MASTER THESIS

SYNERGIES BETWEEN CLIMATE ADAPTATION OBJECTIVES AND OTHER GOALS

HOW THEY CAN BE ACHIEVED IN URBAN DEVELOPMENT PROJECTS

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Synergies between climate adaptation objectives and other goals: how they can be achieved in urban development projects

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Abstract

Nowadays, it is widely acknowledged that mitigation in the face of climate change is not sufficient to protect humans and human settlements; cities need to also adapt to the impacts of climate change in order to truly become climate-resilient. Nevertheless, there is little reporting regarding how cities are implementing climate adaptation in practice or about how policy is translated into actions that improve a city's ability to adapt to extreme weather conditions. This is evident in the domain of urban development, a crucial field for integrating adaptation measures with other objectives and making cities climate adaptive. Considering this, the objective of the present research is to explore how cities can realize climate adaptation objectives alongside other goals by achieving synergies between them. To succeed in this, it focuses on the domain of urban development and investigates how the aforementioned synergies can be achieved, as well as which factors influence the outcome of this process. The methodology consists of a literature review and a case study of four urban development project in the Netherlands and Germany. The results include a conceptual model which illustrates how synergies between climate adaptation objectives and other goals can be achieved, 22 factors that influence the achievement of those synergies and their categorization into necessary or supportive conditions to a successful outcome. To my knowledge, this is the first research that explores in depth how climate adaptation can be achieved alongside other goals in practice.

Keywords: climate adaptation, synergies, urban development projects

1. Introduction

Climate change is one of the key challenges of our time. Besides NASA proving data that prove the notable increase in the Earth's surface temperature within the last century (Carter, Cavan, Connelly, Guy, & Handley, 2015) and UN's various publications which underline the issue (Hallegatte & Corfee-Morlot, 2011; UN, 1992, 1998), the world has witnessed extreme and unusual long-lasting changes in the climate which have had obvious and tangible effects on its everyday life. Examples of this are the increase of the precipitation in the Northeast of USA by 70% between 1958 and 2010 (Jabareen, 2015) and the European heat wave of 2003 (Carter et al., 2015; Haines, Kovats, Campbell-Lendrum, & Corvalan, 2006). Since 1997, when the Kyoto Protocol came into force, many governments and organizations committed themselves to implementing mitigation measures that focus on the reduction of greenhouse gas emissions. However, those actions are not able to stop or reverse climate change and thus adapting to the new situation is essential for humans and human settlements (Galderisi, 2014; Klein, Schipper, & Dessai, 2005).

The necessity to adapt to climate change is currently recognized at a global scale; a proof of this is the signing of the Paris Agreement by 174 countries plus the E.U. in 2015 (UN, 2015). For policy-makers to successfully achieve adaptation to climate change, the importance of incorporating climate adaptation into different policy scales and sectors – or else, mainstreaming – is constantly underlined by researchers, the U.N and the E.U. (European Commission, 2013; Mogelgaard et al., 2018; Persson & Klein, 2009; UN-HABITAT, 2011), with an emphasis on the city level where measures can be tailored to specific needs (Archer, Almansi, Digregorio, Roberts, & Syam, 2014; Carter et al., 2015; Mimura et al., 2014). Despite all this, according to the UN Habitat (2011), very few cities seem to have incorporated climate adaptation strategies to their building and infrastructure standards, as well as to their land-use management protocols. Nevertheless, there is concrete evidence that adaptation measures are already implemented and integrated in different kind of local projects, such as urban development and green infrastructure (Breemen, 2013; Silva & Costa, 2016, 2018), without though addressing how this is actually achieved.

Considering the above, the present research strives to gain insights into how synergies between climate adaptation objectives and other goals can be achieved in practice. To succeed in this, it focuses on the domain of urban development and studies four cases - in the Netherlands and Germany - with the purpose to identify the factors that influence the realization of the aforementioned synergies. Additionally, the research attempts to determine which of the identified factors are necessary or supportive conditions to the achievement of synergies between climate adaptation objectives and other goals. To my knowledge, this is the first research that investigates the topic of achieving climate adaptation alongside other goals in practice, in such depth. Furthermore, this is the first attempt to prioritize the factors which influence the realization of the aforementioned synergies by distinguishing them into necessary or supportive conditions to a successful outcome.

