*)

Despite such a climate policy integration narrative has not yet been created explicitly, the ingredients for such a narrative have become visible during the interviews. Climate mitigation strategies are often perceived as measures that are a pain in the eye, such as windmills and heat pumps. Therefore, the implementation of climate mitigation measures often goes hand in hand with public resistance. On the contrary, climate adaptation measures are often perceived as something beautiful, e.g. adding greenery. These ingredients provide a basis for a narrative where both climate mitigation and adaptation find a place and embrace each other. Especially when a construction can be created where climate mitigation can finance climate adaptation. To finalise the narrative, communicating climate adaptation should include all the aspects of adaptation, e.g. heat stress, drought, and pluvial flooding.

Having such an overarching story could potentially improve the collaboration between the involved stakeholders. With such an overarching story the reason would be clear from the

start why stakeholders involved in both climate mitigation and adaptation should work together. A climate policy integration narrative explicitly makes clear the synergy between climate mitigation and adaptation. However, when creating such a climate policy integration narrative the inclusion of all stakeholders involved is a precondition. This means both internally within the municipality with all the relevant departments and externally with for example knowledge institutions, regional water authorities, and energy companies. On the short term, such an overarching story could be developed on a municipal level in collaboration with heat grid installation company WarmteStad.

4.3.3 Including assessment tools and evaluation methods

On a national scale, the implementation of the so-called ‘Environment and Planning Act’ (*in Dutch: Omgevingswet*) might facilitate the integration of climate mitigation and adaptation in decision-making (Snep et al., 2020). Important pillars of this new act are integration, cohesion, and participation (Kennisportaal Ruimtelijke Adaptatie, 2019). In order to comply with this act new ways of working need to be experimented with, such as climate policy integration. As explained before, the creation of a climate policy integration narrative could potentially help to comply with this act. Furthermore, a policy officer urban development and climate adaptation at the municipality brought up a potential solution to facilitate this integrated working style:

“I have thought of it myself, you should have a kind of checklist for area development. [...] Whether or not it is arranged via ICT. That if something is related to a program, a pop-up goes or an email with this is going on there. [...] So, you will never skip a department. For example, because someone [...] was not interested. Or maybe does not have the talent for integrated thinking. However, we all have to adopt an integrated work style. But is everyone able to do that? [...] That is the question. So, whether you should make that formal or not [...]. And that you have checklists.” (*Policy officer urban development and climate adaptation – municipality of Groningen*)

4.4 Key observations

To summarize this analysis, key activities that the municipality has undertaken in relation to the build-up of intellectual, social, and political capital are presented in the Table below.

Institutional capacity	Activity	Key activities employed by municipality
Intellectual capital	Using urban climate maps	- Execution of a stress test contributed to greater awareness about the problem by multiple departments and the necessity of climate policy integration
	Addressing variety of actors, levels, and scales	- Discussion of the results of the stress test with a variety of stakeholders such as the municipal health service, the province of Groningen, the regional water authorities, housing associations, knowledge institutes, and citizens

	Creating transdisciplinary knowledge base	<ul style="list-style-type: none"> - Organization of brainstorm sessions for multiple departments with the aim to explore the synergies between climate mitigation and adaptation - Expression by the municipality to become a knowledge hub of the Global Centre on Adaptation
	Using local knowledge	<ul style="list-style-type: none"> - Running of a survey among inhabitants about the effects of climate change on a local scale - Establishment of field teams to facilitate an in-depth understanding of the social vulnerabilities that are derived from climate change in a certain context
	Stimulating double loop learning	<ul style="list-style-type: none"> - Advocation of a new, more integrated working style by the municipality in its climate policy - Establishment of field teams with a diverse set of employees regarding expertise and knowledge - Organization of brainstorm session for multiple departments with the aim to explore how to adopt this new, integrated working style within the municipality
Social capital	Creating arenas for knowledge exchange	<ul style="list-style-type: none"> - Organization of risk dialogues based on the outcomes of the stress test with multiple stakeholders - Initiation of organizing the Climate Adaptation Week in January 2021 in the city of Groningen
	Encouraging shared values	<ul style="list-style-type: none"> - Expression by the municipality to explore the quantification of climate adaptation measures encourages the financial value of climate adaptation
	Creating transboundary networks	<ul style="list-style-type: none"> - Arrival of the Global Centre on Adaptation in the city of Groningen creates new network capacities for the municipality
Political capital	Stimulating leadership and change agents	<ul style="list-style-type: none"> - Awareness raising about the skills needed for integrated thinking within the municipality
	Allocating shared budget	<ul style="list-style-type: none"> - Creation of flexibility for shifting existing budgets and programs
	Developing a climate policy integration narrative	<ul style="list-style-type: none"> - Awareness raising about the importance of having a climate policy integration narrative and the ingredients of such a narrative
	Including assessment tools and evaluation methods	<ul style="list-style-type: none"> - Stimulation of integrated thinking by the new Environmental Planning Act

Table 7 Undertaken activities for institutional capacity building by municipality of Groningen

A general observation is that moving towards integrated practices still appears to be difficult. Knowledge exchange seems to be limited between municipal departments and programs. Although recently initiatives have been started to increase interaction between employees concerned with climate mitigation and adaptation. Nevertheless, in order to achieve double loop learning only sharing knowledge is not enough. This means that existing norms and basic assumptions have to be challenged. Considering the future goals drafted by the municipality, the two discourses of climate mitigation and adaptation will probably continue their own trajectory in the future. To illustrate, the municipality aims to be energy neutral by 2035 (Gemeente Groningen, unknown) and climate adaptive by 2050 (Gemeente Groningen, 2020). However, the Delta Program on Spatial Adaptation expresses the need to combine climate adaptation measures with other objectives in the physical environment, such as the energy transition. At the moment, there is no national policy on how to undertake the integration of mitigation with adaptation in urban planning. This means that it is up to the Dutch cities to figure out how to give meaning to the ambition set by the Dutch national government. Therefore, in this research it is assumed that both at a strategic level and operational level institutional capacity building processes are needed. A project that experimented with integrating climate mitigation with adaptation in urban planning in the municipality of Groningen is the project Paddepoel climate-proof. Activities employed by the project organization for building institutional capacity on the project level will be discussed in the next chapter. This chapter will provide insights on how the municipal policy on climate policy integration finds meaning at the operational level.

Chapter 5: Institutional capacity building by the Paddepoel climate-proof project organisation

In this chapter the results of the collected data about the undertaken activities by the Paddepoel climate-proof project organisation for building institutional capacity on an operational level are described. The findings are presented by discussing them according to the analytical framework presented in Chapter 2. In Table 8 the key activities are outlined in relation to the building of intellectual, social, and political capital. First, a general overview is given about the Paddepoel climate-proof project.

The project that is selected is situated in the neighbourhood Paddepoel in the city of Groningen. This neighbourhood has been built in the 1960's (van Loon & Kattouw, 2019). Paddepoel is a neighbourhood which suffers from pluvial flooding because large parts of the area consist of stone (RTV-Noord, 2019). Also, inhabitants of the neighbourhood indicated that the lack of attractive public space is a key issue (van Loon & Kattouw, 2019). In this project the following stakeholders are relevant for this research: heat grid installation company WarmteStad, departments within the municipality of Groningen concerned with climate mitigation and adaptation, and neighbourhood organisation Co-Creatie Paddepoel (van Loon & Kattouw, 2019).

In 2018 WarmteStad came up with the idea to extend the heat grid from Zernike towards Paddepoel. One year later, in 2019, the Dutch ministry of Infrastructure and Management announced a funding scheme for the integration of climate mitigation with adaptation (Stadszaken, 2019). The field team from the municipality drew this under the attention of the policy makers of the municipality. The streets in Paddepoel had to be broken up during the construction of the heat grid, which offered opportunities for the redevelopment of these streets (Stadszaken, 2019). To comply with the criteria for the funding the initial plan of WarmteStad had to be revised, i.e. adding climate adaptation measures and involving citizens in the design process.

In this regard, Paddepoel climate-proof can be seen as a project that promotes both climate mitigation and adaptation measures. Although, the project is labelled as a project with an integrated focus, the construction of the heat grid is considered as the point of departure of the project by the municipality and other stakeholders (Citydeal klimaatadaptatie, 2020). This can be explained by the fact that heat grid installation company WarmteStad already finished their plans and started with the preparations for constructing the heat grid in Paddepoel. This start of the process of integrating climate adaptation has been mentioned by several interviewees:

“So, it all worked out in the end. However, it really has been a running start. The municipality had to jump onto a moving train.” (*Manager realization – WarmteStad*)

“There was quite a bit of hassle to get everyone into it, because they were already on track. [...] And they actually had already gone a long way, when they were called back. Like, wait a minute, this should actually be included.” (*Consultant sustainable design – municipality of Groningen*)

All interviewees agree time pressure was experienced during the plan-making phase for an integrated design of the street, partly because the subsidy was granted last-minute. This hurried start has had an effect on the continuation of the process of the project, especially

because WarmteStad already finished the plans for constructing the heat grid. A policy officer urban development and climate adaptation from the municipality shared her experience of the process:

“We have of course applied for a subsidy for climate adaptation in combination with mitigation. However, it came from the climate adaptation budget. And at one point, it seemed to be a side thing. Then suddenly it goes about the street again. No, it is not about the street. It is about climate adaptation after a heat grid was installed.” (*Policy officer urban development and climate adaptation – municipality of Groningen*)

To summarize, the strategy to combine climate mitigation with adaptation has been an ad hoc process. In the remaining of this chapter the activities employed by the project organisation for building institutional capacity are described by focusing on the three elements of institutional capital: intellectual, social, and political capital.

5.1 Intellectual capital

Based on the presented analytical framework activities for building intellectual capital are using urban climate maps, addressing variety, creating a transdisciplinary knowledge base, using local knowledge, and stimulating double loop learning.

5.1.1 Using urban climate maps

To make the neighbourhood of Paddepoel climate adaptive the outcomes of the stress test has been used as a point of departure by the municipality. The stress test showed that Paddepoel is mostly vulnerable to heat stress and pluvial flooding (Kennisportaal Ruimtelijke Adaptatie, 2020). Furthermore, this is a neighbourhood where vulnerable groups are living, such as elderly people. This stress test has also been showed to the inhabitants of Paddepoel by the municipality at one of the meetings organized for the inhabitants. In this way, the stress test provides information for a common starting point at the beginning of the process and acts as a communication tool towards inhabitants. However, this stress test lacks accuracy as indicated by a consultant urban water management from the municipality:

“Well, at least for me it has become clear to investigate what the exact damage situation will be for example. We knew we could expect flooding in the Plutolaan. However, not how much and where [...]. Now we have calculation programs for this. And we have been busy with this program in Selwerd. Basically, a program that shows how much, well actually how the water flows. You let go a heavy rain shower. Low-lying areas will be flooded. [...] And additionally, you could easily calculate the effects of for example a wadi or lowering a street.” (*Consultant urban water management – municipality of Groningen*)

In this regard, intellectual capital has been built by the municipality of Groningen through the use of sophisticated software to visualize the effects of climate change. However, what also becomes clear from this quote is that the focus is mostly on pluvial flooding and less on heat stress or drought.

5.1.2 Addressing variety of actors, levels, and scales

At the start of the project variety of actors, levels, and scales has not been addressed explicitly. As explained before, the initial project was to construct a heat grid in Paddepoel. The municipal department concerned with climate adaptation has been involved in a later stage when the subsidy for climate adaptation measures was granted by the national government. To comply with the criteria of the granted subsidy, inhabitants needed to be included throughout the process. Therefore, extra attention is given on involving citizens in the process in the project Paddepoel climate-proof (Gemeente Groningen, 2020).

Next to involving citizens, several interviewees from the municipality indicated the importance of involving businesses, such as businesses related to utility services. Every now and then, this kind of businesses also need to make efforts underground. The municipality acknowledges the importance aligning these activities with the construction of for instance a heat grid.

Furthermore, considering variety in setting out a tender appears to be important for integrating climate mitigation with adaptation. Many interviewees from the municipality stated that in the Paddepoel climate-proof project the actual tender turned out differently than expected. Here, the difference in aim of climate mitigation and adaptation measures becomes problematic. To illustrate, a heat grid is a generic underground measure, whereas climate adaptation measures can be both underground and above ground and are more context specific. However, contractors are most of the time specialized in either underground activities or above ground activities. This means that integrating climate mitigation with adaptation measures asks a broadening of expertise of contractors.

In the Paddepoel climate-proof project, WarmteStad was in charge of the implementation of the plans. What complicated the integration process in the Paddepoel climate-proof project was WarmteStad did not have any experience with tendering above ground, which eventually led to delays in the project. In that sense, addressing variety during the tender process appeared to be difficult for WarmteStad. Many interviewees from the municipality acknowledged that this is one of the lessons learned. In the project in Selwerd the municipality will be in charge of the tender process, because the municipality is better in addressing the variety.

5.1.3 Creating a transdisciplinary knowledge base

In this research a transdisciplinary knowledge base has been defined as the integration of multiple knowledge frames. These interactions include amongst others: a joint problem definition, mutual learning, and the creation of emergent knowledge.

As explained in Chapter 2 strategies for climate mitigation are mainly formulated on the basis of information from a limited number of scientific bodies of thought, e.g. economics and technology. The interviewed employees of WarmteStad acknowledged that WarmteStad mainly processes technical knowledge about engineering a heat grid at the start of the Paddepoel climate-proof project. When the subsidy was granted WarmteStad's strategy had to be changed from merely engineering a heat grid towards integrating a heat grid in the built environment with climate adaptation measures. A policy officer urban development and climate adaptation of the municipality explained that the municipality has assisted

WarmteStad with their knowledge about stakeholder management. Furthermore, the employees of WarmteStad acknowledged that WarmteStad has invested in new forms of knowledge such as stakeholder analyses. In this regard, knowledge from the worlds of climate mitigation and adaptation are brought together.

5.1.4 Using local knowledge

For a long time, the inhabitants of Paddepoel expressed the need of redesigning the streets in Paddepoel because they were considered unsafe and unattractive. When the field team from the municipality became aware of WarmteStad's plans, the field team drew the wishes of the inhabitants under the attention of the policy makers of the municipality. The streets in Paddepoel had to be broken up during the construction of the heat grid, which offered opportunities for the redevelopment of these streets.

In order to come up with the final design of the streets local knowledge of inhabitants has been used as input. As became clear from the interview this local knowledge and local wishes are actually used in the final design. This is mentioned by a citizens' representative from neighbourhood organisation Co-Creatie Paddepoel:

“Actually, the residents were quite in agreement. It is funny that we actually came up with completely different ideas compared to what the municipality had come up with. [...] The inhabitants said they wanted to have the road a little bit narrower. [...] There was someone who made a very precise tree plan, because they all wanted different trees in the street. [...] So, there were a lot of things.” (*Citizens' representative – Co-Creatie Paddepoel*)

Furthermore, including the local knowledge of inhabitants and local wishes of the inhabitants could make the nuisances during the construction of the heat grid less of a problem. One of the aims of WarmteStad is to minimize the inconvenience. Next to that, WarmteStad can be considered a local company. WarmteStad only has projects within the municipality of Groningen. Therefore, they gain a lot of knowledge about the Groningen context. Besides, most of the WarmteStad's employees are living in the municipality of Groningen and therefore do know the local context.

5.1.5 Stimulating double loop learning

To some degree the granted subsidy has stimulated double loop learning. The Paddepoel climate-proof project has been labelled as a pilot project by the national government. The purpose of a so-called pilot project is to acquire knowledge about the process of climate policy integration and the effectiveness of the measures. Above all, the municipality of Groningen explicitly addresses that they want to learn from this project to improve their way of working (Gemeente Groningen, 2020), e.g. a new, more integrated working style.

When the subsidy from the national government was granted for the integration of climate adaptation measures, an integral project team was established by the municipality with employees from diverse municipal departments and programs. Furthermore, an integral project leader has been appointed to make sure all interests are aligned.

As became clear from the interviews and observations, lessons learned, and best practices about climate policy integration are included in the design phase of the expansion of the heat grid towards the neighbourhood of Selwerd. These are mainly lessons learned about the collaboration between WarmteStad and the municipality. Furthermore, the essence of integrating climate mitigation with adaptation is clear at the start of the project in Selwerd, as illustrated by a project leader urban development and energy transition from the municipality:

“So that is [...] quite difficult. And especially in the Plutolaan we did this for the first time. You need to put some extra effort to get such a project off the ground. And in my view, in Selwerd South it was already much more about what we should do exactly. It was much more about the content [...]. Then it was no longer a question whether we would do it.” (*Project leader urban development and energy transition – municipality of Groningen*)

In this regard, existing norms and basic assumptions are challenged.

5.2 Social capital

Based on the presented analytical framework activities for building social capital are creating arenas for knowledge exchange, encouraging shared values, and creating transboundary networks.

5.2.1 Creating arenas for knowledge exchange

In conjunction with neighbourhood organisation Co-Creatie Paddepoel, the municipality of Groningen organized several design sessions for the inhabitants of Paddepoel (Kennisportaal Ruimtelijke Adaptatie, 2020). This neighbourhood organisation Co-Creatie Paddepoel acted as an intermediary between the municipality and the inhabitants. According to van Loon & Kattouw (2019) there were no pre-imposed frameworks that would guide the sessions, i.e. an open process. Such a communicative approach facilitates the exchange of local knowledge in order to come up with a tailor-made design for Paddepoel. Furthermore, at the beginning of the process co-creation has been considered as an approach to follow, which is based on the principle of equality.

Next to that, WarmteStad's mobile information point could be considered as an arena for knowledge exchange. Here, inhabitants could gain information about the project, but also share their complains or ideas. A manager realization of WarmteStad shared his view about the mobile information point:

“That is where our mobile information point is located. I think our accessibility and approachability has been very important.” (*Manager realization – WarmteStad*)

5.2.2 Encouraging shared values

As explained in Chapter 4, climate mitigation and adaptation are considered as two sides of the same coin. However, their embedded values differ. This is also visible on the operational level, i.e. the Paddepoel climate-proof project. For instance, the financial value is strongly embedded in constructing the heat grid. To illustrate, the business case for constructing a heat

grid is often clear, whereas this is most of the time not the case with climate adaptation measures. WarmteStad clearly had a business case. The following quote from a manager realization employed at WarmteStad illustrates how the business case of mitigation measures influences the collaboration between the municipality and WarmteStad:

“You are two separate companies/institutions, each with your own results and objectives. And in this case, WarmteStad has made a business case based on a specific growth scenario. We are founded by the municipality, partly [...] to reach the climate goals of the municipality of Groningen. And that is only possible if we follow a certain growth model. This growth scenario is mapped out in our heat plan. And based on this heat plan we have made a business case.” (*Manager realization – WarmteStad*)

Furthermore, from this quote the influence of concrete targets on a business case becomes clear. To be able to manage uncertainties WarmteStad focuses on bulk, i.e. connecting the bigger apartment buildings. Due to WarmteStads’ business case differences in speed between climate mitigation and adaptation measures have been experienced by most of the interviewees. This is translated in for example differences in procedures. To demonstrate, the construction of the heat grid is mainly driven by customer demand. WarmteStad has signed contracts with for example housing associations. If WarmteStad is not able to construct the heat grid in time, WarmteStad has to pay fines. Three interviewees have illustrated this difference in perspective on time.

“In itself that was still quite difficult, because WarmteStad actually did not want anything with climate adaptation at all. [...] They had the idea we only need to construct the heat grid. And that is the only thing we do. And it will only be complicated and difficult when we also have to redesign the street. And that we have to discuss this with the inhabitants. This will add costs. They only wanted to be quick and efficient.” (*Consultant sustainable design – municipality of Groningen*)

“You are running in a completely different pace. And you are managed differently. To somehow be able to synchronize this. Actually, those are two things. The management is slightly different. [...] And on the other hand, the pace. You have to deal with two different organisations. One organisation needs half a year for the preparations and the other organisations needs one or two years or whatever. And to be able to bring this together, that is [...] still the biggest challenge.” (*Manager realization – WarmteStad*)

“If you only want to construct a heat pipe, as cheap as possible from A to B, you are serving the costumer.” (*Consultant spatial development and implementation – municipality of Groningen*)

To bring these different time paths in line with each other, WarmteStad has suspended the procurement of the first tracés. WarmteStad acknowledge the added value of adding climate adaptation measures. As explained in Chapter 4, climate adaptation strategies are often considered as something beautiful. For WarmteStad this would potentially result in less public resistance when breaking up the street for the construction of the heat grid. Furthermore, integrating climate mitigation with adaptation offered both the municipality and WarmteStad financial gain, because the streets had to be broken up once.

5.2.3 Creating transboundary networks

During the project in Paddepoel, a new partnership has been created between the municipality and heat grid installation company WarmteStad. In that sense, a new transboundary network has been created between stakeholders involved in both climate mitigation and adaptation. The fact that the municipality is a co-shareholder of this company facilitated the information flow between the municipality and Warmtestad (van Loon & Kattouw, 2019). However, because the collaboration with WarmteStad and the municipality was relatively new, information sharing was not considered self-evident. This was illustrated by a policy officer urban development and climate adaptation of the municipality:

“Then a difficult part of the process occurred about transparency. And then different agendas are noticeable. Not giving insights about the costs. And how much work and time you need to spend on the project. You simply ask for their budget, which can be used for the co-financing for the application. Well, you do not get that easily.” (*Policy officer urban development and climate adaptation – municipality of Groningen*)

In this regard, transparency appeared to be important for the subsidy application. Therefore, transparency about aims of different stakeholders is needed when integrating climate mitigation with adaptation. As said before, one of the aims of climate mitigation is often to earn money.

Furthermore, cultural differences within WarmteStad complicated the collaboration with the municipality. These cultural differences exist because WarmteStad is for 50 percent of the municipality and for the other 50 percent of the regional water company, as illustrated by the citizens’ representative from neighbourhood organisation Co-Creatie Paddepoel:

“You also have to get used to each other [...]. And the water company is much more bounded compared to the municipality. They are focused on [...] goals, results, check, check, check. [...] Much more about how do we get in a straight line from A to B as quickly as possible.” (*Citizens’ representative – Co-Creatie Paddepoel*)

As explained before, the collaboration between the municipality and WarmteStad improved throughout the process. In that sense, a transboundary network has been created which was boosted by the granted subsidy.

When looking at the local level, several neighbourhood initiatives have been arisen in Paddepoel. For example, Grunneger Power, Paddepoel Energiek, and Buurtwarmte050 are working on realising a local heat grid, which will enable smaller blocks and individual homes to be connected (Gemeente Groningen, unknown). However, climate adaptation is not a topic in these initiatives. Therefore, these neighbourhood initiatives have a sectoral focus.

5.3 Political capital

Based on the presented analytical framework activities for building political capital are stimulating leadership and change agents, allocating a shared budget, developing a climate policy integration narrative, and including assessment tools and evaluation methods.

5.3.1 Stimulating leadership and change agents

Several change agents have played a role in the project Paddepoel climate-proof. To illustrate, the citizens' representative of Co-Creatie Paddepoel has been very active in drawing the attention of the municipality and WarmteStad for the wishes of the inhabitants to make the neighbourhood climate adaptive.

As explained in Chapter 2 strategies for climate mitigation are mainly formulated on the basis of information from a limited number of scientific bodies of thought, e.g. economics and technology. This perspective influences the framing of the problem. Nevertheless, as indicated by the employees of WarmteStad, WarmteStad as a company has made a transformation towards stakeholder management, partly because of the integration the heat grid with climate adaptation measures. The new focus implies a shift in the quality of leaders and employees. This shift is illustrated by a manager realization of WarmteStad:

“That is what I also meant with the project manager is no longer the technician. But it is really someone with sensitivity for the environment. At the moment, that is almost the most important.” (*Manager realization – WarmteStad*)

Within WarmteStad a new project leader has been appointed who possessed those capabilities described in the quote. In this regard, political capital has been built by WarmteStad, since WarmteStad is moving towards the frames of reference of climate adaptation.

5.3.2 Allocating shared budget

In the project Paddepoel climate-proof financial gain has been found by integrating climate mitigation with adaptation. To some degree, WarmteStad acted as co-financer of the climate adaptation measures. The street had to be broken up because WarmteStad would construct the heat grid. This offered financial opportunities for the municipality to implement climate adaptation measures, such as permeable pavement, a rainwater sewer, and additional greenery. Furthermore, it also saves WarmteStad money as they do not have to turn the street back in its original state. However, to streamline the budget for climate mitigation measures with the budget for adaptation measures still appeared to be difficult. This has been illustrated by a project leader urban development and energy transition of the municipality:

“In the Plutolaan it took some time to get used to it. Suddenly, also the people involved in maintenance where part of the discussion. [...] In the beginning, they also thought what is happening here. And the same for WarmteStad. However, when you have put that together at some point, then 1 and 1 is say 3. So, [...] there are separate budget that you need to put together. [...] That is quite difficult. Actually, this was for the first time in the Plutolaan. So, you need to put some extra effort to get such a project started.” (*Project leader urban development and energy transition – municipality of Groningen*)

5.3.3 Developing a climate policy integration narrative

Having a climate policy integration narrative is also reflected on the local scale. As explained before climate adaptation measures can make the construction of climate mitigation measures more attractive. This is also the argument the municipality of Groningen has made at the start of the collaboration with WarmteStad. When constructing a heat grid, WarmteStad will probably lose support because inhabitants will experience nuisance. Furthermore, most of the inhabitants will not yet profit from the heat grid since only the bigger apartment blocks will be connected to the heat grid. The interviewees of WarmteStad agreed that integrating climate mitigation and adaptation objectives could improve their image.

The narrative that climate change adaptation measures can make the implementation of climate mitigation strategies more attractive has also been communicated to the inhabitants by neighbourhood organisation Co-Creatie Paddepoel. This is illustrated by a citizens' representative from neighbourhood organisation Co-Creatie Paddepoel:

“So, flyers have been used all over the Plutolaan. A small flyer called from mud to a good feeling (*in Dutch: van modderboel naar goed gevoel*). And that started with the sentence: now the streets will be broken up. And what do you really want to see in the street?” (*Citizens' representative – Co-Creatie Paddepoel*)

5.3.4 Including assessment tools and evaluation methods

As explained before WarmteStad as a company has made a transformation from a focus on engineering a heat grid towards a focus on stakeholder management. Such a new focus implies the need for new tools and methods. WarmteStad has for example invested in stakeholder analyses. Furthermore, WarmteStad has invested in stakeholder communication, e.g. a mobile information point. In this regard, political capital has been built by WarmteStad, since WarmteStad is moving towards the frames of reference of climate adaptation.

5.4 Key observations

To summarize this analysis, key activities that the project organisation has undertaken in relation to the build-up of intellectual, social, and political capital are presented in the Table below.

Institutional capacity	Activity	Key activities employed by project organisation
Intellectual capital	Using urban climate maps	- Communication of the outcomes of the stress test about Paddepoel acted as a common

		<p>starting point for the municipality and inhabitants</p> <ul style="list-style-type: none"> - Development of sophisticated software to visualise the effects of climate change and the effects of potential measures in more detail
	Addressing variety of actors, levels, and scales	<ul style="list-style-type: none"> - Stimulation of addressing variety by applying for the subsidy provided by the national government - Awareness raising by the municipality about addressing variety during the tender process
	Creating transdisciplinary knowledge base	<ul style="list-style-type: none"> - Provision of knowledge about stakeholder management by the municipality for heat grid installation company WarmteStad - Investment in new forms of knowledge such as stakeholder analyses by WarmteStad
	Using local knowledge	<ul style="list-style-type: none"> - Attention has been drawn by the field team for integrating climate adaptation while constructing the heat grid based on inhabitants' wishes - Creation of local focus by WarmteStad because WarmteStad only has projects within the municipality of Groningen and employs people that are living in or nearby the municipality
	Stimulating double loop learning	<ul style="list-style-type: none"> - Establishment of integral project team with an integral project leader by the municipality - Stimulation of shifting assumptions about the essence of climate policy integration due to the granted subsidy
Social capital	Creating arenas for knowledge exchange	<ul style="list-style-type: none"> - Organisation of design sessions for inhabitants by the municipality and WarmteStad - Placing mobile information point in neighbourhood Paddepoel by WarmteStad
	Creating transboundary networks	<ul style="list-style-type: none"> - Creation of a new partnership between WarmteStad and the municipality of Groningen
	Creating shared values	<ul style="list-style-type: none"> - Suspension of the procurement of the first traces by WarmteStad considering financial gain and the added value of climate adaptation measures
Political capital	Stimulating leadership and change agents	<ul style="list-style-type: none"> - Hiring of employees with sensitivity for the environment by WarmteStad
	Allocating shared budget	<ul style="list-style-type: none"> - Streamlining separate budgets from several municipal departments and programs and Warmtestad
	Developing a climate policy	<ul style="list-style-type: none"> - Communication of the added value of integrating climate change adaptation measures while constructing the heat grid by

integration narrative	<p>the municipality at the start of the collaboration with WarmteStad</p> <ul style="list-style-type: none"> - Distribution of a flyer that communicates the message that climate adaptation measures can make the implementation of climate mitigation strategies more attractive by neighbourhood organisation Co-Creatie Paddepoel
Including assessment tools and evaluation methods	<ul style="list-style-type: none"> - Investment in new tools and methods such as stakeholder analyses and a mobile information point by WarmteStad

Table 8 Undertaken activities for institutional capacity building by Paddepoel climate-proof project organisation

The project Paddepoel climate-proof has been considered by all the interviewees as a project in which new ways of working are experimented with, i.e. integrated practices. Although, the integration of climate mitigation with adaptation in urban planning can be described as an ad hoc process. The trick is to turn the experiences and lessons learned into a structural change in urban planning, i.e. institutionalization of the best practices. To make sure this project will be more than something incidental, lessons for institutional reform are presented in the next chapter.

Chapter 6: Reflection and conclusion

This research aimed at understanding how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning. A document analysis, semi-structured interviews, and observations were executed to answer the main research question. In this chapter, the findings are concluded along the research questions presented in Chapter 1. The results are generalized to a broader context, thereby adding to the scientific relevance of this research. Subsequently, based on the case study findings lessons for institutional reform are formulated in order to facilitate the integration of mitigation with adaptation. Then, to position the relevance of this research a reflection is provided. At the end of this chapter suggestions for further research are given.

6.1 Introduction

An increasing body of literature shows that the challenges related to climate policy integration are not only technical in nature, but in particular institutional. It can be argued that the divide between climate mitigation and adaptation is mainly a mental construct, which is enhanced by the different ways of framing the problem of climate change and how to solve the problem accordingly. It is the current institutional fabric as a result of this historic dichotomy that makes an integrated approach in urban planning difficult, not the incompatibility of the actions. This dichotomy between the mitigation and adaptation domains has resulted in contrasting ways of working, i.e. different policy concepts, rules, and perspectives.

The aim of this research was to gain insight in how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning and thereby overcoming the institutional barriers related to climate policy integration. In this research, an answer is given to the following research question: *how can institutional capacity be built in order to facilitate the integration of climate mitigation with adaptation in urban planning in medium-sized Dutch cities?*

The concept of institutional capacity building has been fundamental for the orientation of this research. The build-up of institutional capacity is important because it determines the ability of people to perform effectively its tasks and to be able to cooperate with other stakeholders. This is especially relevant to the issue of climate policy integration, because of its cross-sectoral nature and the various actors involved. As proposed by Khakee (2002), Cars et al., (2017), and Healey (1998) the build-up of institutional capacity requires the development of intellectual, social, and political capital. Drawing on this institutional capacity building literature and literature about climate policy integration, the mitigation-adaptation dichotomy, and sustainable development in general, the researcher converted the three capitals into an analytical framework. The analytical framework has been used to study the city of Groningen, whereby research has been done on the municipal level and project level.

6.2 Empirical reflection and conclusion

This research shows the importance of institutional capacity building at both the strategic level and the operational level. Building institutional capacity at both the strategic and operational level can be considered as a parallel process. Institutional capacity at a strategic level is needed to be able to develop integrated practices, i.e. policy formation. And thereby setting the institutional context for implementing projects. On the contrary, implementing projects can be regarded as a way to build institutional capacity at the operational level, which can also stimulate institutional capacity building at the strategic level. Therefore, it turned out to be crucial to distinguish between these two levels of institutional capacity building.

6.2.1 Institutional capacity building on the strategic level in Groningen

This sub-section answers the following sub-question: *which activities are undertaken by the municipality of Groningen for building institutional capacity on a strategic level to integrate climate mitigation with adaptation in urban planning?*

In the municipality of Groningen, the climate mitigation and adaptation discourses have evolved separately by following their own trajectory. Although the municipality has outlined two different time paths for either climate mitigation or adaptation, the municipality acknowledges the need to integrate climate mitigation with adaptation to be able to combat climate change. This research concludes that institutional capacity has been built in various ways by the municipality of Groningen for integrating climate mitigation with adaptation in urban planning. With regard to intellectual capital, the municipality has executed so called-stress tests, involved a variety of stakeholders in formulating their policy, organized brainstorm activities, and gained local knowledge by running a survey and establishing field teams. With regard to social capital, the municipality has organized risk dialogues, taken the initiative to organize the Climate Adaptation Week, encouraged shared values by trying to quantify climate adaptation measures, participated in many networks related to the topic of climate change. With regard to political capital, within the municipality awareness is rising about a new kind of skill set that is needed for climate policy integration and about the importance of a climate policy integration narrative.