This paper first provides the readers with background information regarding the topic of climate adaptation in the context of urban development. Next, it presents the methodology and results. Those are followed by the discussion, recommendations and conclusion parts. Finally, the detailed results of the research can be found in the Appendices of the paper.

2. Climate adaptation in the context of urban development

Climate adaptation as a concept has many definitions which vary from broad to specific. Some researchers describe it as an action that limits the impacts of climate change and addresses its uncertainties (Dessai & van Der Sluijs, 2007; Jabareen, 2015; UN-HABITAT, 2011; Wardekker, de Jong, Knoop, & van der Sluijs, 2010), while others define it as the process of modifying ecological and social systems to accommodate the impacts of climate change (Barnett, 2001), or as the adjustment of human and natural systems to actual and expected impacts of climate change (IPCC, 2007; Moser & Ekstrom, 2010). In general, what they all have in common is that they view

climate adaptation as an adjustment – or process of adjustment – that has as an ultimate goal the safeguarding of human and natural systems from the negative impacts of climate change.

A crucial domain for achieving climate adaptation is urban development, where cities experience most of the direct impacts of climate change (Hoppe, van den Berg, & Coenen, 2014; Uittenbroek, Janssen-Jansen, & Runhaar, 2013). This is because the dangers related to climate change are amplified by the high concentration of people and socio-economic activities, as well as the high density of the built environment (Archer et al., 2014; Depietri & Renaud, 2012; Voskamp & Ven, 2015). To reduce urban vulnerability, cities attempt to achieve climate adaptation in many ways, some of which being the improvement of existing infrastructure and taking planning initiatives to reduce risks (Chu, Anguelovski, & Carmin, 2016). Those are usually implemented via urban development projects which strive to protect the city against hazards such as urban flooding, heat stress and drought, depending on the needs of an area.

Considering the above, for the scope of the present research, climate adaptation is defined as: *An adjustment of the socio-ecological systems and urban space to actual and expected impacts of climate change*. This was derived by the various definitions of climate change as presented previously, with the addition of the reference to urban space as well.

3. Methodology

In this section I describe the steps I followed to conduct the present research. Before I proceed further, it is important to explain that this is an exploratory research since, to my knowledge, something similar has not been studied previously in the context of climate adaptation. Considering this, the first step to achieving the research objective was the development of a conceptual model with a purpose to guide the data collection and data analysis. The next step was to conduct a multiple case study in order to explore what factors affect the realization of synergies between climate adaptation objectives and other goals in practice, as well as which of them are necessary and supportive conditions to a successful outcome. To enhance the external validity of the research, I studied four cases, from two different countries. These steps are explained in more detail below.

3.1. Conceptual Model

The conceptual model is comprised of two parts: the process and its outcome. To develop it, I considered two requirements for the first part and one for the second. The first part had to: a) clearly illustrate the process of achieving synergies between climate adaptation objectives and other goals in the context of a municipal project - such as an urban development project - and b) display the elements and the factors that constitute the aforementioned process, as well as at which stage of the process they influence the outcome. The second part had to be a criterion that would evaluate the extent to which a synergy has been achieved between climate adaptation objectives and other goals. In this way, the model acknowledges that synergies can be achieved to varying degrees; for instance, from weak to very strong.

With these in mind, I followed four steps to develop the conceptual model. First, I conducted a literature study of peer-reviewed academic articles from the fields of climate adaptation and process management to define synergies. Next, by consulting academic articles in the field of process management, I defined a criterion to evaluate the extent to which a synergy between climate adaptation goals and other objectives has been achieved. Third, I identified potential factors which influence the realization of such synergies in relevant academic articles from the fields of climate adaptation and process management. Finally, for each factor, I developed a detailed definition in order to specify what it describes.

Regarding the literature study, the majority of the articles from the field of climate adaptation are published within the last decade; from 2009 since 2019. However, for historical reasons, I also considered a few articles which are dated earlier. Concerning the rest of the articles, I focused on the relevance of their content and not on their publication year; yet, I ensured that the insights they provide are state-of-the-art. Finally, to provide a conceptual model that is valid and

relevant to what is happening currently in practice, I improved it based on the findings from the multiple case study. This is described in the following part.