However, moving towards integrated practices still appears to be difficult. Knowledge exchange seems to be limited between municipal departments and programs. Although recently initiatives have been started to increase interaction between employees concerned with climate mitigation and adaptation. Nevertheless, in order to achieve double loop learning only sharing knowledge is not enough. This means that existing norms and basic assumptions have to be challenged. Considering the future goals drafted by the municipality, the two discourses of climate mitigation and adaptation will probably continue their own trajectory in the future. Several institutional weaknesses that impede this transition towards integrated practices can be identified. For instance, the knowledge exchange between stakeholders is limited, absence of a quantified values for climate adaptation, and financial lock-ins. The institutional strengths and weaknesses are summarized in Table 9.

Institutional capacity	Institutional strengths	Institutional weaknesses
Intellectual capital	Awareness has been raised about the necessity of climate policy integration by the outcomes of the stress tests	Knowledge exchange between municipal departments and programs is limited
	A variety of stakeholders has been addressed in formulating the climate policy of the municipality of Groningen	Stakeholders involved in maintenance are not always involved at an early stage in the process
	Awareness has been raised about the importance of connecting municipal departments by for example organising brainstorm activities	A transdisciplinary knowledge base has not yet been developed
	Local knowledge is gained by establishing the integral field teams	An integrated focus on climate adaptation is lacking. Focus is mainly on pluvial flooding
	An integrated working style has been stimulated by establishing the integral field teams	
Social capital	Network capacity has been created by the arrival of the Global Centre on	A climate policy integration narrative has not yet been

	Adaptation and the initiative to organise the Climate Adaptation Week in Groningen	developed in collaboration with the involved stakeholders
	Awareness has been raised about the importance of having a climate policy integration narrative. The ingredients of such a narrative are already clear	The absence of shared values complicates the integration of climate mitigation and adaptation in the municipality of Groningen
	Awareness has been raised about quantifying climate adaptation	
Political capital	Awareness has been raised about the skill set that is needed for integrated practices	The division in responsibilities of aldermen complicates the integration of climate mitigation with adaptation
	Adopting an integrated working style is stimulated by the Environment and Planning Act	The capacity for integrated thinking of employees is still underdeveloped
		The allocation of budgets aggravates the competition between objectives

Table 9 Institutional strengths and weaknesses at the strategic level

6.2.2 Institutional capacity building on the operational level in Paddepoel

This sub-section answers the following sub-question: *which activities are undertaken by the Paddepoel climate-proof project organisation for building institutional capacity on an operational level to integrate climate mitigation with adaptation in urban planning?*

The project Paddepoel climate-proof has been labelled as a pilot project for integrating climate mitigation with adaptation in urban planning. This research concludes that institutional capacity has been built in various ways by the project organisation of Paddepoel climate-proof. With regard to intellectual capital, the project organisation used the outcomes of the stress test, citizens have been involved throughout the process, and an integral project team has been established. Furthermore, the municipality has assisted WarmteStad with their knowledge about stakeholder management. With regard to social capital, the project organisation has organized design sessions and a mobile information point has been established by WarmteStad. Furthermore, a partnership between WarmteStad and the municipality has been encouraged by the granted subsidy. With regard to political capital, WarmteStad invested in new kind of employees and new tools in order to move towards the frames of reference of climate adaptation, financial gain has been found by adding multiple budgets, and a climate policy integration narrative has been used in communication about the project.

In general, the project Paddepoel climate-proof can be described as an ad hoc process. This can be explained by the fact that this was the first project in the city of Groningen in which the focus was on integrating climate mitigation with adaptation. Several institutional weaknesses that impede this transition towards integrated practices can be identified. For instance, addressing variety in during the tender process was a challenge, lack of transparency by the

involved stakeholders and financial lock-ins. The institutional strengths and weaknesses are summarized in Table 10.

Institutional capacity	Institutional strengths	Institutional weaknesses
Intellectual capital	Urban climate maps acted as a common starting point for climate-proofing the neighbourhood	The municipality has been involved at a later stage for the addition of climate adaptation
	Awareness has been created about the necessity of integrating climate mitigation with adaptation	Variety has not been considered in putting a request to the market
	Local knowledge and local wishes have been used as input for the final design of the street	
Social capital	Local knowledge has been exchanged by organising design sessions for inhabitants	Transparency in budgets, goals, and aims of the involved stakeholders has been an issue
	Partnership between WarmteStad and the municipality has been encouraged by the granted subsidy	Cultural differences and the absence of shared values within WarmteStad and the municipality complicated the integration process
	WarmteStad's mobile information point has acted as an arena for knowledge sharing	Neighbourhood organizations are still focusing on either climate mitigation or adaptation
	Support for the construction of the heat grid has been created by communicating a climate policy integration narrative towards the inhabitants	
Political capital	Employees with a so-called sensitivity for the environment have been hired by WarmteStad	It has proven difficult to streamline budgets at the operational level
	Financial gain has been found by combining activities	
	New tools and methods such as stakeholder analyses have been used by WarmteStad	
	Change agents such as project-leaders and the citizens' representative of Co-Creatie have played an important role in keeping in mind the integration of climate mitigation with adaptation	

Table 10 Institutional strengths and weaknesses at the operational level

6.3 Conclusion

The results show that the activities undertaken by the municipality of Groningen and the Paddepoel climate-proof project organisation provided opportunities to build-up institutional capacities, such as intellectual, social, and political capital. Institutional capacities at the strategic level shaped the conditions for implementing a project such as Paddepoel climate-proof. For instance, challenging existing world views and current ways of working still appeared to be difficult at the strategic level. Therefore, during the project Paddepoel climate-proof integrating climate mitigation with adaptation has not always been self-evident. Lessons and best practices have been transferred towards a comparable in the neighbourhood of Selwerd. Here, it is clear from the start why a heat grid should be linked with objectives to make the neighbourhood climate adaptive and what the expected benefits are. In that sense, the municipality has built institutional capacities on a strategic level by implementing a project.

This research showed the importance of a dynamic view on institutional capacity. Research about climate policy integration should therefore not be limited to the analysis of the outcomes of integrated approaches. Consequently, this research contributes to the development of an analytical framework with key activities for building institutional capacities. The results can be used by (Dutch) medium-sized cities to improve their performance regarding climate change measures. The results can be less valuable for the context of small-sized cities. The activities for building institutional capacity require human and financial resources. With regard to human resources, employees with a so-called sensitivity for the environment and talent for integrated thinking have to be part of the team. For smaller municipalities this is often more difficult to attract such people. Furthermore, one can argue that intellectual capital is often limited in smaller municipalities.

6.3.1 Institutional lessons for Groningen and other medium-sized cities

The concept of institutional capacity building can be considered a fuzzy concept evolved in planning theory (Cars et al., 2017; Khakee, 2002; Healey, 1998). Insights and recommendations from this research may support planners and policy makers to develop institutional capacities to cope with the complexity related to climate policy integration. Based on the institutional weaknesses (Table 9 and 10), the following institutional lessons for Groningen and other medium-sized cities can be formulated.

- *Stimulate knowledge exchange*

In order to stimulate double loop learning the stimulation of knowledge exchange between stakeholders involved in climate mitigation and adaptation is suggested on a strategic level. This knowledge exchange can be stimulated by organizing sessions with the different stakeholders about how climate policy integration can be achieved. It is important that next to pluvial flooding, there is also a focus on heat stress and drought. In Groningen the Global Centre on Adaptation offers opportunities for stimulating knowledge exchange. Other municipalities are advised to start collaborations with knowledge institutes for creating a transdisciplinary knowledge base and thereby building up intellectual capital. Furthermore, checklists for area development can be created to make sure opportunities for climate policy integration are utilized.

- *Quantify climate adaptation*

On a strategic level, the second recommendation is to quantify the values for climate adaptation. At the moment, the financial gain is directly clear for climate mitigation measures in contrast to climate adaptation measures. Municipalities are advised to look beyond financial values, such as ecological, social, and psychological values. Examples of the added value of climate adaptation measures could be a decreased percentage in general practitioner visits, increased percentage of biodiversity, and increased percentage of social cohesion. Furthermore, pluvial flooding, drought, and heat stress should be included integrally. When quantifying these values these can subsequently be translated to monetary values and thereby building up social capital. When insight is gained in the saved costs, the financial gain is made clearer for climate adaptation.

- *Stimulate financial innovation*

On a strategic level, municipalities are advised to conduct research on exploring a construction in which climate mitigation can finance climate adaptation. A precondition is the involvement of a public organisation, because the financial benefits of climate adaptation are mainly related to the social domain. Furthermore, by merging existing budgets effectively, there is more to be spent. A precondition is that transparency in goals and aims of the involved stakeholders is guaranteed. New financial constructions can be tested on the basis of pilot projects, i.e. operational level. In order to stimulate financial innovation, the quantification of climate adaptation measures is considered important, i.e. the build-up of political capital.

- *Develop a climate policy integration narrative*

The development of a climate policy integration narrative appeared to be important when integrating climate mitigation with adaptation in urban planning. Having such an overarching story could potentially improve the collaboration between the involved stakeholders and thereby building up political capital. With such an overarching story the reason is clear from the start why stakeholders involved in both climate mitigation and adaptation should work together. Next to a focus on pluvial flooding, heat stress and drought also need to be part of this story. Therefore, municipalities are advised to create this narrative in collaboration with all the involved stakeholders. Furthermore, a climate policy integration narrative could facilitate the financial innovation proposed above. Developing a climate policy integration narrative is important on both the strategical level and the operational level.

- *Invest in new type of civil servant*

The results show that integrating climate mitigation with adaptation in urban planning asks for a new type of civil servant. On a strategic level, municipalities are advised to include criteria in their selection procedure of new employees that represent a so-called talent for integrated thinking, i.e. build-up of political capital. Furthermore, training and education needs to be provided for the existing staff to develop this integrated thinking. Ideally, a civil servant responsible for climate policy integration should be appointed. However, considering capacity issues within medium-sized cities educating and training existing staff is a first step. On the project level, it is important that such new type of civil servants is part of the project team.

- *Carefully select market parties*

When integrating climate mitigation measures with adaptation it is important to make clear agreements about the tender, the selection criteria, and the market parties that need to be involved. The construction of for example a heat grid and the realization of climate adaptation measures are still considered two different worlds. The best way to bring these two worlds together is to organize a tender with specialists from both worlds and select market parties for the tender together. This means that variety also needs to be considered during the tender process, i.e. the build-up of intellectual capital. The results show that it is best to have a municipality in charge of the tender process, because of their experience with addressing variety. Furthermore, people involved in the maintenance of the measures needs to be included at an early stage.

6.4 Reflections

6.4.1 Theoretical reflections

In understanding the relevance of this research, it is important to position this research in the current planning debate. In general, a shift from a technical rationality to a communicative rationality can be observed. A technical approach to planning is top-down, based on facts, sectoral-oriented, and content-related (de Roo, 2017). To the contrary, a communicative approach to planning is bottom-up, based on agreements, intersectoral-oriented, and value-related (de Roo, 2017). The principles of the communicative approach to planning have been fundamental for this research. A focus towards integrated policies and implementation practices can be considered as a shift away from technical rationality. More specific, this research can be positioned in a specific niche of the communicative planning domain, i.e. institutional capacity building theory. The concept of institutional capacity can be considered multi-interpretable and abstract. Research providing recommendations and insights into how institutional capacity can be built for the topic of climate policy integration remains scarce. To bridge the gap, an analytical framework is developed which can be used to study how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning. The analytical framework proved to be a useful analytical lens to analyse the complexity of climate policy integration and to highlight key activities related to the build-up of institutional capacities by medium-sized cities. For this analytical framework the institutional barriers presented in Table 2 were used as an entry point. The activities needed to build institutional capacity are challenging these four main institutional barriers based on Biesbroek et al. (2009). During the data collection these institutional barriers have been recognized in various dimensions. Therefore, the basis of Biesbroek's work can be considered a solid entry point for developing an analytical framework.

Operationalizations of the concept of institutional capacity building have also been done by Laeni et al. (2020) for the context of international flood resilience programs and by Breukers and Wolsink (2007) for the context of ecological modernization. Both Laeni et al. (2020) and Breukers and Wolsink (2007) point out inclusiveness is considered important in building institutional capacities. This research shows comparable outcomes, i.e. the importance of addressing variety. Similar to these researches the challenges for building institutional capacity are related to continuous and reflexive learning (Laeni et al., 2020), financing (Laeni et al., 2020), and joint problem solving and learning (Breukers & Wolsink, 2007).

Developing the analytical framework for analysing and building institutional capacity took up the largest share of this research. Therefore, it is important to reflect on the capitals and activities that comprise this analytical framework. The three capitals (intellectual, social, and political) provided by Cars et al. (2017), Healey (1998), and Khakee (2002) are considered valuable because of the comprehensiveness and holistic nature of the capitals. However, this also means that the operationalization of these three capitals is open to the interpretation of the researcher. Additional activities might be overlooked by the researcher when composing the analytical framework. To illustrate, the activity 'encouraging shared values' have been added to the analytical framework after the data collection has been done. Furthermore, the operationalization of the capitals is again open to the interpretation of the researcher, even though descriptions have been provided.

To illustrate, the activity 'creating transdisciplinary knowledge base' sounds as something tangible. Although it can be argued that this transdisciplinary knowledge is more in people's minds and therefore difficult to measure. Furthermore, the activity 'stimulating double loop learning' has been operationalized as 'challenging existing norms and basic assumptions'. It can be argued that this is a broad operationalization and therefore difficult to measure. In further research one might look into evaluating the learning capacity of organizations. This is what Gutpa et al. (2010) describe as the creation of institutional memory.

Considering the extensive scope of the analytical framework data on a wide range of topics had to be gathered. To illustrate, three capitals with 11 activities in total had to be analysed. Due to limited resources and time the researcher was not able to get into detail on every capital and its related activities. For example, the activity 'stimulating double loop learning' is an extensive concept in itself.

However, the extensive scope of the analytical framework also had an advantage. Analysing all the three capitals for this research provided a holistic understanding of the complexity of climate policy integration. It can be concluded that the analytical framework provided a solid foundation for advancing current knowledge about climate policy integration and can be applied to a broad range of contexts. The relevance of the analytical framework is based on the links with climate policy integration, mainstreaming approaches for climate mitigation and adaptation, and sustainable development. Conducting more interviews would have improved the outcomes of the research. This provides potential for further research for elaborating on the understanding of institutional capacity building for climate policy integration.

6.4.2 Reflections on research design

In this sub-section reflections are made relating to the validity and reliability of the research. External validity means the expected use of the research outcomes. One of the drawbacks of a case study research is that no generalizations can be made (Clifford et al., 2016). According to Biesbroek et al. (2009), the uniqueness of each locality complicates the search for unequivocal spatial planning approaches. However, the aim of this research is not to make general statements, but rather to unravel the complexity of the integration process by using concrete, context-dependent knowledge. In his work, Flyvbjerg (2006) defends five misunderstandings about case study research. One of them is that one cannot generalize from a single or small

number of cases, and therefore, this research design cannot contribute to scientific development. However, Flyvbjerg (2006) argues that this depends on the case. Therefore, the results can be of value for area redevelopment projects with the same characteristics in mid-sized Dutch cities. Furthermore, it can be argued that generalizations are overrated as the main source of scientific development. When knowledge cannot be formally processed in generalizations does not mean that it cannot enter into the collective process of knowledge accumulation (Flyvbjerg 2006). Therefore, a single or small case study approach can be of value for scientific progress without formulating generalizations.

The internal validity indicates the use of correct units of measurements and correct assumptions. What could have influenced the internal validity is a so-called observer bias, this is especially the case with doing observations. Different researchers may assess subjective criteria differently, including assumptions and preconceptions (cognitive biases). This can influence the way a subject is being researched. There are researchers commenting that the case study is highly subjective, by giving too much scope for the researcher's own interpretation (Flyvbjerg, 2006). Hence, influencing the validity of the data. Especially, institutional capacity building is a topic that gives plenty room for own interpretation by the researcher. However, documenting all the steps taken by the researcher can tackle this problem partly, e.g. transcribing and coding data. Additionally, the original quotes are shown to avoid possible loss in interpretation when translating the quotes from Dutch to English. Furthermore, it can be argued that the observer bias is limited, as the researcher does not live in the nearby area of the selected projects. Therefore, there is no reason for the researcher to influence the process or outcome of the projects. An analysis on existing literature strengthens the internal validity as the elements of the analytical framework are examined by many researchers. Another way to strengthen the correct use of units of measurements is to test the interview questions with people that are willing to serve as subjects. In this way, the researcher is able to track down questions that are unclear or questions that could be misinterpreted.

Reliability means that when this research would be repeated by another researcher, the researcher will find comparable outcomes. To increase the reliability of the outcomes multiple sources of evidence are used. In this way, a certain outcome is checked on the basis of multiple data collection methods. According to Olsen (2004) triangulation can widen the understanding of the results and strengthen the reliability of the results. Furthermore, doing the interview with prior knowledge from the document analysis, enables the researcher to fill in knowledge gaps. Another way to increase the reliability is the way in which questions are formulated. During the interviews the researcher tried to ask questions in a neutral way, i.e. questions that are not guiding the participants answers in a certain direction. Lastly, during the interview the researcher tried to summarize parts of the interview in order to avoid misunderstandings.

What could have influenced the reliability of the data obtained during the attended meetings is the so-called Hawthorne effect. This is the alteration of behaviour by subjects due to their awareness of being observed. Furthermore, an informed consent has not been used for the attended meetings. In order increase the reliability of this research, these attended meetings are only used as background information and getting acquainted with the topic and the context instead of using the attended meetings as data to be analysed. Furthermore, due to the COVID-19 pandemic the researcher was forced to conduct all the interviews online via Google Meet. Sometimes the researcher was not able to hear the properly because of technical issues and the researcher experienced a difficulty in interrupting or asking follow-up questions because of the online environment. Also, it is difficult to read body language when conducting

online interviews. An advantage of conducting online interviews is that potential participants are more likely to participate, because of time-efficiency. Lastly, what could have influenced the reliability of the data about inclusiveness of inhabitants is that interviewing inhabitants has not been included in the scope of this research. The experience of inhabitants has been gained by interviewing the citizens' representative of neighbourhood organization Co-Creatie. Therefore, statements about inhabitants might be biased.

6.5 Suggestions for further research

The first suggestion for further research is to study more projects in medium-sized or smaller Dutch cities by testing the analytical framework on how to build institutional capacity. This is especially relevant for the Dutch government. In 2018 the Dutch government proposed to financially support pilot projects that aim to accelerate the transition towards climate adaptation. One of the eligibility criteria for this subsidy is to integrate climate adaptation with mitigation (Kennisportaal Ruimtelijke Adaptatie, 2020). The everyday practices of climate policy integration have been characterized as situational and context dependent by many authors. Therefore, it would be interesting to carry out a comparative research to be able to make better generalizations of the outcomes of the pilot projects. Especially the medium-sized and smaller cities are interesting to research as they might have fewer resources to build institutional capacities compared to larger cities.

In this research the analytical framework has been used to study institutional capacity building. Further research could focus on the translation of this analytical framework into a policy tool to guide planning practitioners. According to Storbjörk and Ugglå (2015) local authorities are in need of recommendations and guidelines for how to integrate climate objectives in urban planning. In addition, there is no framework for climate policy integration in planning practice (Uittenbroek, 2016; Urwin & Jordan, 2008).

At the moment, many projects that aim to combat climate change are labelled as pilot projects. As became clear from the data collection, already many lessons have been learned about integrating a heat grid with climate adaptation measures in the neighbourhood of Paddepoel in Groningen. For further research it would be interesting to analyse how these lessons are being institutionalized. This is what Gupta et al. (2010) refer to as institutional memory. Building institutional capacity seems to be important for innovation and collective learning in order to deal with complex problems.

Lastly, a follow-up on this research might take a longitudinal perspective on integrating climate mitigation with adaptation in urban planning. Both climate mitigation and adaptation have followed their own pathway and have become institutionalized in different ways. Recently, awareness has been created about integrating these two approaches to combat climate change. By analysing the transition from sector-based policies towards integrated and holistic approaches, critical conditions might be identified that contribute to this transition.

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Appendices

Interview guide

Ik ben momenteel bezig met de afronding van de master planologie aan de Rijksuniversiteit Groningen. Mijn afstudeeronderzoek gaat over de koppeling van klimaat mitigatie en klimaat adaptatie. Uit onderzoek komt naar voren dat deze werelden vaak nog erg gescheiden zijn met veel verschillende stakeholders. Voor mijn onderzoek kijk ik specifiek naar het project in Paddepoel (o.a. plutolaan). Waar een warmtenet is aangelegd en de ambitie was om klimaat adaptieve maatregelen mee te koppelen. Maar daarnaast ben ik ook benieuwd naar hoe de koppeling op strategisch niveau geregeld is.

Ik focus mijn onderzoek op de bestuurlijke problemen tijdens het proces. Daaronder versta ik bijvoorbeeld verschillende benaderingen en perspectieven ten aanzien van mitigatie en adaptatie, bepaalde manieren van werken. Met mijn onderzoek hoop ik inzicht te krijgen in hoe vermogen kan worden opgebouwd om de samenwerking tussen de stakeholders te verbeteren. Is dit voor jou een beetje duidelijk?

Introductie

- Zou u uzelf willen voorstellen? (Functie, werkzaamheden)
 - Wat is uw rol binnen het project geweest?
- Kunt u aan mij omschrijven hoe het proces volgens u verlopen is? (Dilemma's)
- Welke bestuurlijke barrières bent u tegengekomen als het gaat om de integratie van mitigatie en adaptatie (samenwerken)?

Door mensen opgelegde structuren die handelen conditioneren (wet en regelgeving, bepaalde manieren van werken, organisatiestructuren)

Leerproces

- Aan wat voor soort kennis is er behoefte?
- In hoeverre is er sprake van intellectueel begrip? (Spreken zelfde jargon)
- In hoeverre is er sprake van integratie van kennis? En zo ja, hoe wordt dit gedaan? (Tools, klimaatkaarten, gezamenlijk probleemdefinitie en perspectief)
- In hoeverre bestaat er openheid en flexibiliteit ten opzichte van nieuwe ideeën en verschillend gedachtegoed?
- Wat is uw ervaring tot het verkrijgen van nieuwe informatie tijdens het project?
- Welke rol speelt lokale kennis voor het koppelen van klimaatadaptatie en mitigatie?

Sociaal kapitaal

- Hoe zou u de relatie tussen stakeholders willen omschrijven? (Verschillende levels en sectoren, netwerken, samenwerking)
 - Wordt iedereen geïncludeerd?
- In hoeverre bestaat er een gedeelde visie bij de betrokken actoren?
- Hoe wordt kennisoverdracht tussen actoren gestimuleerd?
- Hoe wordt er vertrouwen opgebouwd tussen de betrokken actoren?
- Hoe zou u de aard van de bestaande netwerken omschrijven? (Contact tussen stakeholders, formeel, informeel, koppeling tussen bestaande netwerken, omvang)
 - En wat is daar de invloed van op het integratieproces?

Politiek kapitaal (instrumenten & middelen)

- In hoeverre faciliteert bestaande wet- en regelgeving de integratie van mitigatie en adaptatie?
- Wie zijn volgens u sleutelpersonen in het proces? (Functie, werkzaamheden, rol)
- Wie zijn volgens u zogenoemde 'project champions'? (Hardmaken voor het project/integratie)
- Welke momenten/gebeurtenissen tijdens het proces gaven kans om mitigatie met adaptatie te integreren? (Windows of opportunity)
- Zijn er activiteiten georganiseerd die de opbouw van sociaal kapitaal en kennisdeling stimuleren? (Door wie)
- In welke mate zijn hulpbronnen beschikbaar? (Allocatie budgetten, beoordelingsinstrumenten, evaluatie-instrumenten)
 - En wat is daar de invloed van op het integratieproces?

Afsluiting

- Bent u tijdens het proces nog andere institutionele/bestuurlijke problemen tegengekomen die we nog niet besproken hebben?
- Wat zijn volgens u lessen die geleerd kunnen worden van dit project? (Lessen voor de toekomst, toekomstige bottleneck)
 - Concrete voorbeelden
- Hoe zou u een soortgelijk project vormgeven? (Wat wel en niet doen)
- Kent u nog andere personen die bereid zouden zijn om mee te werken aan dit onderzoek?
- Zijn er nog vergaderingen et cetera die ik zou mogen bijwonen?

Code book

Code categories	Sub-categories	Sub-categories	Inductive/ deductive	
Complementarity approach	Parts	Co-benefits	Deductive	
Synergy approach	Whole	Holistic and integrated	Deductive	
Institutional barrier	Difference in scientific approach	Aim measures	Deductive	
		Knowledge production	Deductive	
		Managing uncertainties	Deductive	
	Difference in perspective on time	Temporal scale	Deductive	
	Difference in spatial scale	Spatial scale	Deductive	
		Benefits	Deductive	
	Sectoral approach with regard to involving stakeholders	Involvement stakeholders	Deductive	
		Measuring effectiveness	Deductive	
Implementation approaches		Deductive		
Institutional capacity building activity	Intellectual capital building	Using urban climate maps	Deductive	
		Addressing variety of actors, levels, and scales	Deductive	
		Creating transdisciplinary knowledge base	Deductive	
		Using local knowledge	Deductive	
		Stimulating double loop learning	Deductive	
		Tender	Inductive	
	Social capital building	Creating arenas for knowledge exchange	Deductive	
		Creating transboundary networks	Deductive	
		Encouraging shared values	Inductive	
	Political capital building	Stimulating leadership and change agents	Deductive	
		Allocating shared budget	Deductive	
		Developing a climate policy integration narrative	Deductive	
		Including assessment tools and evaluation methods	Deductive	
		Environmental Planning Act	Inductive	
		Human resources	Inductive	
		External influences	Corona pandemic	

Table 11 Code book

Informed consent

INFORMED CONSENT FORMULIER

Naam van het onderzoeksproject	Implementatie klimaat-mitigerende en klimaat-adaptieve maatregelen
Doel van het onderzoek	Het interview waaraan u deelneemt zal voor meerdere onderzoeksdoeleinden worden gebruikt. Hieronder vallen de onderzoeken van Allard Roest (projectleider Hanze Hogeschool), Allard Roest (PhD Rijksuniversiteit Groningen) en Welmoed Claus (masterthesis Rijksuniversiteit Groningen). Het doel van deze onderzoeken is om meer inzicht te krijgen in de samenwerking tussen gemeenten, gemeentelijk afdelingen, bewoners, bewonersorganisaties en bedrijven op het gebied van klimaatmitigatie en klimaatadaptatie.
Gang van zaken tijdens het onderzoek	Van het interview zal een audio-opname worden gemaakt, zodat het gesprek later woord voor woord kan worden uitgewerkt. Dit transcript wordt vervolgens gebruikt in verdere onderzoeken. Daarnaast is het mogelijk dat er aan de hand van dit transcript vragen zijn bij een van de onderzoekers, in dat geval zal de onderzoeker trachten u te benaderen voor een vervolginterview.
Vertrouwelijkheid van gegevens	<p>Uw privacy is en blijft maximaal beschermd. Er wordt op geen enkele wijze vertrouwelijke informatie of persoonsgegevens van of over u naar buiten gebracht, waardoor iemand u zal kunnen herkennen.</p> <p>Voordat onze onderzoeksgegevens naar buiten gebracht worden, worden uw gegevens geanonimiseerd. Bij de start van het transcriberen krijgt uw naam een pseudoniem. Op deze manier kan wel worden onderzocht wat u in het gesprek aangeeft, maar weten de betrokken onderzoekers niet dat u het bent. De onderzoeker die het interview heeft afgenomen is verantwoordelijk voor dit pseudoniem. De audio-opnamen, formulieren en andere documenten die in het kader van deze studie worden gemaakt of verzameld, worden opgeslagen op de beveiligde (versleutelde) computers van de onderzoekers.</p> <p>In een publicatie zullen anonieme gegevens worden gebruikt. Wanneer citaten worden gebruikt in publicaties zal uw toestemming hier nogmaals voor worden gevraagd. Om uw privacy te waarborgen zal een pseudoniem in de vorm van de functie die u bekleedt en/of de organisatie waarvoor u werkt worden gebruikt, bijvoorbeeld beleidsadviseur klimaatadaptatie bij de gemeente Groningen.</p>

<p>Vrijwilligheid</p>	<p>Deelname aan dit onderzoek is geheel vrijwillig. U hoeft geen vragen te beantwoorden die u niet wilt beantwoorden. U kunt als deelnemer uw medewerking aan het onderzoek te allen tijde stoppen, of weigeren dat uw gegevens voor het onderzoek mogen worden gebruikt, zonder opgaaf van redenen.</p> <p>Als u tijdens het onderzoek of na de bedenktijd van 5 werkdagen, besluit om uw medewerking te staken, zal dat eveneens op geen enkele wijze gevolgen voor u hebben. Echter: de gegevens die u hebt verstrekt tot aan het moment waarop uw deelname stopt, zal in het onderzoek gebruikt worden, inclusief de bescherming van uw privacy zoals hierboven beschreven. Er worden uiteraard geen nieuwe gegevens verzameld of gebruikt.</p> <p>Als u besluit om te stoppen met deelname aan het onderzoek, of als u vragen of klachten heeft, of uw bezorgdheid kenbaar wilt maken, of een vorm van schade of ongemak vanwege het onderzoek, neemt u dan contact op met:</p> <p>a.h.roest@pl.hanze.nl en/of w.claus@student.rug.nl</p>
<p>Toestemmingsverklaring</p>	<p>Met uw ondertekening van dit document geeft aan dat u goed bent geïnformeerd over het onderzoek, de manier waarop de onderzoeksgegevens worden verzameld, gebruikt en behandeld en welke eventuele risico's u zou kunnen lopen door te participeren in dit onderzoek</p> <p>Indien u vragen had, geeft u bij ondertekening aan dat u deze vragen heeft kunnen stellen en dat deze vragen helder en duidelijk zijn beantwoord. U geeft aan dat u vrijwillig akkoord gaat met uw deelname aan dit onderzoek. Indien u daar behoefte aan heeft ontvangt u een kopie van dit ondertekende toestemmingsformulier.</p> <p>Ik ga akkoord met deelname aan een onderzoeksproject van Allard Hans Roest & Welmoed Claus. Het doel van dit document is om de voorwaarden van mijn deelname aan het project vast te leggen.</p> <ol style="list-style-type: none"> 1. Ik kreeg voldoende informatie over dit onderzoeksproject. Het doel van mijn deelname als een geïnterviewde in dit project is voor mij helder uitgelegd en ik weet wat dit voor mij betekent. 2. Mijn deelname als geïnterviewde in dit project is vrijwillig. Er is geen expliciete of impliciete dwang voor mij om aan dit onderzoek deel te nemen. 3. Het interview zal circa 60 minuten duren. Ik geef de onderzoeker toestemming om tijdens het interview opnames (geluid) te maken en schriftelijke notities te nemen. Het is mij duidelijk dat, als ik toch bezwaar heb met een of meer punten zoals hierboven benoemd, ik op elk moment mijn deelname, zonder opgaaf van redenen, kan stoppen.

	<p>4. Ik heb het recht om vragen niet te beantwoorden. Als ik me tijdens het interview ongemakkelijk voel, heb ik het recht om mijn deelname aan het interview te stoppen.</p> <p>5. Ik heb van de onderzoeker de uitdrukkelijke garantie gekregen dat de onderzoeker er zorg voor draagt dat ik niet ben te identificeren in door het onderzoek naar buiten gebrachte gegevens, rapporten of artikelen. Mijn privacy is gewaarborgd als deelnemer aan dit onderzoek. Wanneer citaten gebruikt zullen worden in publicaties wordt mijn toestemming nogmaals gevraagd door de onderzoeker.</p> <p>7. Ik heb dit formulier gelezen en begrepen. Al mijn vragen zijn naar mijn tevredenheid beantwoord en ik ben vrijwillig akkoord met deelname aan dit onderzoek.</p>	
Handtekening en datum	Naam Deelnemer:	Naam onderzoeker:
	Handtekening:	Handtekening:
	Datum:	Datum:

Original quotes

1. “Maar de focus van die afdeling die nu die stresstest in de uitvoeringsagenda verwerkt is wel echt water, water, water. En dat vind ik zelf iets heel jammers. Want eigenlijk wil je gewoon dat water, hitte en droogte allemaal tegelijkertijd wordt aangepakt. Want ja, de oplossingen lijken zo op elkaar. En ook als je, ze hebben ook, en daar moet je *NAAM* maar over vragen. Die hebben hele ontwerp matrixen van hoe ze nou wegen kunnen aanpassen. En dat gaat van verlagen van een ondergrondse berging. Maar het is allemaal water gefocust. Niet dat ze een ontwerp matrix hebben van hey kijk nou eerst of een probleemkoppeling is. Dus dat je iets meer geld kan uitgeven en daarmee twee problemen kan oplossen. Het is allemaal water en zo goedkoop mogelijk.”
2. “En elk stadsdeel krijgt een eigen wijkwethouder met een klein clubje mensen eromheen. Die gezamenlijk eigenlijk proberen aan de ene kant binnen de gemeenteprogramma's te verbinden met elkaar. Koppelingen te leggen tussen verschillende programma's. En aan de andere kant dat ook te verbinden met dat wat er in de wijk gebeurt. En het perspectief vanuit de bewoners.”
3. “Kijk het is sowieso een lastig omdat je gewoon twee verschillende wethouders hebt die je moet bedienen. Ehm, en die willen, ja die willen ook gewoon scoren soms he. Hoe eenduidig, hoe duidelijker een bepaalde boodschap is. Bijvoorbeeld de aanplant van groene bomen. Of aanplanten van bomen. Of zoveel vierkante meter groen dak gerealiseerd of zo. Weet je daar kan een wethouder mee scoren. Dus dat vraagt, het zou heel mooi zijn als je gewoon 1 wethouder hebt die verantwoordelijk is voor de hele duurzaamheids, of voor de combinatie van de energietransitie en klimaatadaptatie. Die gewoon klimaat in de portefeuille heeft.”
4. “Ik denk dat, even kijken wat wou ik zeggen, dat, wat, wat, waardoor de samenwerking soms wat moeilijker kan zijn zeg maar dat energie. Investeren in energie kan je ook terugverdienen. Dus als je overstapt op duurzame energie of juist die energie transitie in gang zet dan zit er ook altijd een soort van verdienmodel achter. En heeft adaptatie niet. Tenminste niet, je kunt natuurlijk wel uitrekenen van naja als we over 50 jaar te maken krijgen met dit soort regenbuien betekent dat de schade van zoveel dus door te investeren in adaptatie voorkom je die schade. Maar dat is altijd achteraf redeneren. En dat is altijd een beetje speculatief. Want ja, het hoeft niet te gebeuren zeg maar die regenbuien die plaatsvinden over 50 jaar. Terwijl, dus daarin zeg maar zit gewoon een andere manier van ja hoe ga je om met de kosten.”
5. “Al aangetoond dat een stuk of 10 woningen water in de woning kunnen verwachten. Nou dat kan misschien wel 2,5 ton gaan kosten. Die schade. Betekent dat nou dat een maatregel, bijvoorbeeld de aanleg van een groot riool maximaal 2,5 ton mag kosten. Dat is eigenlijk iets nog iets waar we zoekende naar zijn. Van wat mag schade nu eigenlijk. Of hoeveel mag de maatregelen eigenlijk maximaal gaan kosten om iets op te lossen?”
6. “Inzichten in hoe de openbare ruimte klimaat adaptief kan worden ingericht, veranderen op dit moment nog regelmatig. Daarom is het lastig om exacte normen voor de ultieme klimaat adaptieve inrichting te formuleren. Anderzijds kunnen we niet meer afwachten. De richtlijnen die we hebben opgesteld, gebruiken we als input voor onze (stedenbouwkundige) ontwerpen en voor onze gesprekken met bijvoorbeeld ontwikkelaars en andere gebruikers/belanghebbenden bij de openbare ruimte.

Hiermee wordt klimaatadaptatie onderdeel van gesprek in alle ruimtelijk, fysieke maatregelen die wij zelf of ontwikkelaars nemen/ontwikkelen. De (on)mogelijkheden van klimaat adaptieve maatregelen worden hierdoor meer dan voorheen verkend.”

7. “De komst van het GCA biedt (economische) kansen voor de regio om onze ‘koplopers rol’ op het gebied van energie en klimaat verder te ontwikkelen. Onze regio is immers al koploper bij energiemitigatie en energietransitie.”
8. “En dat wordt door de gebiedsteams vaak wel, als je daar de goede mensen op hebt, wel goed gekoppeld zeg maar. En daar was dus *NAAM* een voorbeeld van. Die zat in het gebiedsteam. En die ziet dingen gebeuren en die denk van hey. Maar dat moet ook wel in je zitten. Daar moet je wel talent voor hebben. En ik weet niet of zij alle mensen uit gebiedsteams hebben geselecteerd op die goede kwaliteit.
9. “Uiteindelijk gaat het ook heel veel om geld natuurlijk. Dus en dat is de andere tak eigenlijk. Dat je verschillende potjes met geld bij elkaar moet zien te harken zeg maar. En die potjes met geld moeten ook nog op hetzelfde moment bij elkaar komen. En soms kan het zijn dat de ene pot met geld eigenlijk voor dit jaar is. En de andere pot met geld is voor een ander jaar. Maar omdat zich een kans voordoet moet je soms wat schuiven in programma's en begrotingen zodat het wel past. Dat moet je als je wilt gaan samenwerken, vanuit verschillende programma's, moet je die flexibiliteit hebben. Of maken. Om een klein beetje te schuiven en een klein beetje in te schikken. Voor ook je gezamenlijk belang zal ik maar zeggen.”
10. “Eigenlijk is er heel duidelijk een onderscheid voor. Duidelijk hoeveel geld er gereserveerd is voor wateroverlast. En dat staat dan los van bijvoorbeeld hittestress.”
11. “We hebben iets van een miljoen subsidie gekregen van het Rijk voor die klimaat adaptieve maatregelen. Dus dat is een behoorlijk bedrag zeg maar. Als het gaat over meekoppelen dan denk je dat doe je er even bij. En dat hoeft niet zo heel veel extra te kosten. Maar wat mij op viel is dat als je dat echt goed wilt doen. Dat er dus ook flinke kosten aan zitten. Dus dat het nog best wel eens een illusie zou kunnen zijn dat we alles met meekoppelen kunnen oplossen. Maar ja dat is niet echt positief. Maar daar zitten we wel heel erg op. Dus heel erg als er iets gebeurt dan doen we dat gelijk op een klimaat adaptieve manier. Nou daar is nog wel heel wat voor nodig. En zeker nog een heel groot budget voor nodig om dat voor elkaar te krijgen.”
12. “Op onze programma meerjaren onderhoud staat dat we volgend jaar het asfalt gaan vervangen. Ja het is, het is onbegrijpelijk voor inwoners. En ik denk dat je, dat we, je er echt wel aan moet werken om dat anders te moeten doen. Het is als inwoner niet te begrijpen. Als je vaker de weg opengooit voor verschillende klusjes. En daarom moet je gewoon koppelen.”
13. “Ik heb zelf wel eens gedacht zou je bij elke gebiedsontwikkeling een soort checklist moeten hebben. Ik heb he. Al dan niet, dat het via ICT geregeld wordt. Dat als er iets komt dat via elk programma dat daar maar annex mee is of die daar wellicht annex mee is. Een pop-up gaat of een mailtje van dit ligt er. En moeten we hier wat van vinden ofzo. Zodat je nooit een afdeling over kan slaan. Omdat iemand of z'n hoofd er niet naar stond. Of misschien niet dat talent heeft om integraal te werken. Want dat integraal werken moeten we allemaal doen. Maar kan iedereen dat? Ja. Dat is maar de vraag. Dus of je dat formeel moet maken of inderdaad op z'n minst een smoelenboek. Dat. En dat je gewoon checklisten hebt.”
14. “Dus het is uiteindelijk wel goed gekomen, maar mwah het was wel een, eigenlijk een hele vliegende start. De gemeente moest op een rijdende trein springen zeg maar.”

15. “Daar was nog best wel wat gedoe om ook naja iedereen zo ver te krijgen. Want zij zaten natuurlijk al op, op een spoor. Op een lijn. En ze waren eigenlijk al een heel eind op weg toen werd eigenlijk weer een beetje teruggehaald. Zo van ja wacht even dit moet er eigenlijk ook bij.”
16. “En we hebben natuurlijk subsidie aangevraagd op klimaatadaptatie in combinatie met mitigatie. Maar het kwam vanuit het potje klimaatadaptatie. En op een gegeven moment leek het een beetje een zijdingetje te worden. Dan gaat het ineens weer over de weg. Nee, het gaat niet over de weg. Het ging over klimaatadaptatie nadat er zo'n ding in lag.”
17. “Nou in ieder geval voor mij is het duidelijker om bijvoorbeeld te onderzoeken wat is exact het schade beeld. In de Plutolaan wisten we dat er, dat we wateroverlast konden verwachten. Maar hoeveel en waar. En. Dat dus niet. En daar hebben we dus nu ook rekenprogramma's voor. En daar zijn we in Selwerd al wel druk mee geweest. Eigenlijk een programma die weergeeft hoeveel. Nou goed hoe het water stroomt. Je laat er een hele hevige bui op los. En dan lageregelegen gebieden die komen dan onder water te staan. En ja, op zo'n manier kun je dan zien. Ook. En daarnaast kun je dus eenvoudig berekenen wat de effecten zijn van bijvoorbeeld een wadi of het verlagen van een rijbaan.”
18. “We wilden het eigenlijk zo doen dat we een gezamenlijke aanbesteding zouden uitzetten. Voor zowel de mitigatie onderdelen als de adaptatie ding. Bovengronds. En dat is aan het begin. Volgens mij is dat ook allemaal spaak gelopen in eerste instantie. Ook omdat Warmtestad heel veel ervaring heeft met aanbestedingen, maar dan alleen ondergronds. En niet ervaringen met aanbestedingen als het gaat om bovengronds. En wat voor ja. Maar uiteindelijk heeft Warmtestad, heeft die dat allemaal zelf uitgezet. Zonder de gemeente daar goed in mee te nemen. Het hele bestek hebben ze uiteindelijk hun eigen plan getrokken. En dat heeft uiteindelijk wel tot wat vertragingen bij de uitvoering geleid. En volgens mij hebben ze dat nu in de nieuwe samenwerking hebben ze dan gezegd. De aanbesteding moet gewoon via de gemeente lopen. We hebben hier genoeg expertise in huis om dat te kunnen doen.”
19. “Eigenlijk waren de bewoners best wel over eens. Het is grappig dat we eigenlijk, dat hele andere ideeën uitkwamen dan wat de gemeente had bedacht. Dus mensen zeiden van ja ze wilden allemaal wel die weg wat smaller hebben. Nou dat was natuurlijk heel leuk. Toevallig. Want ze zeiden van dan een beetje slingeren. En dwarsparkeren. En dan een soort perkjes met. Naja. Dus niet zo saai, niet zo'n saaie rechte straat. Naja, op zichzelf was dat best al heel leuk. Dus zo ver waren we toen. Toen heb ik nog een tweede bijeenkomst georganiseerd. En daar hebben we eigenlijk besproken over nou de verdere inrichting van wat dan precies. Was iemand die een heel precies bomen plan heeft gemaakt. Want men wilde allemaal verschillende bomen in de straat. Dus dat is vrij uniek. In plaats van 1 rij dezelfde zeiden ze van nee biodiversiteit. Ze wilden echt bomen en struikjes. Zodat je altijd wel iets in de bloei hebt. Of altijd wel ergens. Wat ze niet willen is vallende vruchtjes. Die staan al in de straat, die willen ze dan weg hebben. Nou en zo kwam er een heel aantal dingen.”
20. “Dus dat is best, best, best even lastig. En zeker in de Plutolaan was dat voor het eerst. Dus dan moet je daar wat extra moeite voor doen om zo'n project van de grond te komen. En naar mijn idee in Selwerd Zuid was dat veel meer van wat moeten we precies gaan doen zeg maar. Ging het veel meer al om de inhoud en hoe kunnen we het een zo goed mogelijk project. Dan was het niet meer een vraag of we het zouden doen zeg maar.”

21. “Daar staat onze keet. Ik denk die bereikbaarheid, benaderbaarheid, laagdrempeligheid van ons wel heel erg belangrijk is inderdaad.”
22. “Je bent twee aparte bedrijven/instellingen met allebei je eigen resultaten/doelstellingen. En in dit geval, WarmteStad heeft een businesscase gemaakt op basis van een bepaald groeiscenario. Wij zijn door de gemeente opgericht, mede door de gemeente opgericht om de klimaatdoelstellingen van Groningen te behalen. En dat kan alleen als we een bepaalde groei volgen. En die groei hebben we zeg maar uitgestippeld in ons warmteplan. En aan de hand van dat warmteplan hebben we zeg maar een businesscase gemaakt.”
23. “Op zich was dat nog best wel moeizaam, want WarmteStad die wilde eigenlijk helemaal niet ook nog eens iets met klimaatadaptatie. En dat ze het misschien wel interessant vonden. Zij hadden gewoon zoiets ja wij moeten gewoon het warmtenet aanleggen en dit is gewoon, dit gaan we gewoon doen. En het is alleen maar ingewikkeld en lastig dat we dan ook nog de straat anders moeten inrichten. En dat we met bewoners in gesprek moeten hierover. En daar komen allemaal maar meer kosten bij. Zij wilden gewoon snel en efficiënt.”
24. “Je loopt een compleet ander tempo. En je wordt anders aangestuurd. Om dat te synchroniseren op een of andere manier. Eigenlijk zijn dat twee dingen. De aansturing is iets anders. De, de, waarvan je zeg maar doet wat je doet. En anderzijds het tempo. Je hebt twee verschillende organisaties. De ene organisaties doet de voorbereiding een half jaar en een andere doet het in een jaar of twee jaar of wat dan ook. En om dat samen te brengen. Nou dat is wel echt, dat zie ik nog als de grootste uitdaging.”
25. “Als je gewoon een warmteleiding wil leggen, zo goedkoop mogelijk van A naar B. Dan dien jij daarmee de klant zeg maar.”
26. “Toen kwam nog wel een beetje het lastige proces van ja hoe transparant ben je dan naar elkaar. En daarin merk je dan toch weer die agenda's zitten. Van niet een kijkje in de keuken willen geven van wat kost nou iets. En hoeveel werk en tijd ben je eraan kwijt. Waar je gewoon zegt van doe mij jullie begroting, die kan ik dan gebruiken als co-financiering voor de aanvraag. Nou die krijg je niet zomaar”.
27. “Je moest ook een beetje aan elkaar wennen. En het waterbedrijf is veel strakker dan de gemeente nog. Die zijn wat meer van naja heel erg van doelen, resultaten, check, check, check. Weet je wel. Aftikken. Heel, heel, ja hoe komen we zo snel mogelijk in een rechte lijn van a naar b.”
28. “Dat is wel wat ik ook bedoelde met de projectleider niet zo zeer meer de technaut is. Maar echt iemand met voelsprietjes voor de omgeving. Dat is haast belangrijker op dit moment.”
29. “In de Plutolaan was dat nog even wennen zal ik maar zeggen. Daar kwam ook stadsbeheer ineens aan tafel zitten. Om, om, ja. Die dachten in het begin ook wat gebeurt hier nou. En WarmteStad hetzelfde. En maar als je eenmaal dat bij elkaar hebt. Dan is 1 en 1 3 zeg maar. Dus ja het zijn wel allemaal aparte begrotingen die je op een hoop moet gaan zitten gooien. Dus dat is best, best, best even lastig. En zeker in de Plutolaan was dat voor het eerst. Dus dan moet je daar wat extra moeite voor doen om zo'n project van de grond te komen.”
30. “Dus werd er wat geflyerd in de hele Plutolaan. Een klein flyertje dat heette van modderboel naar goed gevoel. En dat begon ook met de zin van nou straks gaat die straat eruit. En wat wilt u eigenlijk terugzien in die straat?”

Building institutional capacity for climate policy integration: lessons from the city of Groningen



Colophon

Title

Building institutional capacity for climate policy integration: lessons from the city of Groningen

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Preface

Dear reader,

Right in front of you is my master thesis ‘Building institutional capacity for climate policy integration’. This master thesis forms the final part of the master program Environmental and Infrastructure Planning at the University of Groningen. Thereby, it marks the end of my time as a student at the University of Groningen and the Faculty of Spatial Sciences.

During my studies, the necessity of integrated approaches has been elaborated upon. However, research and examples from planning practice show that this is not always the easy way to go. This fascinated me and has been the major driver exploring the topic and writing this research. I am looking forward to further developing my insights and knowledge in the field of planning practice!

A few persons have been very important in writing this thesis. First and foremost, I would like to express my gratitude to dr. Margo van den Brink for the profound feedback. Her enthusiasm about my research topic motivated me to keep improving my academic writing. Secondly, I would like to thank all the participants that were willing to talk to me about the topic of climate adaptation, climate mitigation, and climate policy integration. I am grateful that they were willing to share their knowledge, opinions, and experiences with me. Without them I could not have completed this thesis. Last but not least, a great thanks goes to my family and friends for their encouragement and countless support.

For now, enjoy reading my thesis!

Welmoed Claus

Katlijk, 14th of January 2021

Summary

To cope with the effects of climate change, many scholars and policymakers have considered climate mitigation and adaptation to be necessary. Given the complexity of the problem there is a convincingly need for climate policy to be integrated with other policy areas. Traditionally, climate mitigation and adaptation have been viewed as two independent actions by policy makers. In academia, most studies still analyse climate mitigation and adaptation in isolation. An increasing body of literature shows that the challenges related to climate policy integration are not only technical in nature, but in particular institutional. It can be argued that the divide between climate mitigation and adaptation is mainly a mental construct, which is enhanced by the different ways of framing the problem of climate change and how to solve the problem accordingly. It is the current institutional fabric as a result of this historic dichotomy that makes an integrated approach in urban planning difficult, not the incompatibility of the actions. This dichotomy between the mitigation and adaptation domains has resulted in contrasting ways of working, i.e. different policy concepts, rules, and perspectives.

In this research, a focus on institutional capacity building is recommended to overcome these institutional barriers and to make the transition towards an integrated approach. The build-up of institutional capacity is important because it determines the ability of people to perform effectively its tasks and to be able to cooperate with other stakeholders. This is especially relevant to the issue of climate policy integration, because of its cross-sectoral nature and the various actors involved. Institutional capacity can be considered a fuzzy and multi-interpretable concept. Research providing recommendations and insights into how institutional capacity can be built for the topic of climate policy integration remains scarce. Institutional capacity is operationalized by using three dimensions: intellectual capital, social capital, and political capital. This research focuses on what these three capitals mean in the context of climate policy integration. To bridge the gap, an analytical framework is developed which can be used to study how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning.

The aim of this research is to gain insight in how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning. The aim leads to the following main research questions: *How can medium-sized cities build institutional capacity in order to facilitate the integration of climate mitigation with adaptation in urban planning?* To be able to answer this research question a single embedded case study design is adopted. This means that both data on a strategic level and an operational level is gathered. The selected case is the city of Groningen. Within the city of Groningen, the area-based planning project Paddepoel climate-proof has been selected. In the neighbourhood Paddepoel, the construction of a heat grid was linked to objectives to make Paddepoel climate-proof.

The results of the analysis show the main activities employed by the municipality of Groningen and the project organization Paddepoel climate-proof in relation to the build-up of intellectual, social, and political capital for climate policy integration. Institutional capacities at the strategic level shaped the conditions for implementing a project such as Paddepoel climate-proof. For instance, challenging existing world views and current ways of working appeared to be difficult at the strategic level. Therefore, during the project Paddepoel climate-proof integrating climate mitigation with adaptation has not always been self-evident. Lessons and best practices have been transferred towards a comparable in the neighbourhood of Selwerd. Here, it is clear from the start why a heat grid should be linked with objectives to make the neighbourhood climate adaptive and what the expected benefits are. In that sense, the

municipality has built institutional capacities on a strategic level by implementing a project. This research showed the importance of a dynamic view on institutional capacity. Research about climate policy integration should therefore not be limited to the analysis of the outcomes of integrated approaches.

Recommendations for Groningen and other medium-sized cities are quantifying climate adaptation, stimulating financial innovation, investing in new type of civil servant, carefully selecting market parties, developing a climate policy integration narrative, and stimulating knowledge exchange.

The main contribution to planning theory is the translation of the fuzzy concept of institutional capacity into an analytical framework that can be used to study institutional capacity for in particular integrating climate mitigation with adaptation. Further research could focus on the translation of this analytical framework into a policy tool to guide planning practitioners. Other suggestions are studying more projects in medium-sized and small-sized Dutch cities by testing the presented analytical framework, analysing how lessons are being institutionalized, and taking a longitudinal perspective on integrating climate mitigation with adaptation in urban planning.

Key words: climate policy integration, climate mitigation, climate adaptation, institutional capacity building, communicative planning.

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Chapter 1: Introduction

1.1 Increasing climate change impacts

Today, the impacts of climate change are increasingly becoming visible. It is expected that over the coming decades, weather patterns will become more extreme, resulting in longer periods of heat and drought and more intense rainfall. Especially urban areas are facing the consequences of climate change. In 2006, around half of the world's population was living in cities and this proportion has even risen in the last few years (Hunt & Watkiss, 2011). Furthermore, cities are the center of political and economic activity. Climate change affects the urban environment in multiple ways. On the one hand, floods may cause traffic disruption, nuisance, and damage (Runhaar et al., 2012). In extreme situations, flooding impacts are injuries and deaths, mental health impacts, and economic damages. On the other hand, exposure to heat stress is a global threat to human health and well-being, affecting the liveability of cities (Harlan et al., 2006). Overall, urban flood, heat, and drought hazards will increase in the future (Liang, 2019).

In order to reduce the undesirable consequences of climate change the focus has been in the first place primarily on mitigating climate change. Internationally, several countries around the world have shown their commitment to mitigate greenhouse gasses. In the so-called Paris Agreement in 2015, a temperature goal of holding the increase in the global-mean temperature below 2 degree Celsius is agreed upon (Mengel et al., 2018). Often climate mitigation is considered a global issue (Qi et al., 2008). However, it can be argued that climate mitigation is a multi-level issue (Lee & Koski, 2015), i.e. measures at the local level are part of this. To fulfil this international commitment, the Dutch government has the ambition for 7 million houses and 1 million buildings to be free of natural gas by 2050 (Ministerie van Binnenlandse Zaken, 2020).

However, to cope with the increasing impacts of climate change, next to mitigation efforts intensified adaptation is needed (Runhaar et al., 2018; Biesbroek et al., 2009; Dang et al., 2003). Attention is now turning to the consideration of the impacts of climate change itself. On a local scale, in particular adaptation to these increased climate change impacts is needed (Castán Broto, 2017; Pasquini et al., 2013). In the Delta Program on Spatial Adaptation, the ambition for the Netherlands to be climate-proof in 2050 is expressed by the Dutch Government (Rijksoverheid, 2019).

1.2 A need for climate policy integration

Many scholars and policymakers have considered climate mitigation and adaptation to be necessary in policy sectors such as agriculture, public health, critical infrastructure, and urban planning (Runhaar, et al., 2018; Root et al., 2015). According to Tasan-Kok et al. (2013) it is widely accepted that urban planning has a critical role in building urban climate resilience. The spatial configurations of urban areas have significant implications for both mitigation and adaptation measures. Given this complex cross-sector nature of the climate problem, there is a convincingly need for climate policy to be integrated with other policy areas (Adelle & Russel, 2013). Stand-alone approaches to climate mitigation or adaptation addressing specific climate risks are considered ineffective, because they ignore the ways in which local and wider contexts determine people's vulnerability (Ayers et al., 2014). The expected benefits from climate policy integration are multitude, e.g. increased coherence among policies (Rauken et al., 2015), more

effective measures (Kok & de Conink, 2007; Uittenbroek, 2016), resource efficiency (Runhaar et al., 2018; Uittenbroek, 2016), increased opportunities for innovation (Uittenbroek et al., 2013), and creation of synergy effects.

Despite the benefits, the progress of policy integration in general and climate policy integration specifically has been limited on a global scale (Kok & de Coninck, 2007; Hartmann & Spit, 2014). Although, the Netherlands is well-known for its experience with the integration of environmental objectives within other policy sectors (Uittenbroek et al., 2013). According to Runhaar et al. (2009) a gradual change from sectoral, generic, and norm-based planning towards more integrated approaches can be observed in the Netherlands. However, policies that do include climate change impacts tend to focus on either mitigation or adaptation rather than a combination of these two approaches (Biesbroek et al., 2009). Traditionally, climate mitigation and adaptation have been viewed as two independent actions by policy makers (Berry et al., 2015).

The Delta Program on Spatial Adaptation expresses the need to combine climate adaptive measures with other objectives such as the energy transition (Rijksoverheid, 2019). At the moment, there is no national policy on how to undertake the integration of climate mitigation with adaptation in urban planning. This means that it is up to the Dutch cities to figure out how to give meaning to the ambition set by the Dutch national government. This implies a major challenge for Dutch cities in the upcoming decades to accelerate this transition towards integrated solutions. Until now there is a limited number of projects in the Netherlands as successful examples that integrate climate mitigation with adaptation.

Also, in academia, most studies still analyse climate mitigation and adaptation in isolation (Grafakos et al., 2020). Especially, the interactions between climate mitigation and adaptation have rarely been researched (Di Gregorio et al., 2017; Swart & Raes, 2007). According to Duguma et al. (2014) there is limited knowledge about how to move from the current dichotomized approach to an integrated approach, i.e. barriers and opportunities, potential challenges, and steps that need to be taken. In-depth research is needed on how to undertake (Adelle & Russel, 2013) and how to achieve (Meijers & Stead, 2009) climate policy integration. In their research Biesbroek et al. (2009) indicate several institutional barriers as reasons why integrating climate mitigation with adaptation in urban planning appeared to be difficult. Key barriers include differences in scientific approaches, differences in measurements of effectiveness, and differences in policy concepts. It can be argued that those barriers are mainly a mental construct, which is enhanced by the different ways of framing the problem of climate change and how to solve the problem accordingly, i.e. institutional barriers (Biesbroek et al., 2009). It is the current institutional fabric as a result of this historic dichotomy that makes an integrated approach in urban planning difficult, not the incompatibility of the actions. This dichotomy between the mitigation and adaptation domains has resulted in contrasting ways of working. In this regard, existing institutions condition the process of climate policy integration.

An increasing body of literature advocates that an understanding of institutional barriers is required in achieving mitigation or adaptation (Næss et al., 2005; Brown & Farrelly, 2009). More related to this research, Storbjörk and Hedrén (2011) argue that increased knowledge is needed on how institutions enable or limit the integration of climate objectives in policymaking. For instance, according to Cuevas et al. (2016) building institutional capacity is crucial to the integration process. Research of Restemeyer et al. (2015) show that in particular

urban climate policy integration requires capacity building among private as well as public stakeholders. However, empirical research needs to be done in order to understand how institutional capacity can be built for integrating climate mitigation with adaptation in urban planning.

Considering the predictions of further growth in cities in terms of economic activities, inhabitants, and related consumption patterns, cities are of importance in developing strategies to mitigate and adapt to climate change. According to Hoppe et al. (2016) the scientific debate on local climate policy integration has largely focused on large-sized cities. In comparison, little attention has been given to medium-sized or small cities. On the contrary, one may argue that medium-sized or small cities are more constrained in the resources they have compared to larger cities, e.g. leadership capacities, financial resources, and staffing (Grafakos et al., 2020; Hoppe et al., 2016). Therefore, this observation stresses the relevance of researching medium-sized cities, as limited resources may hinder the process of building institutional capacity.

1.3 Problem statement

The aim of this study is to gain insight in how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning. The aim of this research leads to the following main research questions:

How can medium-sized cities build institutional capacity in order to facilitate the integration of climate mitigation with adaptation in urban planning?

Secondary research questions are set up to be able to answer the main research question.

5. How can institutional capacity building for climate policy integration be conceptualized and developed into an analytical framework?

An analysis of existing scientific literature will result in an analytical framework. This is relevant for the other secondary questions, as this analytical framework will be used to study institutional capacity building activities. This analytical framework is shown in Chapter 2.6.

6. Which activities are undertaken by the municipality of Groningen for building institutional capacity on a strategic level to integrate climate mitigation with adaptation in urban planning?

Information for this secondary question will be derived from documents and interviews with relevant stakeholders (described in Chapter 3). This will provide information in particular on the current municipal context. The results are discussed in Chapter 4.

7. Which activities are undertaken by the Paddepoel climate-proof project organisation for building institutional capacity on an operational level to integrate climate mitigation with adaptation in urban planning?

Information for this secondary question will be derived from documents and interviews with relevant stakeholders (described in Chapter 3). This will provide information in particular on the current operational context. The results are discussed in Chapter 5.

8. Which lessons can be drawn about building institutional capacity from the selected case study?

Information for this secondary question will be derived from documents and interviews with relevant stakeholders (described in Chapter 3). Recommendations for Groningen and other medium-sized cities on how to build institutional capacity for climate policy integration are presented in Chapter 6.

1.4 Theoretical approach

Climate policy integration is a much-debated topic by many scholars (Adelle & Russel, 2013; Lenschow, 2002; Urwin & Jordan, 2008). Nevertheless, according to Adelle and Russel (2013) climate policy integration has received insufficient attention in the academic debate. In particular, only a few scholars have explained the process of climate policy integration (Uittenbroek et al., 2013). In this research climate policy integration is defined as “the integration of climate change considerations in existing and/or new policies – as well as concrete planning and decision-making practices – at different administrative and political scales as well as in different geographical settings” (Storbjörk and Hedrén, 2011, p. 265). Explicit reference is made to integrating the two climate change objectives, i.e. climate mitigation and adaptation. This research elaborates on the work of Uittenbroek et al. (2013). They suggest that it is important to enlarge research on opportunities and barriers for integrating climate change objectives in order to expand the understanding of the process. Drawing on the work of Biesbroek et al. (2009), this research is built on four institutional barriers, namely a difference in scientific approach, a difference in perspective on time, a difference in spatial scale, and a sectoral approach with regard to involving stakeholders.

In this research, a focus on institutional capacity building is adopted to overcome these institutional barriers to be able to move towards integrated approaches. Institutional capacity is considered important because it determines the ability of people to perform effectively its tasks and to be able to cooperate with other stakeholders (Brown & Farrelly, 2009). The concept of institutional capacity can be considered multi-interpretable and abstract. Operationalizations of the concept have been done by Laeni et al. (2020) for the context of international flood resilience programs and by Breukers and Wolsink (2007) for the context of ecological modernization. However, research providing recommendations and insights into how institutional capacity can be built for the topic of climate policy integration remains scarce. Drawing on research of Cars et al. (2017), Khakee, (2002), and Healey (1998), institutional capacity is operationalized by using three dimensions: intellectual capital, social capital, and political capital. This research focuses on what these three capitals mean in the context of climate policy integration. Therefore, these capitals are linked with solutions put forward in research on climate policy integration (e.g. Hartman & Spit, 2014) and Swart et al. (2013), research on sustainable development in general (e.g. Polk, 2011; Payne & Shepardon, 2015), and research on the mitigation-adaptation dichotomy (e.g. Willbanks, 2005; Biesbroek et al., 2009; Laukkonen et al., 2009; Grafakos et al., 2019; Duguma et al., 2014; Klein et al., 2009; Berry et al., 2015). To bridge the gap, an analytical framework is developed which can be used to study how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning.

1.5 Research design

A single embedded case study design is adopted to understand how institutional capacity can be built for integrating climate mitigation with adaptation in urban planning. In an embedded case study design, there are multiple units of analysis (Yin, 2009). In this research, data has been collected both at a strategic level and operational level, i.e. on a municipal level and project level. Institutional capacity at a strategic level is needed to be able to develop integrated practices, i.e. policy formation. And thereby setting the institutional context for implementing projects. On the contrary, implementing projects can be regarded as a way to build institutional capacity at the operational level, which can also stimulate institutional capacity building at the strategic level.

The selected case is the city of Groningen. Groningen has been selected because it is positioning itself as a frontrunner in both climate mitigation and adaptation. Recently, the Global Centre on Adaptation has been established in the city of Groningen and a Climate Adaptation Week is being organized. Within the city of Groningen, the area-based planning project Paddepoel climate-proof has been selected. In the neighbourhood Paddepoel, the construction of a heat grid was linked to objectives to make Paddepoel climate-proof (Gemeente Groningen, 2020). The selected project has been labelled as a pilot project. This implies a focus on learning and acquiring knowledge, which makes the project an interesting case to be researched.

Primary data is collected by conducting semi-structured interviews and doing observations. Secondary data consists of documents, including policies, newspapers, and articles. The data obtained by the semi-structured interviews, observations, and the documents is analysed by coding the data using the Atlas.ti software.

1.6 Societal and scientific relevance

The results of this research are valuable both theoretically (i.e. how the build-up of institutional capacity for climate policy integration is understood) and in practice (i.e. a better integration of climate mitigation with adaptation in urban planning). Regarding planning practice, the results can be used by (Dutch) medium-sized cities to improve their performance regarding climate change measures. According to Santhia et al. (2018) municipalities often have difficulties with integrating climate change perspectives into urban planning. According to Storbjörk and Uggla (2015) local authorities are in need of recommendations for how to act. Based on the findings lessons for institutional reform can be formulated for medium-sized cities. In addition, there is no framework for climate policy integration in both planning practice and academia (Uittenbroek, 2016; Urwin & Jordan, 2008). Especially the concept of institutional capacity has remained fuzzy for the topic of climate policy integration. To answer this call, this research can provide insights in what should be part of an analytical framework for building institutional capacity. This analytical framework can be used to study institutional capacity for in particular integrating climate mitigation with adaptation.

In general, the results of this research can facilitate an acceleration in the transition towards urban climate resilience. Resilience of complex systems, such as urban areas, is often conceptualized as the ability to resist, recover, adapt, and transform from shocks (Laeni et al., 2019; Restemeyer et al., 2015; Davoudi, 2012). Mitigation can increase the robustness of an urban system, whereas adaptation can increase the acceleration for recovering from a shock

(Tasan-Kok et al., 2013). It is also argued that the institutional capacity of individuals is closely connected to resilience (Tyler & Moench, 2012). Building institutional capacity contributes to the capacity for innovation and learning in order to foster transformation of a system. Therefore, the capacity of social agents covers an important part of urban climate resilience.

1.7 Outline of the thesis

In this chapter the scope of this research has been explained and motivated. Also, the main research question and secondary questions are presented. In Chapter 2 institutional capacity building is operationalized using literature on integrating climate mitigation with adaptation, resulting in an analytical framework. Chapter 3 contains the research design, consisting of the selected case, methods for data collection and analysis, and research ethics. The findings about the strategic level are presented in Chapter 4. The findings about the operational level are presented in Chapter 5. Lastly, conclusions, discussion points, and recommendations are given in Chapter 6. The references used in this research can be found in Chapter 7.