3.2. Multiple case study

The purpose of the multiple case study is to investigate which of the identified factors are necessary or supportive to a successful outcome. In the present research I consider as a successful outcome a high or very high score in the evaluation criterion that was explained in the previous part. Furthermore, I define as a necessary condition a factor that has to be present in order to produce a certain outcome. Additionally, I define as a supportive condition a factor that is beneficial to the production of an outcome, however, its absence does not result in the absence of that outcome.

To achieve the purpose of the multiple case study, I selected cases which succeeded in realizing synergies between climate adaptation objectives and other goals. I followed this approach in order to be confident in identifying which of the factors are necessary conditions. Specifically, I expected that all the necessary factors would be present in successful cases and absent - all or some of them - in those who failed to achieve a successful outcome. Therefore, I deemed the selected approach as more reliable. Moreover, I identified as necessary the factors which were present in all cases, and the rest as supportive.

In this part, I first present the individual cases, how they were selected and the data collection method I applied to study them. Following this, in paragraph 2.3.2, I explain the method I applied to conduct a cross-case analysis and reach conclusions.

3.2.1. Individual cases

Case selection

As already discussed, to investigate which factors influence the realization of synergies between climate adaptation objectives and other goals in practice, I studied four urban development projects which achieved synergies between climate adaptation objectives and other goals. In order to ensure that they would be comparable, I chose cases which strived to achieve the same climate adaptation objectives; in this occasion, protection against urban flooding.

To select the cases, they had to satisfy the following conditions:

i. Be a public project at the municipal level, where the client is the local municipality
ii. Be related to urban development
iii. Have achieved synergies between climate adaptation objectives, related to protection against urban flooding, and other goals
iv. Had various actors involved in the decision-making process
v. The design phase of the project is finished (all or most of the crucial decisions are already made)

In addition to this, I selected cases from two different countries. The reason was to a) enhance the external validity of the study and b) to understand how and to what extent the national policy influences the realization of synergies between climate adaptation objectives and other goals in urban development projects. The two selected countries, the Netherlands and Germany, are different in policy, yet they are closely located geographically and have similar issues in terms of climate change impacts. Therefore, it was possible to find comparable urban development projects that focused on achieving the same climate adaptation objectives; in this occasion, protection against urban flooding.

Based on the aforementioned conditions, I selected the cases that are presented in table 1.

Table 1. Selected cases

	Case A: Oldenzaalse Street	Case B: Station Square	Case C: Oxford Barracks	Case D: HafenCity
Who?	Municipality of Enschede	Municipality of Zwolle and ProRail	City of Münster	City of Hamburg
What?	Replacement of underground storage basin	Renovation of the area in front of the city's main train station	Re-use of a historical site as a residential area	Land development
Why?	To increase the underground water storage capacity – basins – of the area in order to prevent urban flooding	To renovate and modernize the Station Square	To increase the number of residential buildings in the city	To expand the city
When?	2015 – until now (in implementation stage until January 2019; the project is expected to be competed in 2020)	2013 – until now (in implementation stage; the project is expected to be competed in 2020)	2012 – until now (design stage is finished; the project is expected to be completed in 2028)	1999 – until now (in implementation stage; the project is expected to be completed in 2030)
Where?	Enschede, NL	Zwolle, NL	Münster, DE	Hamburg, DE
How?	Formation of an integrated project team where all the relevant municipal departments are equally involved	Formation of an overseeing project team in which both the municipality of Zwolle and ProRail are involved	Inclusion of all the relevant municipal departments in the project team under the leadership of the City Planning department	Establishment of a public-owned land development agency which is responsible for the project
Climate adaptation: domain of focus	Protection against urban flooding	Protection against urban flooding	Protection against urban flooding	Protection against urban flooding

Data collection

As data collection methods I used document analysis and semi-structured interviews. For the document analysis, I analysed relevant documents from verified sources (e.g. website of the municipality, official project documents, press articles, newsletters published by the project teams, etc.). For the semi-structured interviews, I developed a questionnaire with open-ended questions with the purpose to uncover factors that influence the realization of synergies between climate adaptation objectives and other goals. The questionnaire is available in Appendix B.

To collect data, I conducted two interviews per case. I chose this approach first, to study a case from more than one point-of-view and second, to validated ambivalent information when necessary. The interviewees were either the manager of the project, members of the project team or other relevant stakeholders. Based on the collected data, I improved the conceptual model of the research and consolidated the factors that influence the realization of the abovementioned synergies by identified them also in the case studies.