Chapter 2: Institutional capacity building for climate policy integration

This chapter provides an overview of relevant theories, which enables the researcher to operationalize key concepts. First, the concept of urban climate resilience is introduced. Subsequently, the complexity of integrating climate mitigation with adaptation is examined, including the institutional barriers. Then, the necessity of building institutional capacity is elaborated upon. Thereafter, institutional capacity has been operationalized for the topic of climate policy integration. As a result, an analytical framework with activities on how to build institutional capacity for integrating climate mitigation with adaptation in urban planning is shown.

2.1 Urban climate resilience

Climate change is expected to result in more extreme weather events (Dieperink et al., 2016). Therefore, the probability of extreme weather events is increasing. However, climate change impacts do not only concern the probability, but also the impact it has on society. In that sense, climate change impacts are the function of on the one hand the climate hazard and on the other hand the consequences of the impacts (Vis et al., 2003). The consequence factor is exacerbated by socio-economic changes, such as economic growth, population growth, terrestrial changes, and urbanization (Mitchell, 2013; Sörensen et al., 2016). In general, urbanities are highly populated and densely built (Uittenbroek, 2016). Rapidly urbanizing cities are experiencing increasing hazards due to the consequences of climate change in combination with increasing value of existing assets (Hunt & Watkiss, 2011). Thus, climate hazards are increasing because of an increase in the chance (as a result of climate change) plus an increase in the impacts (as a result of continuous urbanization).

In order to anticipate and prepare for environmental challenges there is an increasing demand for cities to become resilient (Laeni et al., 2019). Resilience for complex systems, such as urban areas, is often conceptualized as the ability to resist, recover, adapt, and transform from shocks (Laeni et al., 2019; Restemeyer et al., 2015; Davoudi, 2012). Generally, two strategies can be distinguished to reduce the undesirable consequences of climate change: climate mitigation and climate adaptation (Swart & Raes, 2007). Urban climate resilience is the overarching goal, whereas climate change mitigation and adaptation are the methods to achieve this objective of reducing vulnerability (Hamin & Gurran, 2009). Mitigation can increase the robustness of an urban system, whereas adaptation can increase the acceleration for recovering from a shock (Tasan-Kok et al., 2013). In first instance, climate mitigation and adaptation seem to be two separate approaches. However, in the next sub-section the interrelatedness of climate mitigation and adaptation is explained.

2.2 The complex relation between climate mitigation and adaptation

Climate mitigation refers to “implementing policies to reduce greenhouse gas emissions and enhance sinks (Boucher et al., 2014, p. 24). Therefore, climate mitigation strategies are directly focused on the causes of climate change. In the international debate, the focus has been considerably on mitigating climate change (Klein et al., 2005). Today, however, there is growing recognition that mitigation measures alone are not sufficient to combat the impacts of climate change (Runhaar et al., 2018). Considering the lag times in the global climate

system, mitigation strategies are not going to prevent climate change from happening (Klein et al., 2005). Therefore, next to mitigation efforts intensified adaptation is needed. Climate adaptation can be defined as “initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects (Boucher et al., 2014, p. 25). Nevertheless, reliance on climate adaptation only would ask very high social and economic costs for effective adaptation considering the magnitude of climate change (Klein et al., 2005). Therefore, still intensified mitigation efforts are also needed. According to Wilson & Piper (2010) effective climate policy is aimed at reducing the risks of climate change and therefore requires both climate mitigation and adaptation actions. Where mitigation strategies focus on reducing the probability of a climate hazards, adaptation strategies aim to reduce the consequences of climate hazards. As Laukkonen et al. (2009, p. 288) put it: ‘mitigation aims to avoid the unmanageable and adaptation aims to manage the unavoidable’.

Often climate mitigation is considered a global issue (Qi et al., 2008; Swart & Raes, 2007; Laukkonen et al., 2009). International regimes generally target on one particular issue (Gustavsson et al., 2009), for example reducing emissions by restrictions on polluting airplanes. However, it can be argued that mitigation is a multi-level issue (Lee & Koski, 2015), i.e. measures at the local level are part of this. Swart & Raes (2007) add to this that concrete mitigation actions involve decisions made at the local level. According to Sharp et al. (2011), an increasing number of local governments are addressing global climate change by setting up mitigation policies. This is surprising, since those cities are addressing a transboundary environmental problem (Zuidema, 2016). When a city is reducing greenhouse gas emissions and nearby cities do not, the overall greenhouse gas emissions in an area may not change considerably, making the mitigation debate highly controversial (Laukkonen et al., 2009). Despite the spill over effect, it is increasingly becoming clear that climate change will have an impact on cities (Holgate, 2007; Grafakos et al., 2020). Simultaneously, urban areas contribute greatly to greenhouse gas emissions (Grafakos et al., 2020; Grafakos et al., 2019). Examples of measures on a local scale that may reduce greenhouse gas emissions are the installation of alternative heat suppliers, the cascading of energy in a smart way, the spatial adjustment of a traffic system, and the saving energy by considering the location of new urban areas (Wende et al., 2010). These mitigation strategies are considered by many scholars as insufficient to avoid the climate change impacts, which further increase the need for adaptation measures (Runhaar et al., 2018; Biesbroek et al., 2009).

To differing extents, governments have developed adaptation strategies at both the national level and local level (Dannevig et al., 2012). Although, national policies on climate adaptation are the minority compared to its local variants. Climate adaptation is usually framed as a local issue (Castán Broto, 2017; Pasquini et al., 2013), reflecting the fact that climate change impacts are experienced locally. Since climate change impacts show local variations, it is assumed that much adaptation measures are best managed locally (Rauken et al., 2015). In the context of this research, adaptation strategies can be characterized as: all pro-active measures taken aiming to reduce climate hazards, directly or indirectly. It is a planning action to limit unwanted impacts of intensifying and increasing precipitation patterns. Although the seemingly contrasting scales in which climate mitigation and adaptation actions operate, these strategies are intrinsically interlinked (Laukkonen et al., 2009).

Research by many scholars has shown that often both above-described strategies are considered as separate approaches for dealing with climate change (Biesbroek et al., 2009;

Berry et al., 2015; Duguma et al., 2014). This is generally referred to as the mitigation-adaptation dichotomy (Biesbroek et al., 2009). A dichotomy can be described as classification or separation into two categories. Today, climate mitigation and adaptation are still implemented independent from each other, being addressed by different actors at different scales (Duguma et al., 2014). It is recognized by multiple researchers that this mitigation and adaptation divide needs to be closed (Laukkonen et al., 2009). To illustrate, a higher level of climate mitigation could demand less adaptation measures and vice versa (Duguma et al., 2014; Swart & Raes, 2007). Striking the balance between climate mitigation and adaptation will be challenging, because the options vary per location and time (Klein et al., 2005). As a result, there is no single best mix of climate mitigation and adaptation.

The interrelationship between climate mitigation and adaptation can be considered a complex relationship. It is important to unravel this complexity to be able to avoid conflicts, consider trade-offs, and capture potential synergies (Berry et al., 2015). Moreover, considering this complex relationship between climate mitigation and adaptation a holistic approach is required, i.e. a synergy approach (Berry et al., 2015). According to Duguma et al. (2014) it is in particular land use planning that transcends the mitigation and adaptation divide, as both climate mitigation and adaptation have a spatial dimension (Biesbroek et al., 2009). As Laukkonen et al. (2009, p.289) express: “within the built environment, incorporating both mitigation and planning structures (roads, parks, buildings shells and structural integrity) can last at least 50-150 years and are defined by functionality and spatial planning”.

2.3 Towards a synergy approach for climate policy integration

Climate policy integration is a much-debated topic by many scholars (Adelle & Russel, 2013; Lenschow, 2002; Urwin & Jordan, 2008). In related strands of the climate policy integration literature, the terms proofing and mainstreaming are used instead or alongside integration (Adelle & Russel, 2013). Storbjörk and Hedrén (2011, p. 265) define climate policy integration as “the mainstreaming of climate change considerations in existing and/or new policies – as well as concrete planning and decision-making practices – at different administrative and political scales as well as in different geographical settings”. Lafferty and Hovden (2003) developed the idea of policy integration along two dimensions, i.e. horizontal and vertical policy integration. Horizontal policy integration refers to sectoral integration. Whereas vertical policy integration refers to intergovernmental integration. In this research explicit reference is made to integrating the two climate change objectives, climate mitigation and adaptation, in urban planning, i.e. horizontal policy integration. It should be noted, however, that the importance of the relationship between the vertical and the horizontal dimension of policy integration is acknowledged (Lafferty & Hovden, 2003). Effective policy integration is being pursued when a combination of both vertical and horizontal policy integration is in place. Today, the importance of integrating climate mitigation and adaptation in urban planning is stressed by both academia and planning practice (VijayaVenkataRaman et al., 2012). In their 5th Assessment Report, the Intergovernmental Panel on Climate Change calls for the need of a form of development that combines climate mitigation and adaptation in order to pursue sustainable development (Di Gregorio et al., 2014). Roof gardens provide such an example (Laukkonen et al., 2009). Green roofs can help mitigating climate change by providing cooler inner buildings and sinking carbon. Next to that, they help slowing down flooding during heavy rainfall.

The expected benefits from climate policy integration are multitude, e.g. increased coherence among policies (Rauken et al., 2015), more effective measures (Kok & de Conink, 2007; Uittenbroek, 2016), resource efficiency (Runhaar et al., 2018; Uittenbroek, 2016), increased opportunities for innovation (Uittenbroek et al., 2013), and creation of synergy effects (Adelle & Russel, 2013; Brouwer et al., 2013). Duguma et al. (2014, p. 421) defined synergies as “combined or co-operative effects – literally, the effects produced by things that operate together (parts, elements or individuals). Classically, it has the context that effects produced by the wholes are different from what the parts can produce alone”. Such measures additional benefits, producing win-win situations (Klein et al., 2005). According to Uittenbroek et al. (2013) synergies become most obvious at the local level. The degree of synergy effects can be placed along a continuum (Duguma et al., 2014):

4. Policies and strategies that promote climate mitigation measures with adaptation benefits *or* adaptation measures with mitigation benefits (referred to as co-benefits by Grafakos et al., 2020).
5. Policies and strategies that promote both climate mitigation *and* adaptation measures, however not in an integrated way. It is important to notice that in this approach also co-benefits can become visible.
6. Policies and strategies that promote the integration of climate mitigation with adaptation measures.

Today’s practices show that there is limited attention to the last point. However, this last point is fundamental to progress along the synergy continuum (Duguma et al., 2014). Although, the provision of co-benefits is considered a necessary step towards synergy, a synergy approach goes further as it considers the interconnections and interaction between the different measures.

In general, two different approaches can be distinguished, i.e. the complementarity approach and the synergy approach. The differences between both strategies are shown in Table 1.

	The complementarity approach	The synergy approach
Goal	Reducing the negative consequences of climate change by addressing climate mitigation and adaptation in such a way that either of the two measures is used as an entry point providing the other measure as a co-benefit	Reducing the negative consequences of climate change by addressing climate mitigation and adaptation within a holistic framework without prioritizing one of the two measures
Approach	The parts are prioritized and therefore the focus is on stand-alone interventions	The whole is more important than the parts and therefore the focus is on an integrated approach
Design	Often a top-down approach is used	Multiple stakeholders should be involved in the design

Table 4 Differences between the complementarity approach and the synergy approaches to climate mitigation and adaptation in land use planning (Duguma et al., 2014)

It should be noted however, that climate mitigation and adaptation actions do not always complement each other but can be counterproductive as well (Laukkonen et al., 2009). Especially, when these strategies are not coordinated under a shared vision. In research of Grafakos et al. (2020) a distinction is made between negative (trade-offs and conflicts) and positive (synergies and co-benefits) interrelationships. A conflict is a measure that undermines or counteracts another measure (Grafakos et al., 2019). An example of a conflict is provided by Laukkonen et al. (2009). High density urban areas give the opportunity to cascade energy and stimulate the use of slow mobility in order to reduce emissions. At the same time, a dense-built environment increases the likelihood of urban flooding. And in addition, high densities in urban areas reduce the possibility to incorporate urban greenery. Conversely, climate adaptation measures can also be in conflict with mitigation measures (Klein et al., 2005). To illustrate, the construction and manufacturing of infrastructural adaptive measures causes an increase in greenhouse gas emissions. Trade-offs includes the balancing of climate mitigation and adaptation measures, when for example it is for example not possible to carry out due to financial obstacles (Grafakos et al., 2019). These measures can be conflicting sometimes.

In this research, the above-described synergy approach is taken as a basis, because this approach considers the complex relationship between climate mitigation and adaptation. To move along this continuum, ranging from the complementarity approach to the synergy approach, the process of integrating climate mitigation with adaptation in urban planning is faced with multiple barriers. Especially institutional barriers are considered an obstacle when integrating climate objectives into other policy domains, as it would lead to greater institutional complexity (Locatelli et al., 2015).

2.4 Institutional barriers to climate policy integration

North (1991, p. 97) defines institutions as “the humanly devised constraints that structure political, economic and social interactions”. Shortly, institutions consist of the structure that humans impose in their dealing with each other (North, 1990). In other words, institutions are the informal and formal rules that condition human interactions (Brown & Farrelly, 2009). Formal institutions consist of laws, plans and programs of action, organizations, and regulations (Alexander, 2005). Informal rules include conventions, norms and behaviour, and self-appointed codes of conduct (North, 1990). Helmke & Levitsky (2014, p. 727) define these informal rules as “socially shared rules, usually unwritten, that are created, communicated, and enforced outside of officially sanctioned channels”. This means that informal institutions are seen as social constructs that are re-created by means of interaction between actors. According to Helmke & Levitsky (2004) the performance of formal institutional arrangements is often shaped by informal structures in unexpected ways. Together these formal and informal institutional arrangements comprise the rules of the game (North, 1990). Organizations can be regarded as the players. Drawing on the work of Biesbroek et al. (2009) the remainder of this section discusses four main institutional barriers related to the integration of climate mitigation with adaptation in urban planning.

The first institutional barrier to climate policy integration is the difference in scientific approach (Biesbroek et al., 2009). To illustrate, strategies for mitigation are mainly formulated on the basis of information from a limited number of scientific bodies of thought, e.g. economics and technology. This sectoral perspective influences the framing of the problem.

For formulating mitigation strategies quantitative models are used to produce highly specialized knowledge. According to de Roo (2017) this can be referred to as a technical-rational approach to understanding and solving the problem. It could be questioned whether such a positivistic approach is a valuable approach to combat climate change, as it takes the actual problem out of the broader socio-economic context. To the contrary, adaptation strategies require context specific information to be able to tailor made measures (Biesbroek et al., 2009). This is needed because of the heterogeneity of actors involved in the process, i.e. different values and perspectives of stakeholders. It needs the inclusion of various groups to require not only local knowledge, but also the translation of information into a learning process (Laukkonen et al., 2009). In general, it can be said that for adaptation strategies a social constructionist approach is adopted, where in contrast to positivism, reality is socially constructed (Gergen & Gergen, 1991). According to de Roo (2017) this can be referred to as a communicative-rational approach to understanding and solving the problem, which can be regarded as the opposite of the technical-rational approach. At the moment, the different scientific approaches and the related contrasting ways of producing knowledge strengthens the barriers to successful integration (Biesbroek et al., 2009).

What adds to the difficulty of integrating climate mitigation strategies with adaptation strategies is the lack of knowledge. First of all, land-use planners have to deal with uncertainties related to the topic of climate change (Werritty, 2002). Over the last years knowledge regarding causes and effects of climate change have increased. However, much uncertainty is remaining about the time, the degree and the manner in which local communities will be affected (Hartmann & Spit, 2014). Furthermore, it is difficult to predict consumption patterns (Klein et al., 2005), and demographic and socio-economic shifts (Laukkonen et al., 2009). Hesitation to act can be a result of these uncertainties. How to cope with and react upon these uncertainties differs per rationality, either technical or communicative.

The second institutional barrier that reinforces the mitigation-adaptation dichotomy is the difference in perspective on time (Biesbroek et al., 2009), as the perspective on time conditions the effectiveness of the measures. The reducing of greenhouse gasses tends to focus attention on long-term mitigation whilst adapting to climate change is considered a short-term solution (Swart & Raes, 2007; Landauer et al., 2015). Climate mitigation actions must be pursued to combat the causes of climate change in the long run. The benefits of climate mitigation actions will be evidenced in a couple of decades, as a result of the long residence time of greenhouse gases in the atmosphere (Klein et al., 2005; Wilbanks et al., 2003). On the short-term, climate adaptation measures are needed to reduce the expected impacts from climate change. Climate adaptation actions would be effective immediately (Klein et al., 2005; Wilbanks et al., 2003). From a temporal perspective, the divide between climate mitigation and adaptation has been aggravated due to the fact that mitigation strategies predominantly are proactive or anticipatory whereas adaptation strategies most of the time are considered reactive (Biesbroek et al., 2009; Wilbanks et al., 2003). This indicates that both strategies follow a different time path. As the effects of climate change often become visible on the long-term, measures for mitigation or adaptation can quickly transform into a so-called weak interest in urban planning decisions (Hartmann & Spit, 2014). According to Zuidema (2016) such a weak profile tends to constrain willingness of decisionmakers to pursue proactive, ambitious and hence integrated policies.

The third institutional barrier that influences the integration process is the difference in spatial scale. Climate mitigation is mostly focused on resolving a global problem, whereas climate adaptation is mostly focused on addressing a local problem (Berry et al., 2015; Biesbroek et al., 2009, Swart & Raes, 2007). Often climate mitigation actions are associated with top-down implementation approaches and agreements (Wilbanks & Sathaye, 2007). Since many adaptation actions are implemented locally, bottom-up approaches are associated with climate adaptation. What also widens the gap between mitigation and adaptation is the difference of beneficiaries per spatial scale, whilst implemented at the same scale (Swart & Raes, 2007; Klein et al., 2005). Climate mitigation actions mainly benefits others, i.e. an altruistic vision, since many beneficiaries of mitigation actions are external to the region. On the contrary, climate adaptation mainly benefits those who implement it, i.e. an egoistic vision. Adaptation benefits are more likely to be localized (Wilbanks et al., 2003). Integrating measures of different scale levels is a complex exercise, considering each geographical level has its own characteristics determining the development and formulation of actions, e.g. socio-economic contexts, cultural values, and political discourses (Biesbroek et al., 2009). In essence this global-local division is true, however, concrete measures for mitigation do exist on the local level. Hence, the dominant geographical levels for climate mitigation and adaptation measures differ in general, but at all spatial scales, adaptation and mitigation both play a role (Swart & Raes, 2007). The implementation of climate mitigation and adaptation strategies at the local level can result in a competition with other issues in the spatial planning domain (Hartmann & Spit, 2014), as often these measures require space.

The fourth institutional barrier that complicates the divide between climate mitigation and adaptation is the sectoral approach with regard to involving stakeholders. In the last years, a shift from government to governance has taken place in spatial planning in the Netherlands (Rhodes, 1996). This implies the involvement of a myriad of stakeholders that give impetus to the planning process. It is the outcome of multi-level and multi-actor forms of coordination (Cars et al., 2017). According to Dewulf et al. (2015) the integration of climate mitigation with adaptation in urban planning is a multi-sector and multi-actor challenge. However, mitigation and adaptation strategies involve different types of stakeholders (Biesbroek et al., 2009). Stakeholders involved in mitigation actions are often from energy, agriculture, and mobility departments. Furthermore, mitigation strategies usually involve actors from the transport sector or industry. In comparison to climate adaptation, the number of stakeholders involved is limited. Contrasting, stakeholders involved in adaptation actions are often from green, water management, tourism and recreation, human health, urban planning, and nature conservation departments (Klein et al., 2005). To cope with the impacts of climate change a variety of both public and private stakeholders are involved (Trell & van Geet, 2019). Besides public actors, the involvement of private actors is crucial for the implementation of climate change measures in urban areas, because mitigation and adaptation measures are also needed on private property (Mees, 2017). According to Landauer et al. (2015) privately owned land can hinder the possibilities for public administrations to implement integrated climate mitigation and adaptation measures. Examples of private actors are citizens, housing associations, project developers, and businesses. Each actor group, both public and private, may have different rationales and responsibilities, such as efficiency, legitimacy, fairness or effectiveness, which can hamper the integration process (Mees, 2017; Dewulf et al., 2015; Termeer et al., 2012). Hitherto, most of these actors bear no direct responsibility for reducing climate change risks (Runhaar et al., 2016).

The responsibility for implementing climate change measures can be related to the equitability of mitigation and adaptation actions. It can be argued that mitigation actions are more equitable than adaptation actions, considering the fact that those who emit are those bearing the responsibility (Wilbanks & Sathaye, 2007). Wilbanks et al. (2003) point out that the costs of adaptation are more localized on particular populations and areas where climate adaptation strategies are implemented. In comparison, the cost of climate mitigation measures is often widely distributed across national populations of industrialized countries. One of the reasons why most actors do not consider mitigation or adaptation measures is that often those measures are considered costly (Hartmann & Spit, 2014). Consequently, integrating those measures in spatial planning is interpreted as an extremely weak interest, because there is no economic incentive. Measures for reducing climate risks in spatial planning are considered as an extra cost for an issue of lower priority. However, according to Laukkonen et al. (2009) the effectiveness of responses to climate change will depend also on the inclusion of a comprehensive approach that includes all stakeholders from all social scales, i.e. stakeholders related to both climate mitigation and adaptation. Biesbroek et al. (2009) argues that for climate adaptation mitigation it is more easily to measure the effectiveness compared to climate mitigation adaptation. For the effectiveness of climate adaptation measures there are no quantified objectives or predefined targets that determine the success rate (Klein et al., 2005). This often concerns human lives, material damage, and damage to culture or nature. In addition, because of the local nature of climate adaptation measures, the benefits will be valued differently, considering different economic, social, and political structures (Klein et al., 2005). As a result, insights in the benefits and costs of climate adaptation strategies are far more limited than for climate mitigation strategies.

To conclude, it can be argued that the divide between climate mitigation and adaptation is mainly a mental construct (Biesbroek et al., 2009), which is enhanced by the different ways of framing the problem of climate change and how to solve the problem accordingly. Coming back to North's (1991) definition of institutions, it is the humanly devised constraints that structures interaction. According to Biesbroek et al. (2009) it is the current institutional fabric as a result of the historic dichotomy that makes an integrated approach in urban planning difficult, not the incompatibility of the actions. This dichotomy between the mitigation and adaptation domains has resulted in contrasting ways of working, i.e. different policy concepts, rules, and perspectives. This is what Wiering & Immink (2006, p. 424) describe as policy arrangements, which is 'the consequence of a temporary stabilization of the organization and content of a specific policy domain at a certain level of policy implementation'. To illustrate, where the climate mitigation domain is focused on norms and targets, the climate adaptation domain is more concerned with pilot projects. To bridge the gap between climate mitigation and adaptation in urban planning, the earlier-identified institutional barriers must be met. These institutional barriers are summarized in Table 2. There is a growing need for processes and institutions that can facilitate cross-sector governance to be able to better address the long-term protection of complex systems (Polk, 2011). In order to overcome these institutional barriers and to make the transition towards a synergy approach, there is a need for institutional capacity building, i.e. a pluralist challenge (Cars et al., 2017).

Institutional barrier	Subtopic	Mitigation	Adaptation
Difference in scientific approach	Aim measures	Directly combatting causes	Indirectly reducing consequences
	Knowledge production	Highly specialized knowledge, with a focus on technical knowledge	Context specific knowledge, transdisciplinary knowledge
	Managing uncertainties	Technical-rational approach	Communicative-rational approach
Difference in perspective on time	Temporal scale	Long-term	Short-term
Difference in spatial scale	Spatial scale	Global	Local
	Benefits	External to region of implementation	Beneficiaries are locally
Sectoral approach with regard to involving stakeholders	Involvement stakeholders	Limited number of sectoral interests, mostly governmental	High number of stakeholders
	Measuring effectiveness	Targets and quantified objectives	Qualitative objectives
	Implementation approaches	Mostly top-down	Mostly bottom-up

Table 5 Summary differences of the climate mitigation and adaptation domains as underlying reason for institutional barriers based on Biesbroek et al. (2009), Swart & Raes (2007), Landauer et al. (2015), Klein et al. (2005), Wilbanks et al. (2003) & Hartmann & Spit (2014)

2.5 Institutional capacity building

The concept of institutional capacity building finds its origin in the communicative approaches of the collaborative planning (Healey, 1998). The ability of stakeholders to work together and to solve a collective problem is shaped by institutional capacity (Abreu & Ceglia, 2018). Institutional capacity is important because it determines the ability of people to perform effectively its tasks and to be able to cooperate with other stakeholders (Brown & Farrelly, 2009). According to Cars et al. (2017) institutional capacity can be described as the web of relations involved in urban governance that intertwine government organizations, private stakeholders, and community organizations. According to Polk (2011, p. 187) it consists of “the ability to make relational links, across cultural barriers, organizational divisions and fractures in the distribution of power”. This is especially relevant to the issue of integrating climate change objectives in urban planning, because of its cross-sectoral nature and the various actors involved. Institutional capacity can be operationalized by using three dimensions: intellectual capital, social capital, and political capital (Khakee, 2002). Often the terms knowledge resources, relational resources, and capacity for mobilization are used interchangeably by

many authors (Healey, 1998; Abreu & Ceglia, 2018; Wang et al., 2017; Cars et al., 2017; Polk, 2011). Below these three dimensions are elaborated upon (see also Figure 1).

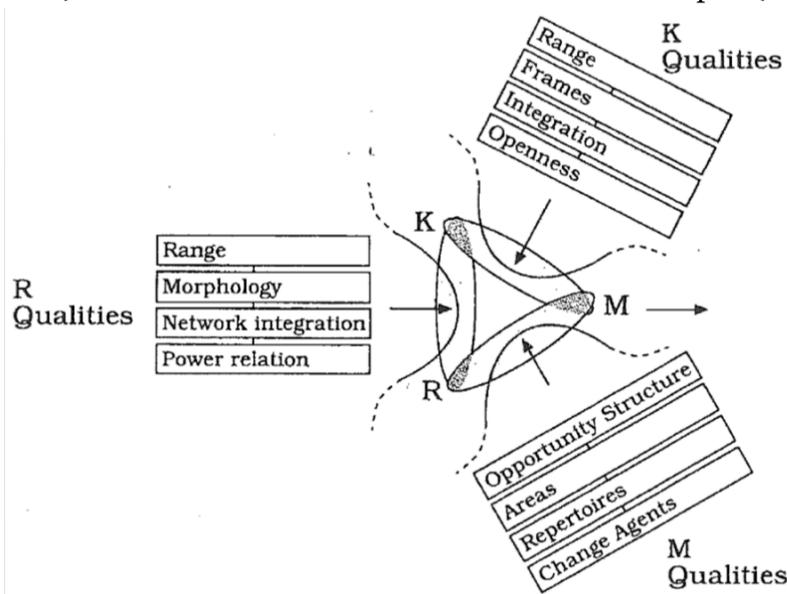


Figure 1 Dimensions of institutional capacity (Cars et al., 2017)

According to Khakee (2002, p.55) intellectual capital refers to “various knowledge resources built on previous experiences, scientific investigations and understanding of people, places and issues”. Collective action among stakeholders is based on the quality of knowledge and experience, either formal or tacit, i.e. the range of knowledge (Wang et al., 2017). Furthermore, the existence of a common understanding of problems and solutions is enabling the capacity to act collectively (Abreu & Ceglia, 2018). This is also called the frame of reference, i.e. the underlying conceptions that shape the interpretations and meanings given to knowledge (Cars et al., 2017; Polk, 2011). The extent to which these frames of references are shared among stakeholders is determining the intellectual capacity, i.e. integration of frames of references. Therefore, building knowledge resources depends on the access to knowledge, the way in which this knowledge is used, and the conscious reflection on frames of reference (Cars et al., 2017). Another element related to intellectual capital is the capacity to absorb new ideas and to start learning from these ideas, i.e. the openness to new ideas (Khakee, 2002; Abreu & Ceglia, 2018; Polk, 2011). Intellectual capital is about the flow of these knowledge resources of multiple stakeholders, and the learning process that takes place when knowledge is exchanged (Cars et al., 2017). Hence, knowledge production can be regarded as a process of social interaction.

Social capital is defined by Khakee (2002) as social network capacities that facilitate collaboration between a broad range of stakeholders in order to be able to coordinate actions and decisions and to achieve support for those actions and decisions. Polk (2011) distinguishes two types of social capital, i.e. bridging social capital (building links between groups) and bonding social capital (building links within a group). The capacity to act collectively can be explained by the quality of relationships (Abreu & Ceglia, 2018). The quality of relationships is assumed to be higher in contexts within which there is sufficient trust, appreciation, reciprocity, and space for stakeholders to give their voice and listen (Healey, 1998). When this is the case, knowledge, understandings, and information can flow easily around among stakeholders (Healey, 1998). Also, the nature and the range of networks is constituting the institutional capacity of the actors involved (Cars et al., 2017), including the morphology, density, power relations, and architecture. Some of the networks will focus on a few nodes,

whereas others are more dispersed. Furthermore, some of the networks are diffuse, while others have clear boundaries. The ability to build up relational resources is linked to the existence of integration between networks.

Political capital can be described as the willingness and commitment among stakeholders to take action collectively (Khakee 2002). Hence, the ability of stakeholders to explore ideas, rules, structures and resources in an attempt to act collectively (Cars et al., 2017). Wang et al. (2017) refer to the capacity to activate the intellectual and social capitals to achieve collectively set goals. The presence of actors that are willing and able to take the lead and the existence of a shared vision is positively affecting the political capital dimension (Abreu & Ceglia, 2018). From research of Storbjörk & Ugglå (2015) it became clear that key agents play a crucial role in driving change. However, too much emphasis on strong singular actors can act as a barrier when integrating climate policy. Such change agents should be able to identify the right arenas and windows of opportunity for mobilizing institutional capital (Cars et al., 2017). Those arenas are places where regulatory power and key resources lie, i.e. opportunity structures with a rich repertoire of mobilization techniques.

To conclude, the three capitals discussed can be seen as a set of abilities for institutional capacity (Cars et al., 2017). Although, the focus should not be on the persistence of the three capitals, but rather on the process of its formation, i.e. institutional capacity building. Institutional capacity building is a process by which humans develop abilities to solve problems, achieve objectives, and perform functions (Tadele & Manyena, 2009). Cars et al. (2017) define the process of building institutional capacity as the transformation, mobilization, and creation of institutional capital in a collective effort. With regard to the topic of this research, building institutional capacity is important in order to conflate the framing of problems and solutions. An analytical framework on how to build institutional capacity among stakeholders for integrating climate mitigation with adaptation in urban planning is presented in the next paragraph (summarized in Table 3).

2.6 Institutional capacity building for climate policy integration

The concept of institutional capacity can be considered multi-interpretable and abstract. There is limited research on how institutional capacity can be built for the topic of climate policy integration. In that sense, to be able to make the transition towards a synergy approach (e.g. a holistic and integrated approach, Table 1). Therefore, the presented analytical framework aims to fill this gap. Drawing on research of Cars et al. (2017), Khakee, (2002), and Healey (1998), institutional capacity is operationalized by using three dimensions: intellectual capital, social capital, and political capital. This research focuses on what these three capitals mean in the context of climate policy integration. In the following, these capitals are linked to solutions put forward in research on climate policy integration, e.g. see Hartmann & Spit (2014) and Swart et al. (2013), research on sustainable development in general, e.g. see Polk (2011) and Payne & Shepardon (2015), and research on the mitigation-adaptation dichotomy, e.g. see Wilbanks (2005), Biesbroek et al. (2009), Laukkonen et al. (2009), Grafakos et al. (2019), Duguma et al. (2014), Klein et al. (2005), and Berry et al. (2015). To develop this analytical framework, the institutional barriers presented in Table 2 are used as an entry point. The actions needed to build institutional capacity presented below are challenging the four main institutional barriers, i.e. the difference in scientific approach, the difference in perspective on time, the difference in spatial scales, and the sectoral approach with regard to involving stakeholders.

2.6.1 Building intellectual capital

The first activity for building intellectual capital proposed by Hartmann & Spit (2014) is the use of urban climate maps for providing information for analysis about the effects of climate change in a particular urban setting. The understanding of the potential effects of climate change by stakeholders might also be increased by the use of virtual reality or augmented reality to illustrate, visualize, and clarify the effects of climate change and the impact of potential solutions (Sørensen et al., 2016). A promising feature in planning practice is the use of a vulnerability analysis (Swart et al., 2013). A vulnerability analysis gives information about the spatial distribution of climate change impacts in a city. The underlying idea is that these vulnerability analyses act as an invitation for risk dialogues among the stakeholders involved with the aim to make the city more climate-proof. This first activity is seen as a starting point for building intellectual capital, as it provides information for a common starting point at the beginning of the process.

After establishing a common starting point, the second activity is raising awareness about the multi-sector, multi-level, and multi-actor nature of climate policy integration (Polk, 2011; Wilbanks, 2005). According to Gupta et al. (2010, p. 463) issues such as climate policy integration can only be addressed through variety, implying that there is “no single appropriate ideological framework, no unique optimal policy strategy or set of mutually consistent solutions, but there are many”. In other words, at the start of the process one should not sort on a particular solution or approach. Therefore, it is important to include both frames of reference (mitigation and adaptation) and its involved variety of stakeholders during the solution formulation process in order to generate tailor-made solutions.

As mentioned earlier, both climate mitigation and adaptation strategies have developed their own knowledge frame and perspective on the problem over time. This means that the frame of reference should be broad when integrating climate mitigation with adaptation (Wilbanks, 2005). Hence, a third activity is the use of a shared knowledge base to bridge the gap between the different scientific approaches (Hartmann & Spit, 2014). Therefore, Biesbroek et al. (2009) stress the importance of transdisciplinary knowledge production and exchange in order to facilitate climate policy integration. According to Payne & Shepardson (2015) it is transdisciplinary knowledge that can account for the complexity of an integrated approach. This is where the social, technical, physical, and economical knowledge of the different domains interacts. This entails the interaction of the knowledge from the mitigation sector (e.g. knowledge from economics and technology) and the adaptation sector (e.g. socially oriented knowledge). These interactions include amongst others: a joint problem definition, mutual learning, and the creation of emergent knowledge (Payne & Shepardson, 2015). Without agreement about language between the stakeholders, there is no chance of an integrated solution (Hartmann & Spit, 2014). For instance, the use of Geographic Information Systems (GIS) is an effective tool for accomplishing learning across spatial scales (Sørensen et al., 2016). Therefore, GIS may be helpful in overcoming the different perspectives on spatial scales. Furthermore, sufficient reflection on the assumptions underlying the frames of reference and openness to new frames of reference is needed (Polk, 2011).

Considering the context-dependency of climate policy integration, a specific kind of knowledge needs to be touched upon as a fourth activity, namely local knowledge in order to be able to make tailor-made decisions (Laukkonen et al., 2009). One-size-fits-all approaches for

integrating climate mitigation and adaptation may not work effectively (Lee & Painter, 2015). It is these specific physical and socio-economic characteristics and conditions of a city that should be reflected upon in policy formation. Interaction and cooperation between policy makers and a local community would enhance the understanding of the challenges faced in that particular area. The urban climate maps and stress tests mentioned as the first activity offer a local understanding of the problem. However, local knowledge also includes perspectives, visions, experience, and knowledge from local communities, especially regarding social and physical vulnerabilities.

Learning is an important fifth activity for building intellectual capital, as learning allows for a changed understanding (Gupta et al., 2010). In the case of climate policy integration this entails reflection on the assumptions underlying the existing frames of reference and the ability to build new frames of reference. Gupta et al. (2010) and Leising et al. (2018) make a distinction between single loop learning (the improvement of existing routines, beliefs, norms, solutions and patterns) and double loop learning (a fundamental change in norms and basic assumptions by challenging world views). Changes within the existing frames of references are more common, i.e. single loop learning. According to Adelle & Russel (2013) for climate policy integration the latter, more complex, form of learning is needed, i.e. a reframing process.

2.6.2 Building social capital

The integration of frames of reference can be considered inherently a social process. According to Laukkonen et al. (2009) the transformation of information into a learning process is important, requiring the inclusion of all stakeholders. Triggering learning between involved stakeholders can generate useful strategies for integrating climate change mitigation with adaptation in urban planning (Payne & Shepardson, 2015). To ensure learning, it is essential that the access to these databases and the outcomes of the analyses are available for all stakeholders involved. In order to facilitate learning, the creation of arenas for knowledge exchange, as a first activity, is important, building a strong networking capacity (Storbjörk & Uggla, 2015; Sörensen et al., 2016). In reference to climate policy integration, the focus here should be on the common ways of working and relationships that are established between stakeholders in different sectors and different scales (Polk, 2011). Therefore, it is important that the participating stakeholders sufficiently cover the different sectors, levels, and scales that are relevant to climate policy integration. In attempting to involve all relevant stakeholders, a suggested approach is a communicative approach. This approach facilitates the opportunity of stakeholder participation (Healey, 1996), where voice is given to all the stakeholders concerning climate mitigation and adaptation. In such an inclusive approach the aim is to find a joint storyline and shared values through communication.

The quality of relationships can be explained by the existence of shared values, which enable space for trust, appreciation, and reciprocity (Healey, 1998). Therefore, the second activity for the build-up of social capital is encouraging shared values. Shared values can be described as common needs, common goals, and a sense of the common good (Parkhill et al., 2015). Laeni et al. (2020) stress the importance of a holistic perspective, which takes into account ecological, economic, and social values for coalition-building towards a change in climate policy. The creation of shared values makes it easier to reach agreement between stakeholders (Badahur et al., 2013).

Lastly, in the Netherlands, policies are often assessed on the basis of the traditional administrative framework of municipalities, provinces, and states (Biesbroek et al., 2009). However, the regions impacted by climate change do not match these traditional administrative boundaries, complicating the mainstreaming process. Spatial planners should look beyond this traditional administrative framework and take the dynamics of systems as a starting point for new institutional arrangements. This implies the need for transboundary networks as a third activity. Such a transboundary network could emerge from existing networks that integrate. Moreover, new networks can arise based on new ideas, i.e. based on new frames of reference.

2.6.3 Building political capital

As explained before, the presence of change agents is an important first activity in building political capital, i.e. leadership. Leadership should be stimulated during the process. According to Gupta et al. (2010, p. 463) “leadership is a driver for change, showing a direction and motivating others to follow”. It can be argued that leadership may affect variety, however, good leaders should be able to provide enough space for variety. For instance, a change agent could play a crucial role in raising awareness on the different perspectives on the problem. Different roles of leadership could be distinguished, such as entrepreneurial or collaborative leadership. Entrepreneurial leaders advocate for policy change and subsequently try to get those specific policy solutions adopted (Meijerink & Stiller, 2013), i.e. a policy focused on climate integration. Collaborative leaders encourage collaboration between actors, i.e. different stakeholders involved in both climate mitigation and adaptation (Gupta et al., 2010). Moreover, leaders or change agents should be able in stimulating the translation from vision to concrete action.

In the case of climate policy integration, the financing scheme is a crucial second activity (Duguma et al., 2014). To implement multifunctional initiatives budget allocations should not be designated to specific practices that do not enclose the whole spectrum of creating synergies. This means that budgets in spatial planning should not be allocated to either adaptation or mitigation, but it should encompass both. Grafakos et al. (2019) point out that financing adaptation measures could be in competition with financing mitigation measures. Therefore, the establishment of a shared funding body or budget might be an efficient way to best allocate budgets. Restemeyer et al. (2015) suggest the financial support for transdisciplinary and informal networks. According to Klein et al. (2005) the current budget arrangements for climate policy have not been designed to promote mainstreaming. Historically, sectoral policies have already formulated their available funds for their own objectives (Biesbroek et al., 2009).

The third activity is the creation of a climate policy integration narrative. According to Davoudi (2012, p. 50) “environmental narratives in planning are selective abstractions which amplify one meaning of the environment and marginalize others”. The establishment of a climate policy integration narrative shapes planners’ conception of integrated practices and how it might be achieved. According to Leising et al. (2018) narratives are important for making the transition towards a synergy approach of climate mitigation and adaptation, in particular in the take-off phase when demonstration and pilot projects are started. Restemeyer et al. (2018) add to this that a narrative can create an agenda for driving change and can stimulate the exploration of new practices and test the unknown. As a result, the creation of a narrative could turn ambitions on a strategic level to policy implementation. A narrative provides coordination

among a heterogeneous group of actors and provides orientation and guidance for joint action (Leising et al., 2018). The proposed dialogue-based communicative approach therefore facilitates the search for core values of the narrative (Healey, 1996). The question here is in which narrative do both the climate mitigation and adaptation discourse find a place and embrace each other. The formation of a climate policy integration discourse can have a profound impact on urban planning (Davoudi, 2012). According to Laeni (2020, p. 6) it is the narrative that “can connect, put on the agenda, activate, attract funding, convince decisions makers, and strengthen collaboration across sectors and levels”.

A fourth activity to build institutional capacity, is the inclusion of assessment tools and evaluation methods in planning procedures. Laukkonen et al. (2009) point out that the inclusion of climate change impacts as inputs of area-based planning project will prioritize climate change objectives strategies in urban planning. Many researchers stress the importance of the use of integrated assessment tools, such as a multi-criteria analysis and integrated modeling, enabling the assessment of multiple objectives and criteria (Grafakos et al., 2019; Wilbanks., 2005, and Sørensen et al., 2016). When the effectiveness and the benefits of an integrated approach becomes clear stakeholders possibly feel mutual responsibility and ownership. According to Berry et al. (2015) many synergies between climate mitigation and adaptation are not acknowledged or unrecognized, because often there is a lack of evidence on the effectiveness and the wider impact. Understanding the interactions between climate mitigation and adaptation is key to minimize the costs of climate policy (Duguma et al., 2014) and to improve the cos-effectiveness and reduce the resource competition (Grafakos et al., 2019). Furthermore, the inclusion of interim evaluation methods in planning procedures can facilitate through enabling modifications and improvements through feedback processes. A one-time analysis is of limited value, because both learning and decision-making practices are sequential in nature (Wilbanks, 2005). It is important to respond in an adaptive way to new experience and information.

Institutional capacity	Activities	Description of activities	Key references
Intellectual capital	Using urban climate maps	Providing information for a common starting point at the beginning of the process	Swart et al. (2013); Hartmann & Spit (2014)
	Addressing variety of actors, levels, and scales	Incorporating multi-actor, multi-level, multi-scale perspectives, to ensure that during the process one should not sort on a particular solution or approach	Polk (2011); Wilbanks (2005); Gupta et al. (2010)
	Creating transdisciplinary knowledge base	Reflecting on the assumptions underlying the frames of reference and problem perspectives, and openness to new frames of reference to bridge the gap of different scientific approaches	Hartmann & Spit (2014); Biesbroek et al. (2009); Payne & Shepardon (2015)
	Using local knowledge	Including knowledge from local communities, especially regarding social and physical vulnerabilities	Laukkonen et al. (2009); Lee & Painter (2015)
	Stimulating double loop learning	Challenging existing norms and basic assumptions, i.e. a reframing process	Gupta et al. (2010); Adelle & Russel (2013); Leising et al. (2018)
Social capital	Creating arenas for knowledge exchange	Applying a communicative approach to stakeholder involvement to give voice to all the involved stakeholders in order to find shared values and a joint storyline through communication	Storbjörk & Uggla (2015); Polk (2011); Healey (1996)
	Encouraging shared values	Applying a holistic perspective on value creation for coalition building	Laeni et al. (2020); Parkhill et al. (2015); Badahur et al. (2013)
	Creating transboundary networks	Integrating existing networks or creating new networks based on new frames of reference	Biesbroek et al. (2009)

Political capital	Stimulating leadership and change agents	Driving change, showing a direction, and motivating others to follow to be able to make the translation from vision to concrete action.	Storbjörk & Uggla (2015); Cars et al. (2017); Gupta et al. (2010); Meijerink & Stiller (2013)
	Allocating shared budget	Establishing a shared funding body or budget to avoid competition between objectives and policy domains	Duguma et al. (2014); Grafakos et al. (2019); Klein et al. (2005); Biesbroek et al. (2009); Restemeyer et al. (2015)
	Developing a climate policy integration narrative	Creating a discourse where both climate mitigation and adaptation can find its place	Davoudi (2012); Leising et al. (2018)
	Including assessment tools and evaluation methods	Enabling the assessment of multiple criteria to bridge the gap of different perspectives on measuring effectiveness	Grafakos et al. (2019); Berry et al. (2015); Duguma et al. (2014); Wilbanks (2005)

Table 6 Analytical framework for building institutional capacity for climate policy integration

2.7 Conclusions: the importance of institutional capacity building

Many authors recognize the separated approach to climate mitigation and adaptation in academia and practice, i.e. the mitigation-adaptation dichotomy. Previous research on this dichotomy advocate for the integration of these two approaches, as the produced effects are higher than the sum of its parts. However, this process of climate policy integration is rather a complex one. This can partly be explained by the difference in aim, knowledge production, management of uncertainties, temporal scale, spatial scale, benefits, involvement of stakeholders, measurement of effectiveness, and implementation approach. It can be argued that the divide between climate mitigation and adaptation is mainly a mental construct, which is enhanced by the different ways of framing the problem of climate change and how to solve the problem accordingly. Therefore, these barriers to climate policy integration can be considered as institutional barriers. In this research, a focus on institutional capacity building is recommended to overcome these institutional barriers. To be able to answer the main research question how medium-sized cities can build institutional capacity in order to facilitate the integration of climate mitigation with adaptation in urban planning, the first step is to look at municipal policy regarding climate policy, i.e. a strategic level. Subsequently, research will be done on the project level, i.e. an operational level. The analytical framework presented can be used to study institutional capacity. How this exactly will be done is explained in the next chapter.

Chapter 3: Methodology

In this chapter, the methodology of this research is presented. In the previous chapter, an analytical framework based on scientific studies is presented. This theoretical background is used for the empirical research to further develop the analytical framework and to study institutional capacity building activities in the city of Groningen. The activities for building institutional capacity employed at a strategic level and operational level will be analysed. In order to achieve this goal a well-structured research design is important. According to Clifford et al. (2016) a well-structured research design is needed to produce convincing and meaningful results. Furthermore, having a well-structured research design is crucial in linking data collection, methods, techniques, and data analyses.

3.1 Research methodology

Clifford et al. (2016) make the distinction between an intensive and an extensive research design. In an extensive research design, the focus is on regularity and patterns in the collected data. Contradictory, in an intensive research design, the focus is on describing a single case or a small number of cases in detail. In this research, an intensive research design is used. As the integration of climate objectives into other domains is context dependent and complex (van den Berg & Coenen, 2012), the focus of this research is on describing a small number of cases in detail. As the aim of this research is to gain an in-depth understanding of the complexity of climate policy integration, a case study is a suitable research method. Taylor (2016, p. 582) defines a case study as “a form of naturalistic research, where the case is studied in its normal context”. According to Adelle & Russel (2013) the everyday practices of climate policy integration are characterized as situational and context dependent. This means that the phenomenon and the context this phenomenon is studied are related. More specifically a single embedded case study design is the approach in this research. In an embedded case study design, there are multiple units of analysis (Yin, 2009). In this research, data has been collected both at a strategic level and operational level, i.e. on a municipal level and project level. Institutional capacity at a strategic level is needed to be able to develop integrated practices, i.e. policy formation. And thereby setting the institutional context for implementing projects. On the contrary, implementing projects can be regarded as a way to build institutional capacity at the operational level, which can also stimulate institutional capacity building at the strategic level.

Furthermore, Yin (1994) makes the distinction between explanatory, descriptive, and exploratory case study research. Here, an explanatory approach will be adopted, because this approach is in particular appropriate for answering why and how questions. More specifically, a qualitative research approach will be adopted within this case study approach. In a broad sense, this is an approach that allows for examining people’s experiences in detail, i.e. social processes such as climate policy integration (Hennink et al., 2020).

3.2 The embedded case: the city of Groningen

The unit of analysis, or the case, can be defined by determining the theoretical scope, the time frame, and the spatial boundary (Yin, 1994). The theoretical scope of this research is determined based on a literature study. Key concepts related to this research are climate policy integration, urban climate resilience, climate mitigation and adaptation, mitigation-adaptation dichotomy, and institutional capacity building.

Defining a time frame is especially relevant when analysing institutional capacity, because institutional capacity is continually evolving (Khakee, 2002). According to Wang et al. (2017) institutional capacity is rather dynamic than static. The time frame of this research is from April 2020 until January 2021. The data collection of both the primary and the secondary data is done in September 2020, October 2020, November 2020, and December 2020. However, it is important to take in mind that the time span of the case is longer than the data collection period, e.g. the documents can be written before the data collection period. Therefore, the data collection period of the primary data and the time span of the written documents determine the time frame of the case.

The spatial boundary of the case is the defined boundary of the medium-sized city Groningen. Groningen has been selected because it is positioning itself as a frontrunner in both climate mitigation and adaptation. Recently, the Global Centre on Adaptation has been established in the city of Groningen and a Climate Adaptation Week is being organized. Furthermore, the researcher has easy access to potential participants, because of the researcher's involvement in the Climate Adaptation Week. Bigger Dutch cities such as Amsterdam or Rotterdam are often part of international networks and hotspots, such as 100 Resilient Cities. It can be assumed that these cities are better able to build institutional capacities, because they have more resources compared to medium-sized cities. It is therefore interesting to research how medium-sized or smaller cities can build institutional capacities with fewer resources. Furthermore, these cities have already been researched extensively.

As explained before the case consists of two units of analysis, i.e. the municipal level and the project level. In order to be able to make robust conclusions it is important that the selected project is not in the starting phase. The selection of the case is done with prior knowledge about the case. It appeared to be rather difficult when searching for relevant projects in Groningen on the internet that take the synergy approach as a starting point, i.e. the ambition to integrate climate mitigation with adaptation. At the same time, this stresses the relevance of this research, as climate policy integration apparently appears to be difficult to be realised. To get access to additional information about potential cases, an exploratory interview is done with an expert on this topic. Within the city of Groningen, the area-based planning project Paddepoel climate-proof has been selected. In the city of Groningen, the former Suiker Unie terrain will be transformed. The municipality of Groningen expresses the aim to integrate climate change mitigation with adaptation here. However, this project has not been selected because it is still in the starting phase. Furthermore, the project Paddepoel climate-proof has been labelled as a pilot project which a focus on learning and acquiring knowledge.

3.2.1 Municipality of Groningen (strategic level)

The city of Groningen is a mid-sized Dutch city in the northern Netherlands. The city is populated with more or less 200.000 citizens (Os-Groningen, 2018). Both climate mitigation and adaptation are issues that the municipality of Groningen is trying to tackle. For example, the municipality of Groningen aims to be gas-free by 2035 (van Loon & Kattouw, 2019). The municipality has mapped the most urgent locations with regards to the effects of climate change, of which one is Paddepoel (Gemeente Groningen, 2016). Furthermore, from the climate adaptation vision of the municipality of Groningen it becomes clear that collaboration, integrative and future-oriented thinking, and playing an exemplary role are corner stones to make Groningen climate neutral in 2050 (Gemeente Groningen, 2020). All those four pillars demonstrate the importance of building institutional capacity.

3.2.2 Paddepoel climate-proof (operational level)

The project that is selected is situated in the neighbourhood Paddepoel in the city of Groningen. This neighbourhood has been built in the 1960's (van Loon & Kattouw, 2019). Paddepoel is a neighbourhood which suffers from pluvial flooding because large parts of the area consist of stone (RTV-Noord, 2019). Furthermore, the stress test shows that heat stress is a serious problem in the neighbourhood. Also, inhabitants of the neighbourhood indicated that the lack of attractive public space is a key issue (van Loon & Kattouw, 2019). In the project Paddepoel climate-proof, the construction of a heat grid was linked to objectives to make Paddepoel climate adaptive (Gemeente Groningen, 2020). The streets in this neighbourhood have been broken up during the construction of the heat grid. To be more specific, this project focused on the following three streets: Plutolaan, Antaresstraat, and the Pleiadenlaan (Kennispoortaal Ruimtelijke Adaptatie, 2020). According to the municipality of Groningen, this offered opportunities for the redevelopment of these streets (Stadszaken, 2019). In that sense, the municipality tried to combine the energy-transition (i.e. climate mitigation) with climate adaptation. Measures related to climate adaptation that are taken will increase the sponge capacity of the neighbourhood, such as the construction of a wadi and the addition of greenery (Gemeente Groningen, 2020). This entails locally buffering of water in order to be able to temporarily store water in times of heavy rainfall.

In 2019 this project has been labelled as a pilot project by the Dutch ministry of Infrastructure and Management (Stadszaken, 2019). To be able to implement the climate adaptation measures, the municipality of Groningen received funding from the national government (Rijksoverheid, 2019). The purpose of such pilot projects is to acquire knowledge about the process and the effectiveness of the measures. Above all, the municipality of Groningen explicitly addresses that they want to learn from this project (Gemeente Groningen, 2020). The ambition is to provide other municipalities with best practice examples. The focus on learning and acquiring knowledge makes this project a good case to be researched. In this project the following stakeholders are relevant for this research: heat grid installation company WarmteStad, departments within the municipality of Groningen concerned with climate mitigation and adaptation, and neighbourhood organization Co-Creatie Paddepoel (van Loon & Kattouw, 2019).

At the moment, the heat grid constructed in the neighbourhood Paddepoel will be extended towards the neighbourhood Selwerd. Similar to Paddepoel climate-proof, the construction of the heat grid is linked to objectives to make the neighbourhood climate-proof (WarmteStad, 2020). Furthermore, both Paddepoel and Selwerd are post-war neighbourhoods, i.e. semi-detached, uniform residential blocks. Currently, the project in Selwerd is in the starting phase. This comparable project has been relevant for this research, because it offers opportunities to ask about transferring lessons and best practices. Furthermore, the researcher has attended project meetings of this comparable project to get a feeling with the topic of integrating climate mitigation with adaptation in practice.

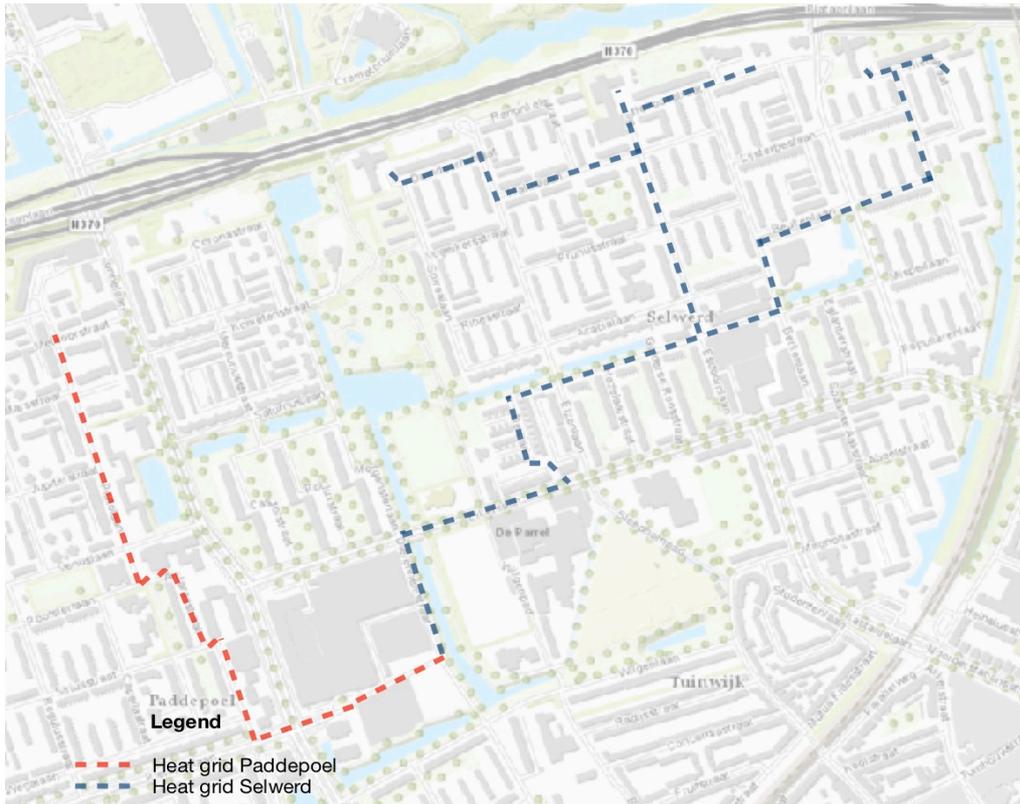


Figure 2 spatial layout planned heat grid in neighbourhoods Paddepoel and Selwerd based on WarmteStad (2020a) & WarmteStad (2020b)

3.3 Data collection

A case study as a research methodology encompasses various methods of data collection and methods of analyses (Taylor, 2016). In this research, both primary and secondary data are gathered to gain an in-depth understanding of the case. A mixed method approach can widen the understanding and strengthen the validity of the results (Tyrrell, 2016; Mills et al., 2010). The term ‘mixed method approach’ often refers to the use of both qualitative and quantitative data collection methods. However, the term ‘mixing research methods’ is considered broader and can therefore also encompass the combination of several qualitative research methods in a case study (Hennink et al., 2016). In this research, qualitative data collection methods are used. According to Longhurst (2016) qualitative data collection methods are particular suitable for examining social processes.

3.3.1 Interviews and participatory observations

The primary data is collected by conducting semi-structured interviews and doing participatory observations (see Table 5 and 6). Semi-structured interviews have some degree of predetermined order but still allow for flexibility in addressing issues (Longhurst, 2016). The interviews are semi-structured by using an interview guide inspired by the operationalizations made in the analytical framework (see Appendix). Key topics included (institutional) barriers, intellectual capital, social capital, and political capital. Furthermore, questions have been asked about lessons learned and what the participant would have done

differently. In that sense, the concept of double loop learning has been asked in a way that the participant is able to understand.

Conducting the semi-structured interviews can be considered a process in itself, as after each interview the interview guide is adjusted to new insights, i.e. an iterative process. The amount of semi-structured interviews is determined by the moment that the researcher did not obtain any new information, i.e. data saturation (Longhurst, 2016). Potential participants have been contacted via e-mail, telephone or Linked-In. Subsequently, other potential participants were also put forward by participants, the so-called snowball effect (Bailey et al., 2011). Flynn (1973) indicates that the snowball effect can have a positive effect on recruiting participants. The Table below shows the characteristics of the interviews. As explained before data has been gathered about both the strategic level and operational level. The Table below shows the type of information that has been gained during each interview.

Participant	Function interviewee	Organization	Strategic/ operational	Form	Date
P0	Climate adaptation expert	Hanze University of Applied Sciences	Both	Unstructured, explorative	29/05/2020
P1	Climate adaptation expert	Hanze University of Applied Sciences	Both	Semi-structured	01/10/2020
P2	Consultant urban water management	Municipality of Groningen	Operational	Semi-structured	08/10/2020
P3	Consultant spatial development and implementation	Municipality of Groningen	Operational	Semi-structured	20/10/2020
P4	Policy officer urban development & climate adaptation	Municipality of Groningen	Both	Semi-structured	22/10/2020
P5	Communications advisor & manager realization	WarmteStad	Operational	Semi-structured	03/11/2020
P6	Project leader urban development and energy transition	Municipality of Groningen	Both	Semi-structured	05/11/2020

P7	Citizens' representative	Co-Creatie Paddepoel	Operational	Semi-structured	10/11/2020
P8	Consultant sustainable design	Municipality of Groningen	Both	Semi-structured	11/11/2020

Table 5 Characteristics interviews

Due to the COVID-19 pandemic all the interviews have been conducted online via Google Meet. Furthermore, the researcher explored the possibilities to attend meetings that could contribute to the understanding of the case. The researcher has done so-called naturalistic observations, i.e. the aim is not to influence the context. The attended meetings all have been organized online via Microsoft teams by the municipality of Groningen. The Table below shows the characteristics of the attended meetings and the type of information that has been gained.

Organization	Topic	Organization	Strategic/operational	Date
Municipality of Groningen	Preparing tendering specifications	Project team Selwerd	Operational	19/10/2020
Municipality of Groningen	Final design Selwerd South	Project group Selwerd	Operational	20/10/2020
National delta-congress	Integrating mitigation with adaptation	National government	Both	12/11/2020

Table 6 Characteristics attended meetings

3.3.2 Content analysis of documents

The secondary data is consisting of documents, including policies, newspapers, and articles (see Table 4). The collection of the secondary data was done before the collection of the primary data. In this way, the researcher is prepared when conducting the interviews. The following search terms were used in Google to find appropriate documents (translated from Dutch to English):

- Paddepoel climate-proof
- Integrating climate mitigation with adaptation Paddepoel
- Paddepoel heat grid and climate adaptation
- Energy transition vision municipality of Groningen
- Climate adaptation vision municipality of Groningen

Furthermore, if certain (not yet selected) documents come up during the interviews, they may also be considered relevant for the analysis. The Table below shows the analysed documents and the type of information that has been found.

Title	Document type	Strategic/ operational	Author
Klimaatbestendig Groningen 2020-2024. Een uitvoeringsagenda op klimaatadaptatie	Policy document	Both	Gemeente Groningen
Drie klimaatbestendige straten in de aardgasvrije wijk Paddepoel	Website	Operational	Kennisportaal Ruimtelijke Adaptatie
Integrale pilot: in Groningen gaan warmtenet en klimaatadaptatie hand in hand	News article	Operational	Stadszaken
Op weg naar een lerende community voor klimaatadaptatie	Research report	Operational	Kennisland
Het succes van de integrale wijkaanpak	Website	Operational	Citydeal klimaatadaptatie
Handuitreiking slim koppelen klimaatadaptatie voor gemeenten	Research report	Both	Nationaal Kennis- en innovatieprogramma Water & Klimaat
Stap voor stap naar aardgasvrije wijken en dorpen	Policy document	Both	Gemeente Groningen
Groningen klimaatbestendig	Policy document	Strategic	Gemeente Groningen
Wijkenenergievisie aardgasvrij Paddepoel	Policy document	Operational	Gemeente Groningen

Table 4 Characteristics analysed documents

3.4 Data analysis and interpretation

To produce convincing and meaningful results systematic analysis and interpretation of the collected data is required (Cope and Kurtz, 2016). First of all, the semi-structured interviews have been recorded and transcribed. These transcripts and the documents are analysed by coding the data using the Atlas.ti software. Coding is the procedural function of assigning specific and concise values to data elements collected. Atlas.ti is a tool for testing expected relationships between theoretical concepts and the obtained data (Dey, 1993), and for structuring the data (Tesch, 1990). Also, codes are used to analyse and structure the observations. The codes are based on the concepts and operationalizations made in Chapter 2, resulting in a codebook (see Appendix). For instance, the institutional barriers, the capitals, and the activities for building institutional capacity.

Next to those deductive codes, inductive codes are added after the conducted interviews. Examples of inductive codes are shared values, human resources, tender, and the Environmental Planning Act. By adding inductive codes, aspects are included that were not considered before conducting the interviews. After analysing the data, the researcher had to interpret the coded data to produce results. The tool code groups has been used to organize the codes.

3.5 Research ethics

Awareness of ethical issues is part of the final decisions of the research design (Clifford et al., 2016). Especially, when conducting interviews ethical issues need to be considered. In this research, ethical issues have been addressed in various ways. First of all, the privacy of the participant has to be guaranteed. By protecting privacy, participants are unconsciously or consciously willing to provide the researcher with more information (Hay, 2010). Participants will be made anonymous by only mentioning the characteristics of the participant, i.e. what kind of stakeholder. In advance of the interview, the purpose of the research is explained and permission to record the interview was asked. Second, after the data collection, the raw data has been treated carefully. The raw data, i.e. the recordings and the transcripts, is stored offline on a computer with a password rather than storing it on an USB-stick or online storage space. The researcher is the only one who has access to the computer. Only the interpreted outcomes are communicated to the outside world. Furthermore, quotes from participants that are used in the final version of this research are sent to the participant in question for approval. Because of all the points raised above, ethical issues will be diminished, and the validity of the research will be increased. All the ethical aspects mentioned above are included in an informed consent form, which has been signed by the participants before conducting the interview. Furthermore, a researcher from the Hanze University of Applied Science has shown his interest in the collected data. To be able to share data, the interest of this researcher has been included in the informed consent. This sharing of data has also explicitly been stressed once again at the start of the interview.

Chapter 4: Institutional capacity building for climate policy integration in the city of Groningen

In this chapter the results of the collected data about the undertaken activities by the municipality for building institutional capacity on a strategic level are described. The findings are presented by discussing them according to the analytical framework presented in Chapter 2. In Table 7 key the activities are outlined in relation to the building of intellectual, social, and political capital by the municipality of Groningen. First, an overview is given about the current situation in the city of Groningen.

In the municipality of Groningen, the climate mitigation and adaptation discourses have evolved separately by following their own trajectory. Historically, climate mitigation has been one of the cornerstones of the municipal policy. The municipality of Groningen has positioned itself as a frontrunner with regard to climate mitigation (Gemeente Groningen, unknown). To illustrate, the municipality aims to be energy neutral by 2035 (Gemeente Groningen, unknown). Recently, the topic of climate adaptation has become a popular theme. The municipality aims to be climate adaptive by 2050 (Gemeente Groningen, 2020). The establishment of the Global Centre on Adaptation (GCA) in 2018 in the city Groningen offered opportunities for positioning climate change adaptation on the agenda. This internationally oriented knowledge institute works as a solutions broker to accelerate action and support for climate change adaptation solutions. The municipality has even expressed the ambition to position itself as a frontrunner in climate adaptation (Gemeente Groningen, 2020). In this sense, the municipality is trying to catch up with the yet underdeveloped theme of climate adaptation in comparison to climate mitigation. Although the municipality has outlined two different time paths for either climate mitigation or adaptation, the municipality also acknowledges the need to integrate climate mitigation with adaptation to be able to combat climate change.

Considering the separate worlds of climate mitigation and adaptation, institutional capacity building is important to make the transition towards an integrated approach. In the remaining of this chapter the activities employed by the municipality for bridging these separate worlds are described by focusing on the three elements of institutional capital: intellectual, social, and political capital.

4.1 Intellectual capital

Based on the presented analytical framework activities for building intellectual capital are using urban climate maps, addressing variety, creating a transdisciplinary knowledge base, using local knowledge, and stimulating double loop learning.

4.1.1 Using urban climate maps

In collaboration with multiple external parties the municipality of Groningen has visualized the effects of climate change for their municipality by executing a so-called stress test (Gemeente Groningen, 2020; van Loon & Kattouw, 2019). With a stress test the possible vulnerabilities of a changing climate are identified, including topics such as heat stress, drought, and pluvial flooding. The stress test can be seen as a dynamic document, which needs to be updated every now and then. All the effects are assessed according to the degree of

urgency by the municipality. According to Snep et al. (2020) this contributes to greater awareness of the problem by different municipal departments. In this sense, executing this stress test can be seen as a first step in building intellectual capital.