3.2.2. Cross-case analysis

To conduct the cross-case analysis, first I translated the qualitative data I collected from the document analysis and interviews, to quantitative data. To succeed in this, I designed a rating scale for the factors that influence the realization of synergies between climate adaptation objectives and other goals based on their detailed definition, and I rated them accordingly. In addition, I rated the extent to which each case achieved the aforementioned synergies, using the evaluation criterion I

defined to develop the conceptual model. The rating was based on the self-assessment of the interviewees.

To cross-analyse the selected cases, I utilized the extent to which each case achieved the desired synergies as a dependant variable, and the factors that influence this outcome, as independent variables. Since all the cases were successful in achieving synergies between climate adaptation and other objectives, they had the same or similar score in the evaluation criterion. Therefore, it was possible to assess which of the independent variables are necessary or supportive to the dependent variable by identifying which of them were present in every case.

Finally, the cross-case analysis was divided into parts based on the structure of the conceptual model. Specifically, the identified factors influence the process of achieving the synergies at a different stage. The cross-case analysis is organized based on those stages.

4. Results

In this section, I present the findings of this research. First, I go through the steps of developing the conceptual model and then present the final outcome. Next, I offer the results of the cross-case analysis. Finally, the detailed results can be found in the Appendices and the end of the document.

4.1. Development of the conceptual model

4.1.1. Theoretical background

The theoretical background is organized into two parts: the definition of a synergy and how to evaluate it, and the factors that may influence the realization of synergies between climate adaptation objectives and other goals in urban development projects.

Defining synergies and how to evaluate them

To define synergies, it is necessary to rely on academic articles that belong to the domain of process management, as the topic is not sufficiently addresses in the field of climate adaptation, at this moment.

According to Daum (2012), who investigated its origins and definitions in various academic articles, a synergy is explained as an interrelationship between value adding activities of two or more parties/networks. A similar approach is presented by de Bruijn and ten Heuvelhof (2008), who underline that in a synergy various involved parties create value by cooperating with each other. A comparable definition is provided by Schulz-Hardt and Mojzisch (2012), who state that a strong synergy has been realized when a group makes decisions that have "a higher quality than either the average or the best of their group members' individual decision prior to group interaction". Moreover, in the paper of van der Veen (van der Veen, n.d.) synergies are presented as an outcome of certain decision-making activities. Considering all these – and especially the definition of Schulz-Hardt and Mojzisch – in the present research a synergy is defined as *the outcome of a multi-actor interactive activity where various parties achieved more value compared to if they had operated alone*.

To evaluate synergies, it is important to first define what is considered a successful outcome. In the present research, I consider as a successful outcome a high degree of integration among the objectives of the various involved actors, that, at the same time, creates more value for all than negative side-effects. The latter part is important because it is possible to achieve a high degree of integration among various objectives and yet achieve a mediocre solution that generates more negative side-effects than actual value.

In the existing process management literature, a criterion that satisfies the requirements regarding what is considered a successful outcome is goal intertwinement. According to Koppenjan and Klijn (2004), goal intertwinement can be applied when a process is focused on solving a problem for which multiple parties – that try to realize different objectives and have a different opinion about what is important – are involved. Its purpose is to measure the extent to which agreed solutions intertwine the involved actors' diverging objectives and reduce or

compensate the costs and negative side-effects. Therefore, in order to assess synergies in this research, I will use the goal intertwinement as evaluation criterion.

Factors that influence goal intertwinement
By investigating academic articles from the domain of climate adaptation and process management, I identified 22 factors that influence the realization of synergies between climate adaptation and other objectives Those can be found in table 2 (following paragraph). To find which factor was identified in which field of literature – climate adaptation or process management – consult Appendix A, table 9.

4.1.2. Conceptual Model
The result of the literature study was the development of the present research's conceptual model. This was achieved by organizing the identified factors that influence the realization of goal intertwinement into groups that affect the process of achieving goal intertwinement at different stages (figure 1). The model was improved after studying the data collected from the individual cases.

The conceptual model is organized into four stages: policy context, specific context, multi-actor interaction process and goal intertwinement. The first two stages are comprised of two groups, while the third is a group of its own. Every group is comprised by a number of factors, with the exception of the group "input to the process" which is organized in sub-groups that include a number of factors (figure 1). In addition to this, the model illustrates the relationships between the groups of each stage, something that was based on the information collected from the case study. Finally, the outcome of the process is goal intertwinement.

The factors that are allocated to each group and sub-group can be found in table 2. The detailed description of each factor is available in Appendix A, table 7.

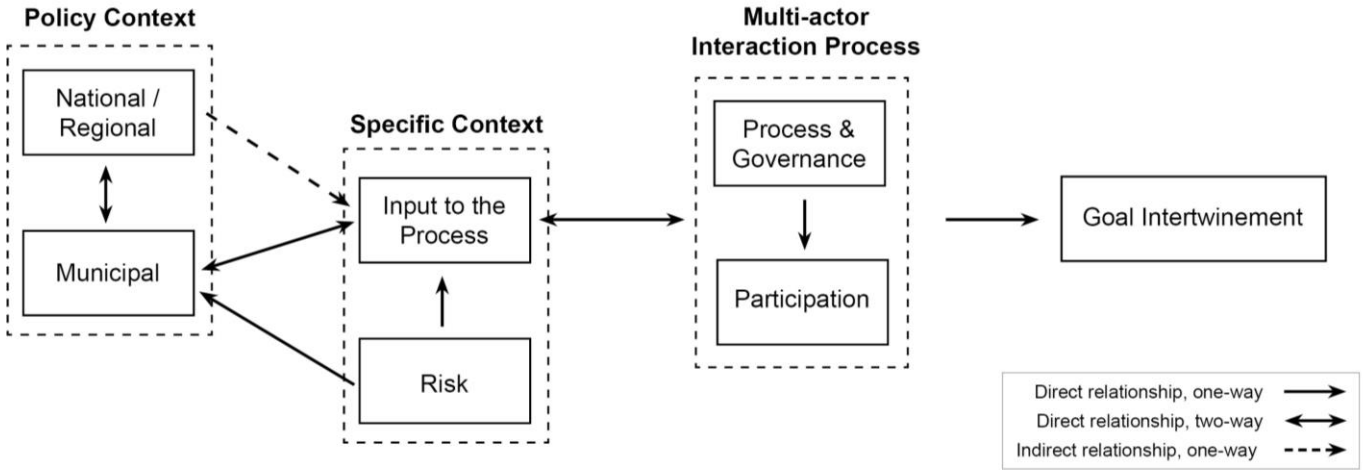

Figure 1. Conceptual model

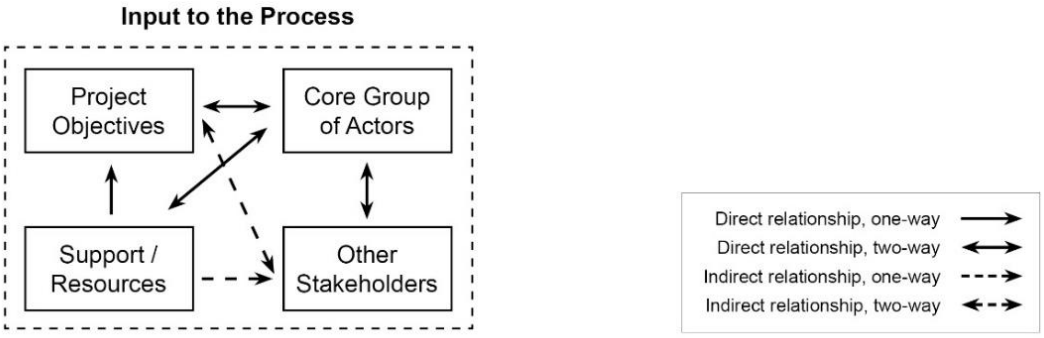

Figure 2. The sub-elements that consist the "input to the process" element of the conceptual model, and the relationships between them

In this research, "core group of actors" is defined as "*the group comprised by municipal employees and members of the project team who are directly involved in the core decision-making activities – both operational and strategic – of the project"*. Furthermore, "other stakeholders" is defined as "*the group comprised by all the other actors who have a stake in the project, but are not directly involved in the decision-making- activities (perhaps they influenced the outcome by providing input, or their interests were considered by the Project Team)*".