Even more important for this research, the results of the stress test also accelerated the transition towards integrated approaches. Based on the stress test a great amount of potential problem areas for heat stress, pluvial flooding, and drought has been identified in the city of Groningen. As indicated by many interviewees, the municipality of Groningen is not able to make those potential problem areas climate adaptive within an acceptable time frame due to capacity issues. The integration of climate adaptation with other activities such as maintenance or the energy transition offers opportunities to speed up the implementation of climate adaptation measures. In this sense, awareness raised about the size of the actual problem by the outcomes of the stress test stimulated climate policy integration within the municipality.

4.1.2 Addressing a variety of actors, levels, and scales

The results of the stress test are analysed together with regional strategic partners, such as the safety region, the municipal health service, the province of Groningen, and regional water authorities. Other stakeholders, such as housing associations and hospitals, have also been invited by the municipality to discuss in particular climate adaptation measures on the basis of this stress test. In this sense, the policy formation for climate adaptation measures has been a joint process with stakeholders from different levels and scales. Furthermore, risk dialogues based on the outcomes of the stress test have also been organized for multiple departments of the municipality with the aim of achieving a common strategy (Citydeal klimaatadaptatie, 2020). In this sense, the stress test functions as a basis for understanding the problem in a specific context while addressing variety. However, as became clear from the interviews, stakeholders invited for these discussions are mostly involved in climate adaptation and not in climate change mitigation.

Furthermore, several interviewees indicated that the focus of climate adaptation is mostly on solving water related issues in the municipality of Groningen. This means that stakeholders involved in heat stress are less included in the process. A climate adaptation expert from the Hanze University of Applied Sciences illustrated the importance of integrating pluvial flooding, heat stress, and drought as follows:

“The focus of the departments that incorporates the stress test into the implementation agenda is water, water, and water. And I think that is too bad. Because you want water, heat stress, and drought to be tackled at the same time. Because the solutions are similar to each other. [...] But it is focused on water. They do not have a design matrix which shows the linkages between the problems. So, you only have to spend a little more money and solve two problems at the same time. It is all water and as cheap as possible.”
(*Climate adaptation expert – Hanze University of Applied Sciences*)

Furthermore, most of the interviewees of the municipality pointed out the importance of early consultation of stakeholders responsible for the maintenance of climate adaptation measures. This is important because in the long run climate adaptation measures are expensive because of the costs related to maintenance. To illustrate, to maintain permeable pavement a special vacuum cleaner is needed. Contrastingly, a sweeper is used for measures such as a wadi. Maintenance becomes especially difficult when there is a combination of multiple climate adaptation measures. At the moment, this early consultation is not always the case.

Knowledge institutes in Groningen play an important role in providing knowledge and support for accelerating the transition towards integrated approaches. Especially the Hanze University of Applied Sciences and the Global Centre on Adaptation are often involved in strategy formulation.

4.1.3 Creating a transdisciplinary knowledge base

In this research a transdisciplinary knowledge base has been defined as the integration of multiple knowledge frames. These interactions include amongst others: a joint problem definition, mutual learning, and the creation of emergent knowledge.

On a municipal level a transdisciplinary knowledge base has not yet been developed. As became clear from the interviews, climate mitigation and adaptation can still be considered as two separate blocks of knowledge. This means that innovations mostly take place within these separate knowledge blocks. Even though all the interviewees acknowledged climate mitigation and adaptation are two sides of the same coin, integration of knowledge between these two worlds is still lacking. This can be explained by the fact that climate policy integration has gained attention only recently by policymakers and is still underdeveloped compared to climate mitigation. Furthermore, a project leader urban development and energy transition explained that knowledge about climate mitigation and adaptation are very different in nature. To illustrate, knowledge about climate mitigation is often generic and highly specialized, whereas knowledge about climate adaptation is mostly context dependent. This complicates the creation of a joint problem definition and mutual learning.

Furthermore, climate adaptation needs to integrate knowledge from various fields of expertise, such as ecology, urban water management, soil science, urban planning, and disaster management. Up to this point, the integration of the various theme's related to climate adaptation such as drought, pluvial flooding, and heat stress is considered difficult by multiple interviewees. Therefore, integrating the knowledge frames of climate mitigation and adaptation can be considered a next step.

Nevertheless, the establishment of the Global Centre on Adaptation in the municipality of Groningen offers opportunities for creating such a transdisciplinary knowledge base. In their implementation agenda the municipality of Groningen also expresses the aim to be a knowledge hub of the Global Centre on Adaptation. Recently, a brainstorm activity has been organized for multiple departments by the municipality with the aim of exploring synergies between climate mitigation and adaptation in the city of Groningen.

4.1.4 Using local knowledge

One of the cornerstones of the climate policy of the municipality of Groningen is to involve the local community (Gemeente Groningen, 2020, Gemeente Groningen, unknown). Firstly, to gain knowledge about the local context, the municipality has in collaboration with the University of Groningen run a survey among inhabitants about climate change. This survey included questions such as which areas should be transformed in order to mitigate the effects of climate change. This contributes to the understanding about the effects of climate change on a local scale by the municipality of Groningen (Gemeente Groningen, 2020).

Furthermore, to gain local knowledge the municipality has established so-called field teams (*in Dutch: gebiedsteams*), which operate on the neighbourhood level. As explained by a

consultant sustainable design of the municipality, most of the local knowledge is gained by interaction of the field team with neighbourhood organizations and the district alderman. Those neighbourhood organizations and district aldermen are better able in knowing the local issues and inhabitant wishes. This leads to an in-depth understanding of social vulnerabilities that are derived from climate change in a certain context. By integrating this local knowledge into existing programs or activities, it is possible to formulate and co-create integrated practices. To illustrate, sewage replacement could be combined with the addition of greenery in a street.

4.1.5 Stimulating double loop learning

As explained in Chapter 2 double loop learning means a fundamental change in norms and basic assumptions by challenging world views. With regard to climate policy integration the adoption of new, more integrated working styles is key. In their climate policy the municipality of Groningen advocate for an approach where multiple objectives are integrated (Gemeente Groningen, 2020). This policy strategy formulated by the municipality of Groningen builds around four pillars: adopting a working style that focuses on integration and collaboration, that is future-oriented, and that fulfils an exemplary role for other projects within and outside the municipality of Groningen (Gemeente Groningen, 2020). All those four pillars demonstrate the importance adopting a new, more integrated working style.

In order to increase communication and collaboration between different municipal departments field teams have been established (van Loon & Kattouw, 2019; Citydeal klimaatadaptatie, 2020; Snep et al., 2020). These field teams consist of a diverse set of employees regarding expertise and knowledge. A project leader urban development and energy transition employed at municipality explained this new, more integrated working style within the municipality of Groningen as follows:

“Each district has its own district-alderman assisted with a small group of people, who together actually try to connect programs within the municipality on the one hand. Integrating different programs. And on the other hand, also look for the connection with what is happening in the neighbourhood. And the residents’ perspective.” (*Project leader urban development and energy transition– municipality of Groningen*)

In that sense, the field teams of the municipality are actively experimenting with a new, more integrated working style. Integrated initiatives arise on the basis of what is happening in the neighbourhood. Based on that local knowledge, connections with other activities and programs within the municipality are actively being searched for by the members of the field team. Nevertheless, double-loop learning also entails experimenting with integrating objectives beforehand on a more strategic level. Recently, a brainstorm activity has been organized for multiple departments by the municipality with the aim of exploring how to work differently within the municipality. According to a consultant sustainable design of the municipality the aim is to organize such brainstorm sessions more often. At the moment this is still in its infancy. Many interviewees from the municipality argued that adopting a new, more integrated working style appears to be rather difficult. In other words, communication and knowledge exchange between different departments and programs is limited. This can for example be explained by the force of existing political structures. In the municipality of Groningen, the division of municipal departments and programs is also reflected in the responsibilities of the

aldermen. To illustrate, an alderman is responsible for the energy transition, whereas another alderman is responsible for quality of life, e.g. climate adaptation, greenery, and ecology. How this task division of aldermen affects climate policy integration is explained by a consultant sustainable design from the municipality:

“Well, it is difficult anyway, because there are two different aldermen you have to serve. [...] They want to score oftentimes. The more unifocal, the clearer a particular message. For example [...] planting trees. Or realized that many square meters of green roofs [...]. An alderman is able to score with these messages. [...] It would be great if we had just one alderman who is responsible for sustainability aspects, or the combination of the energy transition and climate adaptation. That simply has climate in its portfolio.”
(Consultant sustainable design – municipality of Groningen)

To illustrate, the province of Groningen already has a deputy with a portfolio called climate, which covers the topics climate mitigation, climate adaptation, and circular economy. To create a portfolio that includes all the topics of climate change, coalition building during the next elections is considered important by the consultant sustainable design from the municipality.

4.2 Social capital

Based on the presented analytical framework activities for building social capital are creating arenas for knowledge exchange, encouraging shared values, and creating transboundary networks.

4.2.1 Creating arenas for knowledge exchange

On a municipal level, arenas for knowledge exchange do not really exist. Nevertheless, the organised risk dialogues based on the outcomes of the stress test with multiple stakeholders both within and outside the municipality can be considered as arenas for knowledge exchange. However, these risk dialogues are focussed on sharing knowledge about climate adaptation and most often not in combination with climate mitigation.

In collaboration with the Global Centre on Adaptation, the province of Groningen, and knowledge institutes in the city of Groningen, the municipality has taken the initiative to create an arena for knowledge exchange. In January 2021 the Climate Adaptation Week will take place in the city of Groningen. During this week experts and non-experts are invited to share knowledge or experiences and raise awareness about in particular climate change adaptation. Although this event is focussing on climate adaptation, this event might contribute to knowledge exchange between multiple stakeholders in the field of climate change.

4.2.2 Encouraging shared values

Although climate mitigation and adaptation are considered as two sides of the same coin, their embedded values differ. For instance, for climate mitigation strategies the financial value is strongly embedded. To illustrate, for climate mitigation measures there is often a clear business case. In the long run, money invested in these measures can easily be earned back. For climate change adaptation measures, as also a consultant sustainable design of the

municipality explained, such a business case is less clear. This can partly be explained by uncertainty about the effect of climate change in the long run:

“The reason why the collaboration is sometimes complicated [...] One could earn back money while investing in energy. So, if one switches to sustainable energy or actually initiating the energy transition, there is always some kind of business case behind it. Which does not exist for adaptation. At least, one could of course calculate if we have to deal with this kind of rain showers in 50 years’ time what it will mean for the amount of damage. By investing in adaptation, one could prevent this damage. But that is backwards reasoning. Which is always a little bit speculative, because it does not have to happen [...] those rain showers which could take place in 50 years’ time. [...] So, this is [...] just a different way on how to deal with the costs.” (*Consultant sustainable design – municipality of Groningen*)

Furthermore, several interviewees from the municipality mention that within the municipality Groningen it is still unclear how much climate adaptation measures might potentially cost. This doubtfulness is illustrated by a consultant urban water management employed at the municipality:

“It has already been shown that about 10 houses will expect water damage. Well, that could potentially cost 2,5 tons. The damage. Does that mean that a measure, for example the construction of a large sewer may costs a maximum of 2,5 ton? That is actually something we are trying to find answers for. [...] How much should the measures actually cost to solve something?” (*Consultant urban water management – municipality of Groningen*)

The implementation agenda of the municipality of Groningen does provide part of the answer on how much climate adaptation measures in the city might cost. Integrating climate adaptation measures with other strategies in other domains is seen as a way to finance climate adaptation, because of its cost efficiency (Gemeente Groningen, 2020). However, it might be the case that activities in other domains are often planned in the far future. Therefore, the municipality aims to find a balance between urgency and integrating climate adaptation measures with measures in other domains. Nevertheless, this does not provide an actual answer on how much climate adaptation measures might cost.

As explained in Chapter 2 insights in the benefits and costs of climate adaptation are far more limited, because there are no quantified objectives or predefined targets that determine the success rate of climate adaptation. As became clear from the implementation agenda of the municipality, climate adaptation measures accommodate more services rather than only coping with the effects of climate change, e.g. sociological, ecological, and psychological values. In that sense, the values for climate adaptation are more holistic compared to values for climate mitigation.

As became clear from the climate strategy of the municipality of Groningen, the municipality is trying to quantify climate adaptation measures, which is illustrated by the following quote:

“Insights into how public space can be arranged in a climate-adaptive way are still regularly changing. That is why it is difficult to formulate exact standards for the ultimate climate-adaptive design. On the other hand, we can no longer wait. We use the

guidelines that we have drawn up as input for our (urban) designs and for our discussions with developers and other users/stakeholders in public space. This makes climate adaptation part of the discussion in all spatial and physical measures that we or developers take. The possibilities of climate adaptive measures are therefore being explored more than before.” (Gemeente Groningen, 2020, p. 73 & 74)

This illustrates the encouraging of shared values, i.e. shared financial values. This might facilitate overcoming the mitigation-adaptation dichotomy.

4.2.3 Creating transboundary networks

The municipality of Groningen is participating as a member in amongst others the City Deal Climate Adaptation, Climate Adaptation Network Northern-Netherlands, and the Network Climate Adaptation Medium Sized Cities (KANS-network). Furthermore, some networks even have become institutionalized such as the Global Centre on Adaptation (GCA) that is situated in Groningen. The objective of the GCA is to bring governments, companies, organizations, and knowledge institutes together in order to accelerate climate adaptation. The municipality clearly sees the importance of sharing and acquiring knowledge about climate adaptation within these networks (Gemeente Groningen, 2020). Therefore, these networks act as arena’s for knowledge exchange. However, the foundation of those existing networks is climate adaptation. Social capital might be built when new networks arise that are founded on the basis of both climate mitigation and adaptation. However, the GCA can act as a platform where also climate mitigation topics in relation to climate adaptation can be discussed. This is also expressed by the municipality in their implementation agenda on how to become a climate proof city:

“The arrival of the GCA offers (economic) opportunities for the region to further develop our 'leading role' in the field of energy and climate” (Gemeente Groningen, 2020, p. 83).

Besides, the establishment of the GCA in Groningen offers the opportunities for creating an international network.

4.3 Political capital

Based on the presented analytical framework activities for building political capital are stimulating leadership and change agents, allocating a shared budget, developing a climate policy integration narrative, and including assessment tools and evaluation methods.

4.3.1 Stimulating leadership and change agents

As pointed out by several interviewees integrating climate mitigation with adaptation asks for people with different kind of skills, so-called boundary spanners. This is illustrated by a policy officer urban development and climate adaptation from the municipality as follows:

“If you have the right people in the field teams, then integration is done in the right way. [...] However, it has to be part of you. You need to be talented. And I don’t know

whether they selected the people from the field teams based on that quality.” (*Policy officer urban development and climate adaptation – municipality of Groningen*)

At the moment, the municipality of Groningen has to deal with capacity issues, which complicates the search for people that have the so-called talent for integrated thinking. Moreover, differences in capacity are also visible between the climate mitigation department and the department that is concerned with climate adaptation. The municipality of Groningen is positioning itself as a frontrunner with regards to climate mitigation. Although, the municipality expresses the ambition to position itself also as a frontrunner in climate adaptation (Gemeente Groningen, 2020). However, this is not yet reflected in the amount of people working at the department concerned with climate adaptation. Climate adaptation is still experienced as a relatively new field with less people working on the topic.

4.3.2 Allocating a shared budget

In order to achieve the goals set in the policy strategy for climate action, the municipality of Groningen is trying to use existing budgets to ensure efficiency of the available resources (Gemeente Groningen, 2020). Some of these budgets have a destination or have clear substantive frameworks when using these budgets. One could argue that the use of existing budgets might play a limiting role when it comes to integrating climate mitigation with adaptation in urban planning. Especially, considering the specific purposes these budgets are serving. A project leader urban development and energy transition of the municipality pointed out the difficulty of having multiple budgets:

“In the end, it is also about money. [...] You need to rake in different budgets. And those budgets also need to come together at the same time. And sometimes it might be the case that a budget is actually for this year. And another budget for another year. However, because of an arising opportunity you sometimes have to shift a little bit in programs and budget to make sure it will fit. If you want to collaborate, you need this flexibility in different programs. Or create this flexibility. [...] I would say for the common interest.” (*Project leader urban development and energy transition – municipality of Groningen*)

This separation between climate mitigation and adaptation is also reflected in the subsidies from the national government. To illustrate, subsidies to make neighbourhoods gas-free coexist with subsidies for climate-proofing neighbourhoods. Here, a separation between the climate mitigation and adaptation is made, which might complicate overcoming the mitigation-adaptation dichotomy. Furthermore, budgets for climate adaptation seem also be divided, as illustrated by a consultant urban water management of the municipality:

“There is actually a clear distinction. It is clear how much money is reserved for flooding, which is independent from for example heat stress.” (*Consultant urban water management – municipality of Groningen*)

However, both consequences of climate change can potentially be solved with the same measures. Reviewing budgets and financing schemes would offer opportunities for building political capital on a strategic level. Establishing a shared funding body could avoid competition between climate mitigation or adaptation objectives and related policy domains.

It is important to mention, however, that integrating climate change objectives will not always be the most cost-efficient way. This point was raised by a consultant sustainable design employed at the municipality:

“We have received about a million subsidy from the national government for the climate adaptive measures. So, that is a considerable amount. When it comes to integration, you think you can just add. And that it does not have to cost so much extra. But what struck me is that if you really want to do that right, there is also a considerable amount of costs involved. It could be an illusion that we can solve everything with integration. However, that is not really positive. [...] Well, that still takes a lot. And especially, a very large budget is still needed to get that done.” (*Consultant sustainable design – municipality of Groningen*)

In terms of implementation integrating climate mitigation with adaptation can be cost effective. However, at the moment it is considered costly since this is a relatively new way of working with extra process-related costs involved. This also underlines the need for institutional capacity building in order to reduce the costs involved.

4.3.3 Developing a climate policy integration narrative

As explained in Chapter 2, having a climate policy integration narrative is important as it can shape planners' conception of integrated practices and how these integrated practices might be achieved. As became clear from the interviews, such a narrative has not yet been created. However, the importance of having such a climate policy integration narrative is often stressed by the participants. Awareness of the importance of a climate policy narrative can be seen as a first step in building social capital. A narrative can be valuable at multiple levels. For example, on a European or national scale a narrative can be valuable in the application for subsidies. On a local scale a narrative can create residential support. This is illustrated by a policy officer urban development and climate adaptation of the municipality:

“Our multiple-years maintenance program shows we need to replace the asphalt next year. Yes, it is incomprehensible for inhabitants. [...] We really need to do that differently. It is incomprehensible for inhabitants, if you more often have to cut into the street because of multiple chores. And that is why we need to integrate.” (*Policy officer urban development and climate adaptation – municipality of Groningen*)

Despite such a climate policy integration narrative has not yet been created explicitly, the ingredients for such a narrative have become visible during the interviews. Climate mitigation strategies are often perceived as measures that are a pain in the eye, such as windmills and heat pumps. Therefore, the implementation of climate mitigation measures often goes hand in hand with public resistance. On the contrary, climate adaptation measures are often perceived as something beautiful, e.g. adding greenery. These ingredients provide a basis for a narrative where both climate mitigation and adaptation find a place and embrace each other. Especially when a construction can be created where climate mitigation can finance climate adaptation. To finalise the narrative, communicating climate adaptation should include all the aspects of adaptation, e.g. heat stress, drought, and pluvial flooding.

Having such an overarching story could potentially improve the collaboration between the involved stakeholders. With such an overarching story the reason would be clear from the

start why stakeholders involved in both climate mitigation and adaptation should work together. A climate policy integration narrative explicitly makes clear the synergy between climate mitigation and adaptation. However, when creating such a climate policy integration narrative the inclusion of all stakeholders involved is a precondition. This means both internally within the municipality with all the relevant departments and externally with for example knowledge institutions, regional water authorities, and energy companies. On the short term, such an overarching story could be developed on a municipal level in collaboration with heat grid installation company WarmteStad.

4.3.3 Including assessment tools and evaluation methods

On a national scale, the implementation of the so-called ‘Environment and Planning Act’ (*in Dutch: Omgevingswet*) might facilitate the integration of climate mitigation and adaptation in decision-making (Snep et al., 2020). Important pillars of this new act are integration, cohesion, and participation (Kennisportaal Ruimtelijke Adaptatie, 2019). In order to comply with this act new ways of working need to be experimented with, such as climate policy integration. As explained before, the creation of a climate policy integration narrative could potentially help to comply with this act. Furthermore, a policy officer urban development and climate adaptation at the municipality brought up a potential solution to facilitate this integrated working style:

“I have thought of it myself, you should have a kind of checklist for area development. [...] Whether or not it is arranged via ICT. That if something is related to a program, a pop-up goes or an email with this is going on there. [...] So, you will never skip a department. For example, because someone [...] was not interested. Or maybe does not have the talent for integrated thinking. However, we all have to adopt an integrated work style. But is everyone able to do that? [...] That is the question. So, whether you should make that formal or not [...]. And that you have checklists.” (*Policy officer urban development and climate adaptation – municipality of Groningen*)

4.4 Key observations

To summarize this analysis, key activities that the municipality has undertaken in relation to the build-up of intellectual, social, and political capital are presented in the Table below.

Institutional capacity	Activity	Key activities employed by municipality
Intellectual capital	Using urban climate maps	- Execution of a stress test contributed to greater awareness about the problem by multiple departments and the necessity of climate policy integration
	Addressing variety of actors, levels, and scales	- Discussion of the results of the stress test with a variety of stakeholders such as the municipal health service, the province of Groningen, the regional water authorities, housing associations, knowledge institutes, and citizens

	Creating transdisciplinary knowledge base	<ul style="list-style-type: none"> - Organization of brainstorm sessions for multiple departments with the aim to explore the synergies between climate mitigation and adaptation - Expression by the municipality to become a knowledge hub of the Global Centre on Adaptation
	Using local knowledge	<ul style="list-style-type: none"> - Running of a survey among inhabitants about the effects of climate change on a local scale - Establishment of field teams to facilitate an in-depth understanding of the social vulnerabilities that are derived from climate change in a certain context
	Stimulating double loop learning	<ul style="list-style-type: none"> - Advocation of a new, more integrated working style by the municipality in its climate policy - Establishment of field teams with a diverse set of employees regarding expertise and knowledge - Organization of brainstorm session for multiple departments with the aim to explore how to adopt this new, integrated working style within the municipality
Social capital	Creating arenas for knowledge exchange	<ul style="list-style-type: none"> - Organization of risk dialogues based on the outcomes of the stress test with multiple stakeholders - Initiation of organizing the Climate Adaptation Week in January 2021 in the city of Groningen
	Encouraging shared values	<ul style="list-style-type: none"> - Expression by the municipality to explore the quantification of climate adaptation measures encourages the financial value of climate adaptation
	Creating transboundary networks	<ul style="list-style-type: none"> - Arrival of the Global Centre on Adaptation in the city of Groningen creates new network capacities for the municipality
Political capital	Stimulating leadership and change agents	<ul style="list-style-type: none"> - Awareness raising about the skills needed for integrated thinking within the municipality
	Allocating shared budget	<ul style="list-style-type: none"> - Creation of flexibility for shifting existing budgets and programs
	Developing a climate policy integration narrative	<ul style="list-style-type: none"> - Awareness raising about the importance of having a climate policy integration narrative and the ingredients of such a narrative
	Including assessment tools and evaluation methods	<ul style="list-style-type: none"> - Stimulation of integrated thinking by the new Environmental Planning Act

Table 7 Undertaken activities for institutional capacity building by municipality of Groningen

A general observation is that moving towards integrated practices still appears to be difficult. Knowledge exchange seems to be limited between municipal departments and programs. Although recently initiatives have been started to increase interaction between employees concerned with climate mitigation and adaptation. Nevertheless, in order to achieve double loop learning only sharing knowledge is not enough. This means that existing norms and basic assumptions have to be challenged. Considering the future goals drafted by the municipality, the two discourses of climate mitigation and adaptation will probably continue their own trajectory in the future. To illustrate, the municipality aims to be energy neutral by 2035 (Gemeente Groningen, unknown) and climate adaptive by 2050 (Gemeente Groningen, 2020). However, the Delta Program on Spatial Adaptation expresses the need to combine climate adaptation measures with other objectives in the physical environment, such as the energy transition. At the moment, there is no national policy on how to undertake the integration of mitigation with adaptation in urban planning. This means that it is up to the Dutch cities to figure out how to give meaning to the ambition set by the Dutch national government. Therefore, in this research it is assumed that both at a strategic level and operational level institutional capacity building processes are needed. A project that experimented with integrating climate mitigation with adaptation in urban planning in the municipality of Groningen is the project Paddepoel climate-proof. Activities employed by the project organization for building institutional capacity on the project level will be discussed in the next chapter. This chapter will provide insights on how the municipal policy on climate policy integration finds meaning at the operational level.

Chapter 5: Institutional capacity building by the Paddepoel climate-proof project organisation

In this chapter the results of the collected data about the undertaken activities by the Paddepoel climate-proof project organisation for building institutional capacity on an operational level are described. The findings are presented by discussing them according to the analytical framework presented in Chapter 2. In Table 8 the key activities are outlined in relation to the building of intellectual, social, and political capital. First, a general overview is given about the Paddepoel climate-proof project.

The project that is selected is situated in the neighbourhood Paddepoel in the city of Groningen. This neighbourhood has been built in the 1960's (van Loon & Kattouw, 2019). Paddepoel is a neighbourhood which suffers from pluvial flooding because large parts of the area consist of stone (RTV-Noord, 2019). Also, inhabitants of the neighbourhood indicated that the lack of attractive public space is a key issue (van Loon & Kattouw, 2019). In this project the following stakeholders are relevant for this research: heat grid installation company WarmteStad, departments within the municipality of Groningen concerned with climate mitigation and adaptation, and neighbourhood organisation Co-Creatie Paddepoel (van Loon & Kattouw, 2019).

In 2018 WarmteStad came up with the idea to extend the heat grid from Zernike towards Paddepoel. One year later, in 2019, the Dutch ministry of Infrastructure and Management announced a funding scheme for the integration of climate mitigation with adaptation (Stadszaken, 2019). The field team from the municipality drew this under the attention of the policy makers of the municipality. The streets in Paddepoel had to be broken up during the construction of the heat grid, which offered opportunities for the redevelopment of these streets (Stadszaken, 2019). To comply with the criteria for the funding the initial plan of WarmteStad had to be revised, i.e. adding climate adaptation measures and involving citizens in the design process.

In this regard, Paddepoel climate-proof can be seen as a project that promotes both climate mitigation and adaptation measures. Although, the project is labelled as a project with an integrated focus, the construction of the heat grid is considered as the point of departure of the project by the municipality and other stakeholders (Citydeal klimaatadaptatie, 2020). This can be explained by the fact that heat grid installation company WarmteStad already finished their plans and started with the preparations for constructing the heat grid in Paddepoel. This start of the process of integrating climate adaptation has been mentioned by several interviewees:

“So, it all worked out in the end. However, it really has been a running start. The municipality had to jump onto a moving train.” (*Manager realization – WarmteStad*)

“There was quite a bit of hassle to get everyone into it, because they were already on track. [...] And they actually had already gone a long way, when they were called back. Like, wait a minute, this should actually be included.” (*Consultant sustainable design – municipality of Groningen*)

All interviewees agree time pressure was experienced during the plan-making phase for an integrated design of the street, partly because the subsidy was granted last-minute. This hurried start has had an effect on the continuation of the process of the project, especially

because WarmteStad already finished the plans for constructing the heat grid. A policy officer urban development and climate adaptation from the municipality shared her experience of the process:

“We have of course applied for a subsidy for climate adaptation in combination with mitigation. However, it came from the climate adaptation budget. And at one point, it seemed to be a side thing. Then suddenly it goes about the street again. No, it is not about the street. It is about climate adaptation after a heat grid was installed.” (*Policy officer urban development and climate adaptation – municipality of Groningen*)

To summarize, the strategy to combine climate mitigation with adaptation has been an ad hoc process. In the remaining of this chapter the activities employed by the project organisation for building institutional capacity are described by focusing on the three elements of institutional capital: intellectual, social, and political capital.

5.1 Intellectual capital

Based on the presented analytical framework activities for building intellectual capital are using urban climate maps, addressing variety, creating a transdisciplinary knowledge base, using local knowledge, and stimulating double loop learning.

5.1.1 Using urban climate maps

To make the neighbourhood of Paddepoel climate adaptive the outcomes of the stress test has been used as a point of departure by the municipality. The stress test showed that Paddepoel is mostly vulnerable to heat stress and pluvial flooding (Kennisportaal Ruimtelijke Adaptatie, 2020). Furthermore, this is a neighbourhood where vulnerable groups are living, such as elderly people. This stress test has also been showed to the inhabitants of Paddepoel by the municipality at one of the meetings organized for the inhabitants. In this way, the stress test provides information for a common starting point at the beginning of the process and acts as a communication tool towards inhabitants. However, this stress test lacks accuracy as indicated by a consultant urban water management from the municipality:

“Well, at least for me it has become clear to investigate what the exact damage situation will be for example. We knew we could expect flooding in the Plutolaan. However, not how much and where [...]. Now we have calculation programs for this. And we have been busy with this program in Selwerd. Basically, a program that shows how much, well actually how the water flows. You let go a heavy rain shower. Low-lying areas will be flooded. [...] And additionally, you could easily calculate the effects of for example a wadi or lowering a street.” (*Consultant urban water management – municipality of Groningen*)

In this regard, intellectual capital has been built by the municipality of Groningen through the use of sophisticated software to visualize the effects of climate change. However, what also becomes clear from this quote is that the focus is mostly on pluvial flooding and less on heat stress or drought.

5.1.2 Addressing variety of actors, levels, and scales

At the start of the project variety of actors, levels, and scales has not been addressed explicitly. As explained before, the initial project was to construct a heat grid in Paddepoel. The municipal department concerned with climate adaptation has been involved in a later stage when the subsidy for climate adaptation measures was granted by the national government. To comply with the criteria of the granted subsidy, inhabitants needed to be included throughout the process. Therefore, extra attention is given on involving citizens in the process in the project Paddepoel climate-proof (Gemeente Groningen, 2020).

Next to involving citizens, several interviewees from the municipality indicated the importance of involving businesses, such as businesses related to utility services. Every now and then, this kind of businesses also need to make efforts underground. The municipality acknowledges the importance aligning these activities with the construction of for instance a heat grid.

Furthermore, considering variety in setting out a tender appears to be important for integrating climate mitigation with adaptation. Many interviewees from the municipality stated that in the Paddepoel climate-proof project the actual tender turned out differently than expected. Here, the difference in aim of climate mitigation and adaptation measures becomes problematic. To illustrate, a heat grid is a generic underground measure, whereas climate adaptation measures can be both underground and above ground and are more context specific. However, contractors are most of the time specialized in either underground activities or above ground activities. This means that integrating climate mitigation with adaptation measures asks a broadening of expertise of contractors.

In the Paddepoel climate-proof project, WarmteStad was in charge of the implementation of the plans. What complicated the integration process in the Paddepoel climate-proof project was WarmteStad did not have any experience with tendering above ground, which eventually led to delays in the project. A policy officer urban development and climate adaptation at the municipality explained the issues with the tender:

“We actually wanted to do it in such a way that we could put out a request to the market together. For both the mitigation and adaptation elements. [...] I think that has gone wrong initially. Partly because WarmteStad does have a lot of experience with tenders, but only underground. And does not have experience with tenders when it comes to above ground tendering. [...] However, in the end WarmteStad has done the whole tender on its own, without taking the municipality along in the right way. They eventually made their own plan for the entire set of specifications. Eventually this had led to some delays during implementation. And I think they now have said that in the new collaboration the request to the market must be put out by the municipality. We have enough expertise here to do that.” (*Policy officer urban development and climate adaptation – municipality of Groningen*)

In that sense, addressing variety during the tender process appeared to be difficult for WarmteStad. Many interviewees from the municipality acknowledged that this is one of the lessons learned. In the project in Selwerd the municipality will be in charge of the tender process, because the municipality is better in addressing the variety.

5.1.3 Creating a transdisciplinary knowledge base

In this research a transdisciplinary knowledge base has been defined as the integration of multiple knowledge frames. These interactions include amongst others: a joint problem definition, mutual learning, and the creation of emergent knowledge.

As explained in Chapter 2 strategies for climate mitigation are mainly formulated on the basis of information from a limited number of scientific bodies of thought, e.g. economics and technology. The interviewed employees of WarmteStad acknowledged that WarmteStad mainly processes technical knowledge about engineering a heat grid at the start of the Paddepoel climate-proof project. When the subsidy was granted WarmteStad's strategy had to be changed from merely engineering a heat grid towards integrating a heat grid in the built environment with climate adaptation measures. A policy officer urban development and climate adaptation of the municipality explained that the municipality has assisted WarmteStad with their knowledge about stakeholder management. Furthermore, the employees of WarmteStad acknowledged that WarmteStad has invested in new forms of knowledge such as stakeholder analyses. In this regard, knowledge from the worlds of climate mitigation and adaptation are brought together.

5.1.4 Using local knowledge

For a long time, the inhabitants of Paddepoel expressed the need of redesigning the streets in Paddepoel because they were considered unsafe and unattractive. When the field team from the municipality became aware of WarmteStad's plans, the field team drew the wishes of the inhabitants under the attention of the policy makers of the municipality. The streets in Paddepoel had to be broken up during the construction of the heat grid, which offered opportunities for the redevelopment of these streets.