Table 2. Factors that influence goal intertwinement

Stage	Group	Factor	Literature
Policy Context	**National / Regional**	National / regional policy objectives	(Lonsdale, Kretser, Chetkiewicz, & Cross, 2017; Reckien, Flacke, Olazabal, & Heidrich, 2015; Runhaar et al., 2012; van der Berg, 2013)
		Information / knowledge provided by the national / regional policy	(Anguelovski & Carmin, 2011; Runhaar et al., 2012; Runhaar, Wilk, Persson, Uittenbroek, & Wamsler, 2018; Uittenbroek, 2014)
		Financial incentives provided by the national / regional policy	(Runhaar et al., 2012, 2018; Uittenbroek, 2014)
	Municipal	Municipal policy objectives	(Lonsdale et al., 2017; Reckien et al., 2015; Runhaar et al., 2012; van der Berg, 2013)
		Information / knowledge provided by the municipal policy	(Runhaar et al., 2018; Uittenbroek, 2014)
		Municipal budget for adaptation	(Lonsdale et al., 2017; Reckien et al., 2015; Uittenbroek, Janssen-Jansen, & Runhaar, 2013; van der Berg, 2013)
Specific Context	**Risk**	Risk	(Reckien et al., 2015; Runhaar et al., 2012; Uittenbroek2014)
	Input to the Process – Project Objectives	Inclusive project objectives	(Uittenbroek et al., 2013)
	Input to the Process – Support / Resources	Political will at the municipal level	(Lonsdale et al., 2017; Reckien et al., 2015; Runhaar et al., 2012, 2018; Uittenbroek, 2014; van der Berg, 2013)
		Availability of experts at the municipal level	(Anguelovski & Carmin, 2011; Lonsdale et al., 2017; Runhaar et al., 2018)
		Available data and projections at the municipal level	(Galderisi, 2014; Mimura et al., 2014)
	Input to the Process – Core group of actors	Collaborative mindset of the core group of actors	(Lonsdale et al., 2017; Uittenbroek, 2014)
		Commitment of the core group of actors	(van der Berg, 2013)
		Awareness of the core group of actors	(Anguelovski et al., 2014; Mogelgaard et al., 2018; Persson & Klein, 2009; Reckien et al., 2015; Runhaar et al., 2012, 2018; Uittenbroek et al., 2013; van der Berg, 2013)
	Input to the Process – Other Stakeholders	Awareness of the other stakeholders	(Anguelovski et al., 2014; Mogelgaard et al., 2018; Persson & Klein, 2009; Reckien et al., 2015; Runhaar et al., 2012, 2018; Uittenbroek et al., 2013; van der Berg, 2013)
Multi-Actor Interaction Process	**Process & Governance**	Process design	(Edelenbos & Klijn, 2005)
		Flexibility of the process design	(Wardekker et al., 2010; Edelenbos & Klijn, 2005)
		Role allocation	(Mimura et al., 2014)
		Integrated project team	(Luyet, Schlaepfer, Parlange, & Buttler, 2012)
		Rules of collaboration	(Luyet et al., 2012)
	Participation	Early involvement of climate adaptation experts	(Chu, Anguelovski, & Carmin, 2016)
		Early involvement of relevant actors to the core group	(Luyet et al., 2012; Reed, 2008)

4.2. Multiple case study

In this part, first I discuss the individual cases and their characteristics and the context that surrounds them. It is divided into two parts: cases in the Netherlands and cases in Germany; in this way, the national context and the differences that exist between the two countries, are explained. Following this, I present the results of the cross-case analysis.

4.2.1. Individual cases

Cases in the Netherlands

The Netherlands is one of the countries that experiences high risk of urban flooding. As a result, the national government has enforced a policy that requests from every city to perform tests and implement measures to protect their citizens and infrastructure from dangers related to flooding, next to other climate change hazards (Brugge, 2018).

The Dutch cases, besides the national policy, the share regional one as well, since they are located in the same province. In accordance with the national policy, the regional policy focuses intensely on achieving climate adaptation, and especially urban flooding prevention.

- Case A: Oldenzaalse street

In 2015, the city of Enschede conducted tests to identify places within the urban space that are vulnerable to urban flooding. As a result, the municipality decided to conduct a number of projects in order to enhance the resilience of the city. One of the aforementioned projects is the Oldenzaalse street. In this case, the project team had to increase the underground water storage capacity of the area. Next to this, though, the team identified an opportunity to achieve more than initially required, and included other stakeholders, such as utility and land development companies, in order to realize more objectives. Additionally, the project team managed to achieve more in terms of climate adaptation by increasing the green spaces in the area, reducing the impacts of heat stress and enhancing biodiversity.

What is special about this case is the collaborative mindset of the core group of actors. This allowed the project team to be more open to other opinions, as well as to be willing to learn and adjust. Additionally, the commitment of the core group of actors in combination with the previous factor, inspired the project team to achieve more than what was required of them. Furthermore, it is notable that the local businesses and residents of the area accepted the reduction of the parking spots in order to build the green spaces, because they wanted to avoid urban floodings in the future. Finally, the project received enormous support by both the local politicians and the public, as they are all quite aware of the risks of urban flooding and the cost of the damage they may inflict on the city.

- Case B: Station square

The city of Zwolle is located in a very vulnerable position and experiences extreme risk of urban flooding. Because of this, the local municipality is quite aware of the issues and is very oriented towards finding good solutions that protect the city and its citizens.

In the case of the station square project, the project team considered every guideline provided by the municipality in order to implement a project that can withstand extreme conditions in terms of urban flooding. However, this was not enough for the climate adaptation experts of the municipality of Zwolle, who were involved in the project towards the end of the design phase. The municipality had recently received new information regarding the risks of urban flooding in the future and the experts noticed that the residential areas next to the project area were under extreme stress. Under pressure of acting to protect the citizens, they requested from the project team to increase the underwater storage capacity within the project area in an attempt to lessen the risk of flooding in the neighbouring areas. To achieve this, the project team had to closely collaborate with ProRail, a private company that owns the train station facilities in the Netherlands, including part of the facilities in the area of the station square.

What is special about this case is the commitment of the core group of actors to implement the best solutions that will definitely enhance the city's climate resilience, beyond the boundaries of a single project's scope. This is so strong that the municipality was willing to change the design of the project in order to limit the risk of urban flooding in the neighbouring areas. In addition, it is important to note that the city experiences very high risk of urban flooding due to its location and thus, the policy-makers are very dedicated to achieving climate adaptation objectives. Nevertheless, in the beginning, the collaboration with ProRail was challenging since the concept of adapting to climate change is new for the organization. As a result, adjustments had to be made that were not always favourable for all the involved parties.

Cases in Germany

Germany is a federal country comprised of independent states. Therefore, as they are located in different states, the German cases share with each other only the federal policy. Additionally, because the states are independent, the federal policy is frequently influential to a broader and not to a specific level. In the presented cases, the federal policy was found to have no influence on the achievement of synergies between climate adaptation objectives and other goals.

- Case C: Oxford Barracks

The city of Münster experiences high demands in housing. In an attempt to expand the urban space and increase the residential buildings, the local government decided to utilize the old military sites that were not in use, with one being the Oxford Barracks. For this project, the city planning department – responsible for the project – decided to follow a different process and invite representatives from all the relevant municipal departments to participate in the project team and influence the project by adding their requirements, as well as by providing solutions. Furthermore, the citizens were invited to be involved by visiting the area and by participating in a workshop. The results of the workshop were taken into consideration by the project team as user requirements. This case is the only one that is not in the implementation stage by the time the present research was completed. This was due to the long process of acquiring the land from the military agency which originally owned it. The land was acquired close to the completion of this research.

What is special in this case is the collaborative mindset and commitment of the core group of actors, as well as the high level of public participation. In addition, it is interesting to note that the core group of actors had to adjust a lot since they were not used to collaborating with each other in this way before. The experience was new and that resulted in knowledge transfer among the actors.

- Case D: HafenCity

In 1997, the city of Hamburg took the decision to expand the urban space and utilize part of the harbour area for residential, office and retail purposes. For this, it established a public-owned development agency to be responsible for the project in order to enhance cooperation between the various municipal departments who are typically involved in such projects. At this stage, it is important to note that the city experiences floods caused by the Elbe river. The city is protected against urban flooding by a dyke. However, in the case of the new area, a dyke could not be constructed because that would impede the port activity. Because of this, the development agency had to find creative solutions in order to protect the area from urban flooding.