In order to come up with the final design of the streets local knowledge of inhabitants has been used as input. As became clear from the interview this local knowledge and local wishes are actually used in the final design. This is mentioned by a citizens' representative from neighbourhood organisation Co-Creatie Paddepoel:

“Actually, the residents were quite in agreement. It is funny that we actually came up with completely different ideas compared to what the municipality had come up with. [...] The inhabitants said they wanted to have the road a little bit narrower. [...] There was someone who made a very precise tree plan, because they all wanted different trees in the street. [...] So, there were a lot of things.” (*Citizens' representative – Co-Creatie Paddepoel*)

Furthermore, including the local knowledge of inhabitants and local wishes of the inhabitants could make the nuisances during the construction of the heat grid less of a problem. One of the aims of WarmteStad is to minimize the inconvenience. Next to that, WarmteStad can be considered a local company. WarmteStad only has projects within the municipality of Groningen. Therefore, they gain a lot of knowledge about the Groningen context. Besides, most of the WarmteStad's employees are living in the municipality of Groningen and therefore do know the local context.

5.1.5 Stimulating double loop learning

To some degree the granted subsidy has stimulated double loop learning. The Paddepoel climate-proof project has been labelled as a pilot project by the national government. The purpose of a so-called pilot project is to acquire knowledge about the process of climate policy integration and the effectiveness of the measures. Above all, the municipality of Groningen explicitly addresses that they want to learn from this project to improve their way of working (Gemeente Groningen, 2020), e.g. a new, more integrated working style.

When the subsidy from the national government was granted for the integration of climate adaptation measures, an integral project team was established by the municipality with employees from diverse municipal departments and programs. Furthermore, an integral project leader has been appointed to make sure all interests are aligned.

As became clear from the interviews and observations, lessons learned, and best practices about climate policy integration are included in the design phase of the expansion of the heat grid towards the neighbourhood of Selwerd. These are mainly lessons learned about the collaboration between WarmteStad and the municipality. Furthermore, the essence of integrating climate mitigation with adaptation is clear at the start of the project in Selwerd, as illustrated by a project leader urban development and energy transition from the municipality:

“So that is [...] quite difficult. And especially in the Plutolaan we did this for the first time. You need to put some extra effort to get such a project off the ground. And in my view, in Selwerd South it was already much more about what we should do exactly. It was much more about the content [...]. Then it was no longer a question whether we would do it.” (*Project leader urban development and energy transition – municipality of Groningen*)

In this regard, existing norms and basic assumptions are challenged.

5.2 Social capital

Based on the presented analytical framework activities for building social capital are creating arenas for knowledge exchange, encouraging shared values, and creating transboundary networks.

5.2.1 Creating arenas for knowledge exchange

In conjunction with neighbourhood organisation Co-Creatie Paddepoel, the municipality of Groningen organized several design sessions for the inhabitants of Paddepoel (Kennisportaal Ruimtelijke Adaptatie, 2020). This neighbourhood organisation Co-Creatie Paddepoel acted as an intermediary between the municipality and the inhabitants. According to van Loon & Kattouw (2019) there were no pre-imposed frameworks that would guide the sessions, i.e. an open process. Such a communicative approach facilitates the exchange of local knowledge in order to come up with a tailor-made design for Paddepoel. Furthermore, at the beginning of the process co-creation has been considered as an approach to follow, which is based on the principle of equality.

Next to that, WarmteStad's mobile information point could be considered as an arena for knowledge exchange. Here, inhabitants could gain information about the project, but also share their complains or ideas. A manager realization of WarmteStad shared his view about the mobile information point:

“That is where our mobile information point is located. I think our accessibility and approachability has been very important.” (*Manager realization – WarmteStad*)

5.2.2 Encouraging shared values

As explained in Chapter 4, climate mitigation and adaptation are considered as two sides of the same coin. However, their embedded values differ. This is also visible on the operational level, i.e. the Paddepoel climate-proof project. For instance, the financial value is strongly embedded in constructing the heat grid. To illustrate, the business case for constructing a heat grid is often clear, whereas this is most of the time not the case with climate adaptation measures. WarmteStad clearly had a business case. The following quote from a manager realization employed at WarmteStad illustrates how the business case of mitigation measures influences the collaboration between the municipality and WarmteStad:

“You are two separate companies/institutions, each with your own results and objectives. And in this case, WarmteStad has made a business case based on a specific growth scenario. We are founded by the municipality, partly [...] to reach the climate goals of the municipality of Groningen. And that is only possible if we follow a certain growth model. This growth scenario is mapped out in our heat plan. And based on this heat plan we have made a business case.” (*Manager realization – WarmteStad*)

Furthermore, from this quote the influence of concrete targets on a business case becomes clear. To be able to manage uncertainties WarmteStad focuses on bulk, i.e. connecting the bigger apartment buildings. Due to WarmteStads' business case differences in speed between climate mitigation and adaptation measures have been experienced by most of the interviewees. This is translated in for example differences in procedures. To demonstrate, the construction of the heat grid is mainly driven by customer demand. WarmteStad has signed contracts with for example housing associations. If WarmteStad is not able to construct the heat grid in time, WarmteStad has to pay fines. Three interviewees have illustrated this difference in perspective on time.

“In itself that was still quite difficult, because WarmteStad actually did not want anything with climate adaptation at all. [...] They had the idea we only need to construct the heat grid. And that is the only thing we do. And it will only be complicated and difficult when we also have to redesign the street. And that we have to discuss this with the inhabitants. This will add costs. They only wanted to be quick and efficient.” (*Consultant sustainable design – municipality of Groningen*)

“You are running in a completely different pace. And you are managed differently. To somehow be able to synchronize this. Actually, those are two things. The management is slightly different. [...] And on the other hand, the pace. You have to deal with two different organisations. One organisation needs half a year for the preparations and the

other organisations needs one or two years or whatever. And to be able to bring this together, that is [...] still the biggest challenge.” (*Manager realization – WarmteStad*)

“If you only want to construct a heat pipe, as cheap as possible from A to B, you are serving the costumer.” (*Consultant spatial development and implementation – municipality of Groningen*)

To bring these different time paths in line with each other, WarmteStad has suspended the procurement of the first tracés. WarmteStad acknowledge the added value of adding climate adaptation measures. As explained in Chapter 4, climate adaptation strategies are often considered as something beautiful. For WarmteStad this would potentially result in less public resistance when breaking up the street for the construction of the heat grid. Furthermore, integrating climate mitigation with adaptation offered both the municipality and WarmteStad financial gain, because the streets had to be broken up once.

5.2.3 Creating transboundary networks

During the project in Paddepoel, a new partnership has been created between the municipality and heat grid installation company WarmteStad. In that sense, a new transboundary network has been created between stakeholders involved in both climate mitigation and adaptation. The fact that the municipality is a co-shareholder of this company facilitated the information flow between the municipality and Warmtestad (van Loon & Kattouw, 2019). However, because the collaboration with WarmteStad and the municipality was relatively new, information sharing was not considered self-evident. This was illustrated by a policy officer urban development and climate adaptation of the municipality:

“Then a difficult part of the process occurred about transparency. And then different agendas are noticeable. Not giving insights about the costs. And how much work and time you need to spend on the project. You simply ask for their budget, which can be used for the co-financing for the application. Well, you do not get that easily.” (*Policy officer urban development and climate adaptation – municipality of Groningen*)

In this regard, transparency appeared to be important for the subsidy application. Therefore, transparency about aims of different stakeholders is needed when integrating climate mitigation with adaptation. As said before, one of the aims of climate mitigation is often to earn money.

Furthermore, cultural differences within WarmteStad complicated the collaboration with the municipality. These cultural differences exist because WarmteStad is for 50 percent of the municipality and for the other 50 percent of the regional water company, as illustrated by the citizens’ representative from neighbourhood organisation Co-Creatie Paddepoel:

“You also have to get used to each other [...]. And the water company is much more bounded compared to the municipality. They are focused on [...] goals, results, check, check, check. [...] Much more about how do we get in a straight line from A to B as quickly as possible.” (*Citizens’ representative – Co-Creatie Paddepoel*)

As explained before, the collaboration between the municipality and WarmteStad improved throughout the process. In that sense, a transboundary network has been created which was boosted by the granted subsidy.

When looking at the local level, several neighbourhood initiatives have been arisen in Paddepoel. For example, Grunneger Power, Paddepoel Energiek, and Buurtwarmte050 are working on realising a local heat grid, which will enable smaller blocks and individual homes to be connected (Gemeente Groningen, unknown). However, climate adaptation is not a topic in these initiatives. Therefore, these neighbourhood initiatives have a sectoral focus.

5.3 Political capital

Based on the presented analytical framework activities for building political capital are stimulating leadership and change agents, allocating a shared budget, developing a climate policy integration narrative, and including assessment tools and evaluation methods.

5.3.1 Stimulating leadership and change agents

Several change agents have played a role in the project Paddepoel climate-proof. To illustrate, the citizens' representative of Co-Creatie Paddepoel has been very active in drawing the attention of the municipality and WarmteStad for the wishes of the inhabitants to make the neighbourhood climate adaptive.

As explained in Chapter 2 strategies for climate mitigation are mainly formulated on the basis of information from a limited number of scientific bodies of thought, e.g. economics and technology. This perspective influences the framing of the problem. Nevertheless, as indicated by the employees of WarmteStad, WarmteStad as a company has made a transformation towards stakeholder management, partly because of the integration the heat grid with climate adaptation measures. The new focus implies a shift in the quality of leaders and employees. This shift is illustrated by a manager realization of WarmteStad:

“That is what I also meant with the project manager is no longer the technician. But it is really someone with sensitivity for the environment. At the moment, that is almost the most important.” (*Manager realization – WarmteStad*)

Within WarmteStad a new project leader has been appointed who possessed those capabilities described in the quote. In this regard, political capital has been built by WarmteStad, since WarmteStad is moving towards the frames of reference of climate adaptation.

5.3.2 Allocating shared budget

In the project Paddepoel climate-proof financial gain has been found by integrating climate mitigation with adaptation. To some degree, WarmteStad acted as co-financer of the climate adaptation measures. The street had to be broken up because WarmteStad would construct the heat grid. This offered financial opportunities for the municipality to implement climate adaptation measures, such as permeable pavement, a rainwater sewer, and additional greenery. Furthermore, it also saves WarmteStad money as they do not have to turn the street back in its original state. However, to streamline the budget for climate mitigation measures

with the budget for adaptation measures still appeared to be difficult. This has been illustrated by a project leader urban development and energy transition of the municipality:

“In the Plutolaan it took some time to get used to it. Suddenly, also the people involved in maintenance were part of the discussion. [...] In the beginning, they also thought what is happening here. And the same for WarmteStad. However, when you have put that together at some point, then 1 and 1 is say 3. So, [...] there are separate budgets that you need to put together. [...] That is quite difficult. Actually, this was for the first time in the Plutolaan. So, you need to put some extra effort to get such a project started.”
(*Project leader urban development and energy transition – municipality of Groningen*)

5.3.3 Developing a climate policy integration narrative

Having a climate policy integration narrative is also reflected on the local scale. As explained before climate adaptation measures can make the construction of climate mitigation measures more attractive. This is also the argument the municipality of Groningen has made at the start of the collaboration with WarmteStad. When constructing a heat grid, WarmteStad will probably lose support because inhabitants will experience nuisance. Furthermore, most of the inhabitants will not yet profit from the heat grid since only the bigger apartment blocks will be connected to the heat grid. The interviewees of WarmteStad agreed that integrating climate mitigation and adaptation objectives could improve their image.

The narrative that climate change adaptation measures can make the implementation of climate mitigation strategies more attractive has also been communicated to the inhabitants by neighbourhood organisation Co-Creatie Paddepoel. This is illustrated by a citizens' representative from neighbourhood organisation Co-Creatie Paddepoel:

“So, flyers have been used all over the Plutolaan. A small flyer called from mud to a good feeling (*in Dutch: van modderboel naar goed gevoel*). And that started with the sentence: now the streets will be broken up. And what do you really want to see in the street?” (*Citizens' representative – Co-Creatie Paddepoel*)

5.3.4 Including assessment tools and evaluation methods

As explained before WarmteStad as a company has made a transformation from a focus on engineering a heat grid towards a focus on stakeholder management. Such a new focus implies the need for new tools and methods. WarmteStad has for example invested in stakeholder analyses. Furthermore, WarmteStad has invested in stakeholder communication, e.g. a mobile information point. In this regard, political capital has been built by WarmteStad, since WarmteStad is moving towards the frames of reference of climate adaptation.

5.4 Key observations

To summarize this analysis, key activities that the project organisation has undertaken in relation to the build-up of intellectual, social, and political capital are presented in the Table below.

Institutional capacity	Activity	Key activities employed by project organisation
Intellectual capital	Using urban climate maps	<ul style="list-style-type: none"> - Communication of the outcomes of the stress test about Paddepoel acted as a common starting point for the municipality and inhabitants - Development of sophisticated software to visualise the effects of climate change and the effects of potential measures in more detail
	Addressing variety of actors, levels, and scales	<ul style="list-style-type: none"> - Stimulation of addressing variety by applying for the subsidy provided by the national government - Awareness raising by the municipality about addressing variety during the tender process
	Creating transdisciplinary knowledge base	<ul style="list-style-type: none"> - Provision of knowledge about stakeholder management by the municipality for heat grid installation company WarmteStad - Investment in new forms of knowledge such as stakeholder analyses by WarmteStad
	Using local knowledge	<ul style="list-style-type: none"> - Attention has been drawn by the field team for integrating climate adaptation while constructing the heat grid based on inhabitants' wishes - Creation of local focus by WarmteStad because WarmteStad only has projects within the municipality of Groningen and employs people that are living in or nearby the municipality
	Stimulating double loop learning	<ul style="list-style-type: none"> - Establishment of integral project team with an integral project leader by the municipality - Stimulation of shifting assumptions about the essence of climate policy integration due to the granted subsidy
Social capital	Creating arenas for knowledge exchange	<ul style="list-style-type: none"> - Organisation of design sessions for inhabitants by the municipality and WarmteStad - Placing mobile information point in neighbourhood Paddepoel by WarmteStad
	Creating transboundary networks	<ul style="list-style-type: none"> - Creation of a new partnership between WarmteStad and the municipality of Groningen
	Creating shared values	<ul style="list-style-type: none"> - Suspension of the procurement of the first traces by WarmteStad considering financial

		gain and the added value of climate adaptation measures
Political capital	Stimulating leadership and change agents	- Hiring of employees with sensitivity for the environment by WarmteStad
	Allocating shared budget	- Streamlining separate budgets from several municipal departments and programs and Warmtestad
	Developing a climate policy integration narrative	- Communication of the added value of integrating climate change adaptation measures while constructing the heat grid by the municipality at the start of the collaboration with WarmteStad - Distribution of a flyer that communicates the message that climate adaptation measures can make the implementation of climate mitigation strategies more attractive by neighbourhood organisation Co-Creatie Paddepoel
	Including assessment tools and evaluation methods	- Investment in new tools and methods such as stakeholder analyses and a mobile information point by WarmteStad

Table 8 Undertaken activities for institutional capacity building by Paddepoel climate-proof project organisation

The project Paddepoel climate-proof has been considered by all the interviewees as a project in which new ways of working are experimented with, i.e. integrated practices. Although, the integration of climate mitigation with adaptation in urban planning can be described as an ad hoc process. The trick is to turn the experiences and lessons learned into a structural change in urban planning, i.e. institutionalization of the best practices. To make sure this project will be more than something incidental, lessons for institutional reform are presented in the next chapter.

Chapter 6: Reflection and conclusion

This research aimed at understanding how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning. A document analysis, semi-structured interviews, and observations were executed to answer the main research question. In this chapter, the findings are concluded along the research questions presented in Chapter 1. The results are generalized to a broader context, thereby adding to the scientific relevance of this research. Subsequently, based on the case study findings lessons for institutional reform are formulated in order to facilitate the integration of mitigation with adaptation. Then, to position the relevance of this research a reflection is provided. At the end of this chapter suggestions for further research are given.

6.1 Introduction

An increasing body of literature shows that the challenges related to climate policy integration are not only technical in nature, but in particular institutional. It can be argued that the divide between climate mitigation and adaptation is mainly a mental construct, which is enhanced by the different ways of framing the problem of climate change and how to solve the problem accordingly. It is the current institutional fabric as a result of this historic dichotomy that makes an integrated approach in urban planning difficult, not the incompatibility of the actions. This dichotomy between the mitigation and adaptation domains has resulted in contrasting ways of working, i.e. different policy concepts, rules, and perspectives.

The aim of this research was to gain insight in how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning and thereby overcoming the institutional barriers related to climate policy integration. In this research, an answer is given to the following research question: *how can institutional capacity be built in order to facilitate the integration of climate mitigation with adaptation in urban planning in medium-sized Dutch cities?*

The concept of institutional capacity building has been fundamental for the orientation of this research. The build-up of institutional capacity is important because it determines the ability of people to perform effectively its tasks and to be able to cooperate with other stakeholders. This is especially relevant to the issue of climate policy integration, because of its cross-sectoral nature and the various actors involved. As proposed by Khakee (2002), Cars et al., (2017), and Healey (1998) the build-up of institutional capacity requires the development of intellectual, social, and political capital. Drawing on this institutional capacity building literature and literature about climate policy integration, the mitigation-adaptation dichotomy, and sustainable development in general, the researcher converted the three capitals into an analytical framework. The analytical framework has been used to study the city of Groningen, whereby research has been done on the municipal level and project level.

6.2 Empirical reflection and conclusion

This research shows the importance of institutional capacity building at both the strategic level and the operational level. Building institutional capacity at both the strategic and operational level can be considered as a parallel process. Institutional capacity at a strategic level is needed to be able to develop integrated practices, i.e. policy formation. And thereby setting the institutional context for implementing projects. On the contrary, implementing projects can

be regarded as a way to build institutional capacity at the operational level, which can also stimulate institutional capacity building at the strategic level. Therefore, it turned out to be crucial to distinguish between these two levels of institutional capacity building.

6.2.1 Institutional capacity building on the strategic level in Groningen

This sub-section answers the following sub-question: *which activities are undertaken by the municipality of Groningen for building institutional capacity on a strategic level to integrate climate mitigation with adaptation in urban planning?*

In the municipality of Groningen, the climate mitigation and adaptation discourses have evolved separately by following their own trajectory. Although the municipality has outlined two different time paths for either climate mitigation or adaptation, the municipality acknowledges the need to integrate climate mitigation with adaptation to be able to combat climate change. This research concludes that institutional capacity has been built in various ways by the municipality of Groningen for integrating climate mitigation with adaptation in urban planning. With regard to intellectual capital, the municipality has executed so called-stress tests, involved a variety of stakeholders in formulating their policy, organized brainstorm activities, and gained local knowledge by running a survey and establishing field teams. With regard to social capital, the municipality has organized risk dialogues, taken the initiative to organize the Climate Adaptation Week, encouraged shared values by trying to quantify climate adaptation measures, participated in many networks related to the topic of climate change. With regard to political capital, within the municipality awareness is rising about a new kind of skill set that is needed for climate policy integration and about the importance of a climate policy integration narrative.

However, moving towards integrated practices still appears to be difficult. Knowledge exchange seems to be limited between municipal departments and programs. Although recently initiatives have been started to increase interaction between employees concerned with climate mitigation and adaptation. Nevertheless, in order to achieve double loop learning only sharing knowledge is not enough. This means that existing norms and basic assumptions have to be challenged. Considering the future goals drafted by the municipality, the two discourses of climate mitigation and adaptation will probably continue their own trajectory in the future. Several institutional weaknesses that impede this transition towards integrated practices can be identified. For instance, the knowledge exchange between stakeholders is limited, absence of a quantified values for climate adaptation, and financial lock-ins. The institutional strengths and weaknesses are summarized in Table 9.

Institutional capacity	Institutional strengths	Institutional weaknesses
Intellectual capital	Awareness has been raised about the necessity of climate policy integration by the outcomes of the stress tests	Knowledge exchange between municipal departments and programs is limited
	A variety of stakeholders has been addressed in formulating the climate policy of the municipality of Groningen	Stakeholders involved in maintenance are not always involved at an early stage in the process

	Awareness has been raised about the importance of connecting municipal departments by for example organising brainstorm activities	A transdisciplinary knowledge base has not yet been developed
	Local knowledge is gained by establishing the integral field teams	An integrated focus on climate adaptation is lacking. Focus is mainly on pluvial flooding
	An integrated working style has been stimulated by establishing the integral field teams	
Social capital	Network capacity has been created by the arrival of the Global Centre on Adaptation and the initiative to organise the Climate Adaptation Week in Groningen	A climate policy integration narrative has not yet been developed in collaboration with the involved stakeholders
	Awareness has been raised about the importance of having a climate policy integration narrative. The ingredients of such a narrative are already clear	The absence of shared values complicates the integration of climate mitigation and adaptation in the municipality of Groningen
	Awareness has been raised about quantifying climate adaptation	
Political capital	Awareness has been raised about the skill set that is needed for integrated practices	The division in responsibilities of aldermen complicates the integration of climate mitigation with adaptation
	Adopting an integrated working style is stimulated by the Environment and Planning Act	The capacity for integrated thinking of employees is still underdeveloped
		The allocation of budgets aggravates the competition between objectives

Table 9 Institutional strengths and weaknesses at the strategic level

6.2.2 Institutional capacity building on the operational level in Paddepoel

This sub-section answers the following sub-question: *which activities are undertaken by the Paddepoel climate-proof project organisation for building institutional capacity on an operational level to integrate climate mitigation with adaptation in urban planning?*

The project Paddepoel climate-proof has been labelled as a pilot project for integrating climate mitigation with adaptation in urban planning. This research concludes that institutional capacity has been built in various ways by the project organisation of Paddepoel climate-proof. With regard to intellectual capital, the project organisation used the outcomes of the stress test, citizens have been involved throughout the process, and an integral project team has been established. Furthermore, the municipality has assisted WarmteStad with their knowledge about stakeholder management. With regard to social capital, the project organisation has organized design sessions and a mobile information point has been established by

WarmteStad. Furthermore, a partnership between WarmteStad and the municipality has been encouraged by the granted subsidy. With regard to political capital, WarmteStad invested in new kind of employees and new tools in order to move towards the frames of reference of climate adaptation, financial gain has been found by adding multiple budgets, and a climate policy integration narrative has been used in communication about the project.

In general, the project Paddepoel climate-proof can be described as an ad hoc process. This can be explained by the fact that this was the first project in the city of Groningen in which the focus was on integrating climate mitigation with adaptation. Several institutional weaknesses that impede this transition towards integrated practices can be identified. For instance, addressing variety in during the tender process was a challenge, lack of transparency by the involved stakeholders and financial lock-ins. The institutional strengths and weaknesses are summarized in Table 10.

Institutional capacity	Institutional strengths	Institutional weaknesses
Intellectual capital	Urban climate maps acted as a common starting point for climate-proofing the neighbourhood	The municipality has been involved at a later stage for the addition of climate adaptation
	Awareness has been created about the necessity of integrating climate mitigation with adaptation	Variety has not been considered in putting a request to the market
	Local knowledge and local wishes have been used as input for the final design of the street	
Social capital	Local knowledge has been exchanged by organising design sessions for inhabitants	Transparency in budgets, goals, and aims of the involved stakeholders has been an issue
	Partnership between WarmteStad and the municipality has been encouraged by the granted subsidy	Cultural differences and the absence of shared values within WarmteStad and the municipality complicated the integration process
	WarmteStad's mobile information point has acted as an arena for knowledge sharing	Neighbourhood organizations are still focusing on either climate mitigation or adaptation
	Support for the construction of the heat grid has been created by communicating a climate policy integration narrative towards the inhabitants	
Political capital	Employees with a so-called sensitivity for the environment have been hired by WarmteStad	It has proven difficult to streamline budgets at the operational level

Financial gain has been found by combining activities
New tools and methods such as stakeholder analyses have been used by WarmteStad
Change agents such as project-leaders and the citizens' representative of Co-Creatie have played an important role in keeping in mind the integration of climate mitigation with adaptation

Table 10 Institutional strengths and weaknesses at the operational level

6.3 Conclusion

The results show that the activities undertaken by the municipality of Groningen and the Paddepoel climate-proof project organisation provided opportunities to build-up institutional capacities, such as intellectual, social, and political capital. Institutional capacities at the strategic level shaped the conditions for implementing a project such as Paddepoel climate-proof. For instance, challenging existing world views and current ways of working still appeared to be difficult at the strategic level. Therefore, during the project Paddepoel climate-proof integrating climate mitigation with adaptation has not always been self-evident. Lessons and best practices have been transferred towards a comparable in the neighbourhood of Selwerd. Here, it is clear from the start why a heat grid should be linked with objectives to make the neighbourhood climate adaptative and what the expected benefits are. In that sense, the municipality has built institutional capacities on a strategic level by implementing a project.

This research showed the importance of a dynamic view on institutional capacity. Research about climate policy integration should therefore not be limited to the analysis of the outcomes of integrated approaches. Consequently, this research contributes to the development of an analytical framework with key activities for building institutional capacities. The results can be used by (Dutch) medium-sized cities to improve their performance regarding climate change measures. The results can be less valuable for the context of small-sized cities. The activities for building institutional capacity require human and financial resources. With regard to human resources, employees with a so-called sensitivity for the environment and talent for integrated thinking have to be part of the team. For smaller municipalities this is often more difficult to attract such people. Furthermore, one can argue that intellectual capital is often limited in smaller municipalities.

6.3.1 Institutional lessons for Groningen and other medium-sized cities

The concept of institutional capacity building can be considered a fuzzy concept evolved in planning theory (Cars et al., 2017; Khakee, 2002; Healey, 1998). Insights and recommendations from this research may support planners and policy makers to develop institutional capacities to cope with the complexity related to climate policy integration. Based on the institutional weaknesses (Table 9 and 10), the following institutional lessons for Groningen and other medium-sized cities can be formulated.

- *Stimulate knowledge exchange*

In order to stimulate double loop learning the stimulation of knowledge exchange between stakeholders involved in climate mitigation and adaptation is suggested on a strategic level. This knowledge exchange can be stimulated by organizing sessions with the different stakeholders about how climate policy integration can be achieved. It is important that next to pluvial flooding, there is also a focus on heat stress and drought. In Groningen the Global Centre on Adaptation offers opportunities for stimulating knowledge exchange. Other municipalities are advised to start collaborations with knowledge institutes for creating a transdisciplinary knowledge base and thereby building up intellectual capital. Furthermore, checklists for area development can be created to make sure opportunities for climate policy integration are utilized.

- *Quantify climate adaptation*

On a strategic level, the second recommendation is to quantify the values for climate adaptation. At the moment, the financial gain is directly clear for climate mitigation measures in contrast to climate adaptation measures. Municipalities are advised to look beyond financial values, such as ecological, social, and psychological values. Examples of the added value of climate adaptation measures could be a decreased percentage in general practitioner visits, increased percentage of biodiversity, and increased percentage of social cohesion. Furthermore, pluvial flooding, drought, and heat stress should be included integrally. When quantifying these values these can subsequently be translated to monetary values and thereby building up social capital. When insight is gained in the saved costs, the financial gain is made clearer for climate adaptation.

- *Stimulate financial innovation*

On a strategic level, municipalities are advised to conduct research on exploring a construction in which climate mitigation can finance climate adaptation. A precondition is the involvement of a public organisation, because the financial benefits of climate adaptation are mainly related to the social domain. Furthermore, by merging existing budgets effectively, there is more to be spent. A precondition is that transparency in goals and aims of the involved stakeholders is guaranteed. New financial constructions can be tested on the basis of pilot projects, i.e. operational level. In order to stimulate financial innovation, the quantification of climate adaptation measures is considered important, i.e. the build-up of political capital.

- *Develop a climate policy integration narrative*

The development of a climate policy integration narrative appeared to be important when integrating climate mitigation with adaptation in urban planning. Having such an overarching story could potentially improve the collaboration between the involved stakeholders and thereby building up political capital. With such an overarching story the reason is clear from the start why stakeholders involved in both climate mitigation and adaptation should work together. Next to a focus on pluvial flooding, heat stress and drought also need to be part of this story. Therefore, municipalities are advised to create this narrative in collaboration with all the involved stakeholders. Furthermore, a climate policy integration narrative could facilitate the financial innovation proposed above. Developing a climate policy integration narrative is important on both the strategical level and the operational level.

- *Invest in new type of civil servant*

The results show that integrating climate mitigation with adaptation in urban planning asks for a new type of civil servant. On a strategic level, municipalities are advised to include criteria in their selection procedure of new employees that represent a so-called talent for integrated thinking, i.e. build-up of political capital. Furthermore, training and education needs to be provided for the existing staff to develop this integrated thinking. Ideally, a civil servant responsible for climate policy integration should be appointed. However, considering capacity issues within medium-sized cities educating and training existing staff is a first step. On the project level, it is important that such new type of civil servants is part of the project team.

- *Carefully select market parties*

When integrating climate mitigation measures with adaptation it is important to make clear agreements about the tender, the selection criteria, and the market parties that need to be involved. The construction of for example a heat grid and the realization of climate adaptation measures are still considered two different worlds. The best way to bring these two worlds together is to organize a tender with specialists from both worlds and select market parties for the tender together. This means that variety also needs to be considered during the tender process, i.e. the build-up of intellectual capital. The results show that it is best to have a municipality in charge of the tender process, because of their experience with addressing variety. Furthermore, people involved in the maintenance of the measures needs to be included at an early stage.

6.4 Reflections

6.4.1 Theoretical reflections

In understanding the relevance of this research, it is important to position this research in the current planning debate. In general, a shift from a technical rationality to a communicative rationality can be observed. A technical approach to planning is top-down, based on facts, sectoral-oriented, and content-related (de Roo, 2017). To the contrary, a communicative approach to planning is bottom-up, based on agreements, intersectoral-oriented, and value-related (de Roo, 2017). The principles of the communicative approach to planning have been fundamental for this research. A focus towards integrated policies and implementation practices can be considered as a shift away from technical rationality. More specific, this research can be positioned in a specific niche of the communicative planning domain, i.e. institutional capacity building theory. The concept of institutional capacity can be considered multi-interpretable and abstract. Research providing recommendations and insights into how institutional capacity can be built for the topic of climate policy integration remains scarce. To bridge the gap, an analytical framework is developed which can be used to study how medium-sized cities can build institutional capacity for integrating climate mitigation with adaptation in urban planning. The analytical framework proved to be a useful analytical lens to analyse the complexity of climate policy integration and to highlight key activities related to the build-up of institutional capacities by medium-sized cities. For this analytical framework the institutional barriers presented in Table 2 were used as an entry point. The activities needed to build institutional capacity are challenging these four main institutional barriers based on Biesbroek et al. (2009). During the data collection these institutional barriers have been

recognized in various dimensions. Therefore, the basis of Biesbroek's work can be considered a solid entry point for developing an analytical framework.

Operationalizations of the concept of institutional capacity building have also been done by Laeni et al. (2020) for the context of international flood resilience programs and by Breukers and Wolsink (2007) for the context of ecological modernization. Both Laeni et al. (2020) and Breukers and Wolsink (2007) point out inclusiveness is considered important in building institutional capacities. This research shows comparable outcomes, i.e. the importance of addressing variety. Similar to these researches the challenges for building institutional capacity are related to continuous and reflexive learning (Laeni et al., 2020), financing (Laeni et al., 2020), and joint problem solving and learning (Breukers & Wolsink, 2007).

Developing the analytical framework for analysing and building institutional capacity took up the largest share of this research. Therefore, it is important to reflect on the capitals and activities that comprise this analytical framework. The three capitals (intellectual, social, and political) provided by Cars et al. (2017), Healey (1998), and Khakee (2002) are considered valuable because of the comprehensiveness and holisticity of the capitals. However, this also means that the operationalization of these three capitals is open to the interpretation of the researcher. Additional activities might be overlooked by the researcher when composing the analytical framework. To illustrate, the activity 'encouraging shared values' have been added to the analytical framework after the data collection has been done. Furthermore, the operationalization of the capitals is again open to the interpretation of the researcher, even though descriptions have been provided.

To illustrate, the activity 'creating transdisciplinary knowledge base' sounds as something tangible. Although it can be argued that this transdisciplinary knowledge is more in people's minds and therefore difficult to measure. Furthermore, the activity 'stimulating double loop learning' has been operationalized as 'challenging existing norms and basic assumptions'. It can be argued that this is a broad operationalization and therefore difficult to measure. In further research one might look into evaluating the learning capacity of organizations. This is what Gutpa et al. (2010) describe as the creation of institutional memory.

Considering the extensive scope of the analytical framework data on a wide range of topics had to be gathered. To illustrate, three capitals with 11 activities in total had to be analysed. Due to limited resources and time the researcher was not able to get into detail on every capital and its related activities. For example, the activity 'stimulating double loop learning' is an extensive concept in itself.

However, the extensive scope of the analytical framework also had an advantage. Analysing all the three capitals for this research provided a holistic understanding of the complexity of climate policy integration. It can be concluded that the analytical framework provided a solid foundation for advancing current knowledge about climate policy integration and can be applied to a broad range of contexts. The relevance of the analytical framework is based on the links with climate policy integration, mainstreaming approaches for climate mitigation and adaptation, and sustainable development. Conducting more interviews would have improved the outcomes of the research. This provides potential for further research for elaborating on the understanding of institutional capacity building for climate policy integration.

6.4.2 Reflections on research design

In this sub-section reflections are made relating to the validity and reliability of the research. External validity means the expected use of the research outcomes. One of the drawbacks of a case study research is that no generalizations can be made (Clifford et al., 2016). According to Biesbroek et al. (2009), the uniqueness of each locality complicates the search for unequivocal spatial planning approaches. However, the aim of this research is not to make general statements, but rather to unravel the complexity of the integration process by using concrete, context-dependent knowledge. In his work, Flyvbjerg (2006) defends five misunderstandings about case study research. One of them is that one cannot generalize from a single or small number of cases, and therefore, this research design cannot contribute to scientific development. However, Flyvbjerg (2006) argues that this depends on the case. Therefore, the results can be of value for area redevelopment projects with the same characteristics in mid-sized Dutch cities. Furthermore, it can be argued that generalizations are overrated as the main source of scientific development. When knowledge cannot be formally processed in generalizations does not mean that it cannot enter into the collective process of knowledge accumulation (Flyvbjerg 2006). Therefore, a single or small case study approach can be of value for scientific progress without formulating generalizations.

The internal validity indicates the use of correct units of measurements and correct assumptions. What could have influenced the internal validity is a so-called observer bias, this is especially the case with doing observations. Different researchers may assess subjective criteria differently, including assumptions and preconceptions (cognitive biases). This can influence the way a subject is being researched. There are researchers commenting that the case study is highly subjective, by giving too much scope for the researcher's own interpretation (Flyvbjerg, 2006). Hence, influencing the validity of the data. Especially, institutional capacity building is a topic that gives plenty room for own interpretation by the researcher. However, documenting all the steps taken by the researcher can tackle this problem partly, e.g. transcribing and coding data. Additionally, the original quotes are shown to avoid possible loss in interpretation when translating the quotes from Dutch to English. Furthermore, it can be argued that the observer bias is limited, as the researcher does not live in the nearby area of the selected projects. Therefore, there is no reason for the researcher to influence the process or outcome of the projects. An analysis on existing literature strengthens the internal validity as the elements of the analytical framework are examined by many researchers. Another way to strengthen the correct use of units of measurements is to test the interview questions with people that are willing to serve as subjects. In this way, the researcher is able to track down questions that are unclear or questions that could be misinterpreted.

Reliability means that when this research would be repeated by another researcher, the researcher will find comparable outcomes. To increase the reliability of the outcomes multiple sources of evidence are used. In this way, a certain outcome is checked on the basis of multiple data collection methods. According to Olsen (2004) triangulation can widen the understanding of the results and strengthen the reliability of the results. Furthermore, doing the interview with prior knowledge from the document analysis, enables the researcher to fill in knowledge gaps. Another way to increase the reliability is the way in which questions are formulated. During the interviews the researcher tried to ask questions in a neutral way, i.e. questions that are not guiding the participants answers in a certain direction. Lastly, during the interview the researcher tried to summarize parts of the interview in order to avoid misunderstandings.

What could have influenced the reliability of the data obtained during the attended meetings is the so-called Hawthorne effect. This is the alteration of behaviour by subjects due to their awareness of being observed. Furthermore, an informed consent has not been used for the attended meetings. In order to increase the reliability of this research, these attended meetings are only used as background information and getting acquainted with the topic and the context instead of using the attended meetings as data to be analysed. Furthermore, due to the COVID-19 pandemic the researcher was forced to conduct all the interviews online via Google Meet. Sometimes the researcher was not able to hear the properly because of technical issues and the researcher experienced a difficulty in interrupting or asking follow-up questions because of the online environment. Also, it is difficult to read body language when conducting online interviews. An advantage of conducting online interviews is that potential participants are more likely to participate, because of time-efficiency. Lastly, what could have influenced the reliability of the data about inclusiveness of inhabitants is that interviewing inhabitants has not been included in the scope of this research. The experience of inhabitants has been gained by interviewing the citizens' representative of neighbourhood organization Co-Creatie. Therefore, statements about inhabitants might be biased.

6.5 Suggestions for further research

The first suggestion for further research is to study more projects in medium-sized or smaller Dutch cities by testing the analytical framework on how to build institutional capacity. This is especially relevant for the Dutch government. In 2018 the Dutch government proposed to financially support pilot projects that aim to accelerate the transition towards climate adaptation. One of the eligibility criteria for this subsidy is to integrate climate adaptation with mitigation (Kennisportaal Ruimtelijke Adaptatie, 2020). The everyday practices of climate policy integration have been characterized as situational and context dependent by many authors. Therefore, it would be interesting to carry out a comparative research to be able to make better generalizations of the outcomes of the pilot projects. Especially the medium-sized and smaller cities are interesting to research as they might have fewer resources to build institutional capacities compared to larger cities.

In this research the analytical framework has been used to study institutional capacity building. Further research could focus on the translation of this analytical framework into a policy tool to guide planning practitioners. According to Storbjörk and Ugglå (2015) local authorities are in need of recommendations and guidelines for how to integrate climate objectives in urban planning. In addition, there is no framework for climate policy integration in planning practice (Uittenbroek, 2016; Urwin & Jordan, 2008).

At the moment, many projects that aim to combat climate change are labelled as pilot projects. As became clear from the data collection, already many lessons have been learned about integrating a heat grid with climate adaptation measures in the neighbourhood of Paddepoel in Groningen. For further research it would be interesting to analyse how these lessons are being institutionalized. This is what Gupta et al. (2010) refer to as institutional memory. Building institutional capacity seems to be important for innovation and collective learning in order to deal with complex problems.

Lastly, a follow-up on this research might take a longitudinal perspective on integrating climate mitigation with adaptation in urban planning. Both climate mitigation and adaptation have

followed their own pathway and have become institutionalized in different ways. Recently, awareness has been created about integrating these two approaches to combat climate change. By analysing the transition from sector-based policies towards integrated and holistic approaches, critical conditions might be identified that contribute to this transition.

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Appendices

Interview guide

Ik ben momenteel bezig met de afronding van de master planologie aan de Rijksuniversiteit Groningen. Mijn afstudeeronderzoek gaat over de koppeling van klimaat mitigatie en klimaat adaptatie. Uit onderzoek komt naar voren dat deze werelden vaak nog erg gescheiden zijn met veel verschillende stakeholders. Voor mijn onderzoek kijk ik specifiek naar het project in Paddepoel (o.a. plutolaan). Waar een warmtenet is aangelegd en de ambitie was om klimaat adaptieve maatregelen mee te koppelen. Maar daarnaast ben ik ook benieuwd naar hoe de koppeling op strategisch niveau geregeld is.

Ik focus mijn onderzoek op de bestuurlijke problemen tijdens het proces. Daaronder versta ik bijvoorbeeld verschillende benaderingen en perspectieven ten aanzien van mitigatie en adaptatie, bepaalde manieren van werken. Met mijn onderzoek hoop ik inzicht te krijgen in hoe vermogen kan worden opgebouwd om de samenwerking tussen de stakeholders te verbeteren. Is dit voor jou een beetje duidelijk?

Introductie

- Zou u uzelf willen voorstellen? (Functie, werkzaamheden)
 - Wat is uw rol binnen het project geweest?
- Kunt u aan mij omschrijven hoe het proces volgens u verlopen is? (Dilemma's)
- Welke bestuurlijke barrières bent u tegengekomen als het gaat om de integratie van mitigatie en adaptatie (samenwerken)?

Door mensen opgelegde structuren die handelen conditioneren (wet en regelgeving, bepaalde manieren van werken, organisatiestructuren)

Leerproces

- Aan wat voor soort kennis is er behoefte?
- In hoeverre is er sprake van intellectueel begrip? (Spreken zelfde jargon)
- In hoeverre is er sprake van integratie van kennis? En zo ja, hoe wordt dit gedaan? (Tools, klimaatkaarten, gezamenlijk probleemdefinitie en perspectief)
- In hoeverre bestaat er openheid en flexibiliteit ten opzichte van nieuwe ideeën en verschillend gedachtegoed?
- Wat is uw ervaring tot het verkrijgen van nieuwe informatie tijdens het project?
- Welke rol speelt lokale kennis voor het koppelen van klimaatadaptatie en mitigatie?

Sociaal kapitaal

- Hoe zou u de relatie tussen stakeholders willen omschrijven? (Verschillende levels en sectoren, netwerken, samenwerking)
 - Wordt iedereen geïncludeerd?
- In hoeverre bestaat er een gedeelde visie bij de betrokken actoren?
- Hoe wordt kennisoverdracht tussen actoren gestimuleerd?
- Hoe wordt er vertrouwen opgebouwd tussen de betrokken actoren?
- Hoe zou u de aard van de bestaande netwerken omschrijven? (Contact tussen stakeholders, formeel, informeel, koppeling tussen bestaande netwerken, omvang)
 - En wat is daar de invloed van op het integratieproces?

Politiek kapitaal (instrumenten & middelen)

- In hoeverre faciliteert bestaande wet- en regelgeving de integratie van mitigatie en adaptatie?
- Wie zijn volgens u sleutelpersonen in het proces? (Functie, werkzaamheden, rol)
- Wie zijn volgens u zogenoemde 'project champions'? (Hardmaken voor het project/integratie)
- Welke momenten/gebeurtenissen tijdens het proces gaven kans om mitigatie met adaptatie te integreren? (Windows of opportunity)
- Zijn er activiteiten georganiseerd die de opbouw van sociaal kapitaal en kennisdeling stimuleren? (Door wie)
- In welke mate zijn hulpbronnen beschikbaar? (Allocatie budgetten, beoordelingsinstrumenten, evaluatie-instrumenten)
 - En wat is daar de invloed van op het integratieproces?

Afsluiting

- Bent u tijdens het proces nog andere institutionele/bestuurlijke problemen tegengekomen die we nog niet besproken hebben?
- Wat zijn volgens u lessen die geleerd kunnen worden van dit project? (Lessen voor de toekomst, toekomstige bottleneck)
 - Concrete voorbeelden
- Hoe zou u een soortgelijk project vormgeven? (Wat wel en niet doen)
- Kent u nog andere personen die bereid zouden zijn om mee te werken aan dit onderzoek?
- Zijn er nog vergaderingen et cetera die ik zou mogen bijwonen?

Code book

Code categories	Sub-categories	Sub-categories	Inductive/ deductive	
Complementarity approach	Parts	Co-benefits	Deductive	
Synergy approach	Whole	Holistic and integrated	Deductive	
Institutional barrier	Difference in scientific approach	Aim measures	Deductive	
		Knowledge production	Deductive	
		Managing uncertainties	Deductive	
	Difference in perspective on time	Temporal scale	Deductive	
	Difference in spatial scale	Spatial scale	Deductive	
		Benefits	Deductive	
	Sectoral approach with regard to involving stakeholders	Involvement stakeholders	Deductive	
		Measuring effectiveness	Deductive	
Implementation approaches		Deductive		
Institutional capacity building activity	Intellectual capital building	Using urban climate maps	Deductive	
		Addressing variety of actors, levels, and scales	Deductive	
		Creating transdisciplinary knowledge base	Deductive	
		Using local knowledge	Deductive	
		Stimulating double loop learning	Deductive	
		Tender	Inductive	
	Social capital building	Creating arenas for knowledge exchange	Deductive	
		Creating transboundary networks	Deductive	
		Encouraging shared values	Inductive	
	Political capital building	Stimulating leadership and change agents	Deductive	
		Allocating shared budget	Deductive	
		Developing a climate policy integration narrative	Deductive	
		Including assessment tools and evaluation methods	Deductive	
		Environmental Planning Act	Inductive	
		Human resources	Inductive	
		External influences	Corona pandemic	

Table 11 Code book

Informed consent

INFORMED CONSENT FORMULIER

Naam van het onderzoeksproject	Implementatie klimaat-mitigerende en klimaat-adaptieve maatregelen
Doel van het onderzoek	Het interview waaraan u deelneemt zal voor meerdere onderzoeksdoeleinden worden gebruikt. Hieronder vallen de onderzoeken van Allard Roest (projectleider Hanze Hogeschool), Allard Roest (PhD Rijksuniversiteit Groningen) en Welmoed Claus (masterthesis Rijksuniversiteit Groningen). Het doel van deze onderzoeken is om meer inzicht te krijgen in de samenwerking tussen gemeenten, gemeentelijk afdelingen, bewoners, bewonersorganisaties en bedrijven op het gebied van klimaatmitigatie en klimaatadaptatie.
Gang van zaken tijdens het onderzoek	Van het interview zal een audio-opname worden gemaakt, zodat het gesprek later woord voor woord kan worden uitgewerkt. Dit transcript wordt vervolgens gebruikt in verdere onderzoeken. Daarnaast is het mogelijk dat er aan de hand van dit transcript vragen zijn bij een van de onderzoekers, in dat geval zal de onderzoeker trachten u te benaderen voor een vervolginterview.
Vertrouwelijkheid van gegevens	<p>Uw privacy is en blijft maximaal beschermd. Er wordt op geen enkele wijze vertrouwelijke informatie of persoonsgegevens van of over u naar buiten gebracht, waardoor iemand u zal kunnen herkennen.</p> <p>Voordat onze onderzoeksgegevens naar buiten gebracht worden, worden uw gegevens geanonimiseerd. Bij de start van het transcriberen krijgt uw naam een pseudoniem. Op deze manier kan wel worden onderzocht wat u in het gesprek aangeeft, maar weten de betrokken onderzoekers niet dat u het bent. De onderzoeker die het interview heeft afgenomen is verantwoordelijk voor dit pseudoniem. De audio-opnamen, formulieren en andere documenten die in het kader van deze studie worden gemaakt of verzameld, worden opgeslagen op de beveiligde (versleutelde) computers van de onderzoekers.</p> <p>In een publicatie zullen anonieme gegevens worden gebruikt. Wanneer citaten worden gebruikt in publicaties zal uw toestemming hier nogmaals voor worden gevraagd. Om uw privacy te waarborgen zal een pseudoniem in de vorm van de functie die u bekleedt en/of de organisatie waarvoor u werkt worden gebruikt, bijvoorbeeld beleidsadviseur klimaatadaptatie bij de gemeente Groningen.</p>

<p>Vrijwilligheid</p>	<p>Deelname aan dit onderzoek is geheel vrijwillig. U hoeft geen vragen te beantwoorden die u niet wilt beantwoorden. U kunt als deelnemer uw medewerking aan het onderzoek te allen tijde stoppen, of weigeren dat uw gegevens voor het onderzoek mogen worden gebruikt, zonder opgaaf van redenen.</p> <p>Als u tijdens het onderzoek of na de bedenktijd van 5 werkdagen, besluit om uw medewerking te staken, zal dat eveneens op geen enkele wijze gevolgen voor u hebben. Echter: de gegevens die u hebt verstrekt tot aan het moment waarop uw deelname stopt, zal in het onderzoek gebruikt worden, inclusief de bescherming van uw privacy zoals hierboven beschreven. Er worden uiteraard geen nieuwe gegevens verzameld of gebruikt.</p> <p>Als u besluit om te stoppen met deelname aan het onderzoek, of als u vragen of klachten heeft, of uw bezorgdheid kenbaar wilt maken, of een vorm van schade of ongemak vanwege het onderzoek, neemt u dan contact op met:</p> <p>a.h.roest@pl.hanze.nl en/of w.claus@student.rug.nl</p>
<p>Toestemmingsverklaring</p>	<p>Met uw ondertekening van dit document geeft aan dat u goed bent geïnformeerd over het onderzoek, de manier waarop de onderzoeksgegevens worden verzameld, gebruikt en behandeld en welke eventuele risico's u zou kunnen lopen door te participeren in dit onderzoek</p> <p>Indien u vragen had, geeft u bij ondertekening aan dat u deze vragen heeft kunnen stellen en dat deze vragen helder en duidelijk zijn beantwoord. U geeft aan dat u vrijwillig akkoord gaat met uw deelname aan dit onderzoek. Indien u daar behoefte aan heeft ontvangt u een kopie van dit ondertekende toestemmingsformulier.</p> <p>Ik ga akkoord met deelname aan een onderzoeksproject van Allard Hans Roest & Welmoed Claus. Het doel van dit document is om de voorwaarden van mijn deelname aan het project vast te leggen.</p> <ol style="list-style-type: none"> 1. Ik kreeg voldoende informatie over dit onderzoeksproject. Het doel van mijn deelname als een geïnterviewde in dit project is voor mij helder uitgelegd en ik weet wat dit voor mij betekent. 2. Mijn deelname als geïnterviewde in dit project is vrijwillig. Er is geen expliciete of impliciete dwang voor mij om aan dit onderzoek deel te nemen. 3. Het interview zal circa 60 minuten duren. Ik geef de onderzoeker toestemming om tijdens het interview opnames (geluid) te maken en schriftelijke notities te nemen. Het is mij duidelijk dat, als ik toch bezwaar heb met een of meer punten zoals hierboven benoemd, ik op elk moment mijn deelname, zonder opgaaf van redenen, kan stoppen.

	<p>4. Ik heb het recht om vragen niet te beantwoorden. Als ik me tijdens het interview ongemakkelijk voel, heb ik het recht om mijn deelname aan het interview te stoppen.</p> <p>5. Ik heb van de onderzoeker de uitdrukkelijke garantie gekregen dat de onderzoeker er zorg voor draagt dat ik niet ben te identificeren in door het onderzoek naar buiten gebrachte gegevens, rapporten of artikelen. Mijn privacy is gewaarborgd als deelnemer aan dit onderzoek. Wanneer citaten gebruikt zullen worden in publicaties wordt mijn toestemming nogmaals gevraagd door de onderzoeker.</p> <p>7. Ik heb dit formulier gelezen en begrepen. Al mijn vragen zijn naar mijn tevredenheid beantwoord en ik ben vrijwillig akkoord met deelname aan dit onderzoek.</p>	
Handtekening en datum	Naam Deelnemer:	Naam onderzoeker:
	Handtekening:	Handtekening:
	Datum:	Datum:

Original quotes

31. “Maar de focus van die afdeling die nu die stresstest in de uitvoeringsagenda verwerkt is wel echt water, water, water. En dat vind ik zelf iets heel jammers. Want eigenlijk wil je gewoon dat water, hitte en droogte allemaal tegelijkertijd wordt aangepakt. Want ja, de oplossingen lijken zo op elkaar. En ook als je, ze hebben ook, en daar moet je *NAAM* maar over vragen. Die hebben hele ontwerp matrixen van hoe ze nou wegen kunnen aanpassen. En dat gaat van verlagen van een ondergrondse berging. Maar het is allemaal water gefocust. Niet dat ze een ontwerp matrix hebben van hey kijk nou eerst of een probleemkoppeling is. Dus dat je iets meer geld kan uitgeven en daarmee twee problemen kan oplossen. Het is allemaal water en zo goedkoop mogelijk.”
32. “En elk stadsdeel krijgt een eigen wijkwethouder met een klein clubje mensen eromheen. Die gezamenlijk eigenlijk proberen aan de ene kant binnen de gemeenteprogramma's te verbinden met elkaar. Koppelingen te leggen tussen verschillende programma's. En aan de andere kant dat ook te verbinden met dat wat er in de wijk gebeurt. En het perspectief vanuit de bewoners.”
33. “Kijk het is sowieso een lastig omdat je gewoon twee verschillende wethouders hebt die je moet bedienen. Ehm, en die willen, ja die willen ook gewoon scoren soms he. Hoe eenduidig, hoe duidelijker een bepaalde boodschap is. Bijvoorbeeld de aanplant van groene bomen. Of aanplanten van bomen. Of zoveel vierkante meter groen dak gerealiseerd of zo. Weet je daar kan een wethouder mee scoren. Dus dat vraagt, het zou heel mooi zijn als je gewoon 1 wethouder hebt die verantwoordelijk is voor de hele duurzaamheids, of voor de combinatie van de energietransitie en klimaatadaptatie. Die gewoon klimaat in de portefeuille heeft.”
34. “Ik denk dat, even kijken wat wou ik zeggen, dat, wat, wat, waardoor de samenwerking soms wat moeilijker kan zijn zeg maar dat energie. Investeren in energie kan je ook terugverdienen. Dus als je overstapt op duurzame energie of juist die energie transitie in gang zet dan zit er ook altijd een soort van verdienmodel achter. En heeft adaptatie niet. Tenminste niet, je kunt natuurlijk wel uitrekenen van naja als we over 50 jaar te maken krijgen met dit soort regenbuien betekent dat de schade van zoveel dus door te investeren in adaptatie voorkom je die schade. Maar dat is altijd achteraf redeneren. En dat is altijd een beetje speculatief. Want ja, het hoeft niet te gebeuren zeg maar die regenbuien die plaatsvinden over 50 jaar. Terwijl, dus daarin zeg maar zit gewoon een andere manier van ja hoe ga je om met de kosten.”
35. “Al aangetoond dat een stuk of 10 woningen water in de woning kunnen verwachten. Nou dat kan misschien wel 2,5 ton gaan kosten. Die schade. Betekent dat nou dat een maatregel, bijvoorbeeld de aanleg van een groot riool maximaal 2,5 ton mag kosten. Dat is eigenlijk iets nog iets waar we zoekende naar zijn. Van wat mag schade nu eigenlijk. Of hoeveel mag de maatregelen eigenlijk maximaal gaan kosten om iets op te lossen?”
36. “Inzichten in hoe de openbare ruimte klimaat adaptief kan worden ingericht, veranderen op dit moment nog regelmatig. Daarom is het lastig om exacte normen voor de ultieme klimaat adaptieve inrichting te formuleren. Anderzijds kunnen we niet meer afwachten. De richtlijnen die we hebben opgesteld, gebruiken we als input voor onze (stedenbouwkundige) ontwerpen en voor onze gesprekken met bijvoorbeeld ontwikkelaars en andere gebruikers/belanghebbenden bij de openbare ruimte.

- Hiermee wordt klimaatadaptatie onderdeel van gesprek in alle ruimtelijk, fysieke maatregelen die wij zelf of ontwikkelaars nemen/ontwikkelen. De (on)mogelijkheden van klimaat adaptieve maatregelen worden hierdoor meer dan voorheen verkend.”
37. “De komst van het GCA biedt (economische) kansen voor de regio om onze ‘koplopers rol’ op het gebied van energie en klimaat verder te ontwikkelen. Onze regio is immers al koploper bij energiemitigatie en energietransitie.”
 38. “En dat wordt door de gebiedsteams vaak wel, als je daar de goede mensen op hebt, wel goed gekoppeld zeg maar. En daar was dus *NAAM* een voorbeeld van. Die zat in het gebiedsteam. En die ziet dingen gebeuren en die denk van hey. Maar dat moet ook wel in je zitten. Daar moet je wel talent voor hebben. En ik weet niet of zij alle mensen uit gebiedsteams hebben geselecteerd op die goede kwaliteit.”
 39. “Uiteindelijk gaat het ook heel veel om geld natuurlijk. Dus en dat is de andere tak eigenlijk. Dat je verschillende potjes met geld bij elkaar moet zien te harken zeg maar. En die potjes met geld moeten ook nog op hetzelfde moment bij elkaar komen. En soms kan het zijn dat de ene pot met geld eigenlijk voor dit jaar is. En de andere pot met geld is voor een ander jaar. Maar omdat zich een kans voordoet moet je soms wat schuiven in programma's en begrotingen zodat het wel past. Dat moet je als je wilt gaan samenwerken, vanuit verschillende programma's, moet je die flexibiliteit hebben. Of maken. Om een klein beetje te schuiven en een klein beetje in te schikken. Voor ook je gezamenlijk belang zal ik maar zeggen.”
 40. “Eigenlijk is er heel duidelijk een onderscheid voor. Duidelijk hoeveel geld er gereserveerd is voor wateroverlast. En dat staat dan los van bijvoorbeeld hittestress.”
 41. “We hebben iets van een miljoen subsidie gekregen van het Rijk voor die klimaat adaptieve maatregelen. Dus dat is een behoorlijk bedrag zeg maar. Als het gaat over meekoppelen dan denk je dat doe je er even bij. En dat hoeft niet zo heel veel extra te kosten. Maar wat mij op viel is dat als je dat echt goed wilt doen. Dat er dus ook flinke kosten aan zitten. Dus dat het nog best wel eens een illusie zou kunnen zijn dat we alles met meekoppelen kunnen oplossen. Maar ja dat is niet echt positief. Maar daar zitten we wel heel erg op. Dus heel erg als er iets gebeurt dan doen we dat gelijk op een klimaat adaptieve manier. Nou daar is nog wel heel wat voor nodig. En zeker nog een heel groot budget voor nodig om dat voor elkaar te krijgen.”
 42. “Op onze programma meerjaren onderhoud staat dat we volgend jaar het asfalt gaan vervangen. Ja het is, het is onbegrijpelijk voor inwoners. En ik denk dat je, dat we, je er echt wel aan moet werken om dat anders te moeten doen. Het is als inwoner niet te begrijpen. Als je vaker de weg opengooit voor verschillende klusjes. En daarom moet je gewoon koppelen.”
 43. “Ik heb zelf wel eens gedacht zou je bij elke gebiedsontwikkeling een soort checklist moeten hebben. Ik heb he. Al dan niet, dat het via ICT geregeld wordt. Dat als er iets komt dat via elk programma dat daar maar annex mee is of die daar wellicht annex mee is. Een pop-up gaat of een mailtje van dit ligt er. En moeten we hier wat van vinden ofzo. Zodat je nooit een afdeling over kan slaan. Omdat iemand of z'n hoofd er niet naar stond. Of misschien niet dat talent heeft om integraal te werken. Want dat integraal werken moeten we allemaal doen. Maar kan iedereen dat? Ja. Dat is maar de vraag. Dus of je dat formeel moet maken of inderdaad op z'n minst een smoelenboek. Dat. En dat je gewoon checklisten hebt.”
 44. “Dus het is uiteindelijk wel goed gekomen, maar mwah het was wel een, eigenlijk een hele vliegende start. De gemeente moest op een rijdende trein springen zeg maar.”

45. “Daar was nog best wel wat gedoe om ook naja iedereen zo ver te krijgen. Want zij zaten natuurlijk al op, op een spoor. Op een lijn. En ze waren eigenlijk al een heel eind op weg toen werd eigenlijk weer een beetje teruggehaald. Zo van ja wacht even dit moet er eigenlijk ook bij.”
46. “En we hebben natuurlijk subsidie aangevraagd op klimaatadaptatie in combinatie met mitigatie. Maar het kwam vanuit het potje klimaatadaptatie. En op een gegeven moment leek het een beetje een zijdingetje te worden. Dan gaat het ineens weer over de weg. Nee, het gaat niet over de weg. Het ging over klimaatadaptatie nadat er zo'n ding in lag.”
47. “Nou in ieder geval voor mij is het duidelijker om bijvoorbeeld te onderzoeken wat is exact het schade beeld. In de Plutolaan wisten we dat er, dat we wateroverlast konden verwachten. Maar hoeveel en waar. En. Dat dus niet. En daar hebben we dus nu ook rekenprogramma's voor. En daar zijn we in Selwerd al wel druk mee geweest. Eigenlijk een programma die weergeeft hoeveel. Nou goed hoe het water stroomt. Je laat er een hele hevige bui op los. En dan lageregelegen gebieden die komen dan onder water te staan. En ja, op zo'n manier kun je dan zien. Ook. En daarnaast kun je dus eenvoudig berekenen wat de effecten zijn van bijvoorbeeld een wadi of het verlagen van een rijbaan.”
48. “We wilden het eigenlijk zo doen dat we een gezamenlijke aanbesteding zouden uitzetten. Voor zowel de mitigatie onderdelen als de adaptatie ding. Bovengronds. En dat is aan het begin. Volgens mij is dat ook allemaal spaak gelopen in eerste instantie. Ook omdat Warmtestad heel veel ervaring heeft met aanbestedingen, maar dan alleen ondergronds. En niet ervaringen met aanbestedingen als het gaat om bovengronds. En wat voor ja. Maar uiteindelijk heeft Warmtestad, heeft die dat allemaal zelf uitgezet. Zonder de gemeente daar goed in mee te nemen. Het hele bestek hebben ze uiteindelijk hun eigen plan getrokken. En dat heeft uiteindelijk wel tot wat vertragingen bij de uitvoering geleid. En volgens mij hebben ze dat nu in de nieuwe samenwerking hebben ze dan gezegd. De aanbesteding moet gewoon via de gemeente lopen. We hebben hier genoeg expertise in huis om dat te kunnen doen.”
49. “Eigenlijk waren de bewoners best wel over eens. Het is grappig dat we eigenlijk, dat hele andere ideeën uitkwamen dan wat de gemeente had bedacht. Dus mensen zeiden van ja ze wilden allemaal wel die weg wat smaller hebben. Nou dat was natuurlijk heel leuk. Toevallig. Want ze zeiden van dan een beetje slingeren. En dwarsparkeren. En dan een soort perkjes met. Naja. Dus niet zo saai, niet zo'n saaie rechte straat. Naja, op zichzelf was dat best al heel leuk. Dus zo ver waren we toen. Toen heb ik nog een tweede bijeenkomst georganiseerd. En daar hebben we eigenlijk besproken over nou de verdere inrichting van wat dan precies. Was iemand die een heel precies bomen plan heeft gemaakt. Want men wilde allemaal verschillende bomen in de straat. Dus dat is vrij uniek. In plaats van 1 rij dezelfde zeiden ze van nee biodiversiteit. Ze wilden echt bomen en struikjes. Zodat je altijd wel iets in de bloei hebt. Of altijd wel ergens. Wat ze niet willen is vallende vruchtjes. Die staan al in de straat, die willen ze dan weg hebben. Nou en zo kwam er een heel aantal dingen.”
50. “Dus dat is best, best, best even lastig. En zeker in de Plutolaan was dat voor het eerst. Dus dan moet je daar wat extra moeite voor doen om zo'n project van de grond te komen. En naar mijn idee in Selwerd Zuid was dat veel meer van wat moeten we precies gaan doen zeg maar. Ging het veel meer al om de inhoud en hoe kunnen we het een zo goed mogelijk project. Dan was het niet meer een vraag of we het zouden doen zeg maar.”

51. “Daar staat onze keet. Ik denk die bereikbaarheid, benaderbaarheid, laagdrempeligheid van ons wel heel erg belangrijk is inderdaad.”
52. “Je bent twee aparte bedrijven/instellingen met allebei je eigen resultaten/doelstellingen. En in dit geval, WarmteStad heeft een businesscase gemaakt op basis van een bepaald groeiscenario. Wij zijn door de gemeente opgericht, mede door de gemeente opgericht om de klimaatdoelstellingen van Groningen te behalen. En dat kan alleen als we een bepaalde groei volgen. En die groei hebben we zeg maar uitgestippeld in ons warmteplan. En aan de hand van dat warmteplan hebben we zeg maar een businesscase gemaakt.”
53. “Op zich was dat nog best wel moeizaam, want WarmteStad die wilde eigenlijk helemaal niet ook nog eens iets met klimaatadaptatie. En dat ze het misschien wel interessant vonden. Zij hadden gewoon zoiets ja wij moeten gewoon het warmtenet aanleggen en dit is gewoon, dit gaan we gewoon doen. En het is alleen maar ingewikkeld en lastig dat we dan ook nog de straat anders moeten inrichten. En dat we met bewoners in gesprek moeten hierover. En daar komen allemaal maar meer kosten bij. Zij wilden gewoon snel en efficiënt.”
54. “Je loopt een compleet ander tempo. En je wordt anders aangestuurd. Om dat te synchroniseren op een of andere manier. Eigenlijk zijn dat twee dingen. De aansturing is iets anders. De, de, waarvan je zeg maar doet wat je doet. En anderzijds het tempo. Je hebt twee verschillende organisaties. De ene organisaties doet de voorbereiding een half jaar en een andere doet het in een jaar of twee jaar of wat dan ook. En om dat samen te brengen. Nou dat is wel echt, dat zie ik nog als de grootste uitdaging.”
55. “Als je gewoon een warmteleiding wil leggen, zo goedkoop mogelijk van A naar B. Dan dien jij daarmee de klant zeg maar.”
56. “Toen kwam nog wel een beetje het lastige proces van ja hoe transparant ben je dan naar elkaar. En daarin merk je dan toch weer die agenda's zitten. Van niet een kijkje in de keuken willen geven van wat kost nou iets. En hoeveel werk en tijd ben je eraan kwijt. Waar je gewoon zegt van doe mij jullie begroting, die kan ik dan gebruiken als co-financiering voor de aanvraag. Nou die krijg je niet zomaar”.
57. “Je moest ook een beetje aan elkaar wennen. En het waterbedrijf is veel strakker dan de gemeente nog. Die zijn wat meer van naja heel erg van doelen, resultaten, check, check, check. Weet je wel. Aftikken. Heel, heel, ja hoe komen we zo snel mogelijk in een rechte lijn van a naar b.”
58. “Dat is wel wat ik ook bedoelde met de projectleider niet zo zeer meer de technaut is. Maar echt iemand met voelsprietjes voor de omgeving. Dat is haast belangrijker op dit moment.”
59. “In de Plutolaan was dat nog even wennen zal ik maar zeggen. Daar kwam ook stadsbeheer ineens aan tafel zitten. Om, om, ja. Die dachten in het begin ook wat gebeurt hier nou. En WarmteStad hetzelfde. En maar als je eenmaal dat bij elkaar hebt. Dan is 1 en 1 3 zeg maar. Dus ja het zijn wel allemaal aparte begrotingen die je op een hoop moet gaan zitten gooien. Dus dat is best, best, best even lastig. En zeker in de Plutolaan was dat voor het eerst. Dus dan moet je daar wat extra moeite voor doen om zo'n project van de grond te komen.”
60. “Dus werd er wat geflyerd in de hele Plutolaan. Een klein flyertje dat heette van modderboel naar goed gevoel. En dat begon ook met de zin van nou straks gaat die straat eruit. En wat wilt u eigenlijk terugzien in die straat?”