What is special in this case is that in 1997, when the project started, the concept of climate adaptation did not exist. Therefore, the local policy did not include climate adaptation objectives; only goals related to safety. HafenCity is a long-term innovative project where the project team adjusted to global trends regarding climate change, captured lessons on the topic of adapting to climate change and inspired the local policy. Furthermore, the project is characterized by a clear role allocation, an efficient planning process, a group of actors committed to achieving climate adaptation objectives, and a result that evidently blends adaptation measures with other ones.

4.2.2. Cross-case analysis

As already explained in the methodology part, to conduct the cross-case analysis, I developed a rating scale for each factor to translate the qualitative data I collected to quantitative data. The scale is based on the definition of each individual factor and can be found in Appendix A, table 8. Next, I used goal intertwinement as a dependant variable and the factors that may influence it as independent ones.

Below, first I analyse the cases based on their outcome (goal intertwinement). Then, I present the results of the cross-case analysis in parts that related to the stages of the conceptual model: policy context, specific context and multi-actor interaction process. Finally, I briefly summarize the results in the conclusion of the cross-case analysis part.

Goal intertwinement

Table 3 displays the rating of each case regarding goal intertwinement. As already discussed, all the cases have the same or similar score. More specifically, cases A, B and D have the same score, while case B is the only one that differs. Case B received a lower score – yet, still a high one – due to the challenging collaboration between the local municipality and ProRail that led the latter party to agree to terms which were not necessarily beneficial for it.

Table 3. Cross-case analysis: goal intertwinement

	Case A	Case B	Case C	Case D
Goal Intertwinement	Very high	High	Very high	Very high

Policy context

In table 4, it is possible to see how each case compares to one another in terms of the factors that belong to the policy context stage of the conceptual framework. Based on this, the cases have in common the same score on the factors "municipal policy objectives" and "municipal budget for adaptation". Therefore, those factors influence the achievement of goal intertwinement. In regards to the "national / regional policy objectives", it has moderate to no influence on goal intertwinement. Moreover, concerning the "financial incentives provided by the national / regional policy" data regarding whether this factor exists in Germany in the context of climate adaptation and protection against urban flooding were not found. So, this factor may also play a role but that cannot be concluded by this research. Further, the "information / knowledge provided but the municipal policy" it is an important factor – as implied in the interviews and indicated in literature – but in the case D, was not present, especially in the beginning. Thus, it may be assumed that as a factor it is supportive but not necessary in order to achieve goal intertwinement. Finally, the factor "information / knowledge provided by the national / regional policy" is present in the Dutch cases and not the German ones, however, even in the Dutch context, it was not considered as important by the interviewees and thus I consider it as a supportive and not necessary factor.

Table 4. Cross-case analysis: policy context (necessary conditions in bold, supportive conditions in italics)

	Case A	Case B	Case C	Case D
National / regional policy objectives	*Moderate influence*	*Moderate to no influence*	*Moderate to no influence*	*Moderate to no influence*
Information / knowledge provided by the national / regional policy	*Yes*	*Yes*	*No*	*No*
Financial incentives provided by the national / regional policy	*Yes*	*Yes*	---	---

Municipal policy objectives	**Strong influence**	**Strong Influence**	**Strong Influence**	**Strong Influence**
Information / knowledge provided by the municipal policy	*Yes*	*Yes*	*Yes*	*No*
Municipal budget for adaptation	**Yes**	**Yes**	**Yes**	**Yes**

Specific context

In table 5, the results of the cross-case analysis between the factors of the specific context component can be found. There, it is evident that in all cases these factors have a high score: "risk", "inclusive project objectives", "political will at the municipal level", "availability of climate adaptation experts at the municipal level", "availability of data and projections at the municipal level", "commitment of the core group of actors", and "awareness of the core group of actors". Therefore, I conclude that the aforementioned factors are necessary to the achievement of goal intertwinement. Additionally, the collaborative mindset of the core group of actors appears to be present in every case but in different levels that do not include "weak" or "very weak". Therefore, I consider it as a factor that may benefit the achievement of a high goal intertwinement score, but only as a supportive condition. Finally, the factor "awareness of the other stakeholders" does not seem to be a necessary condition for achieving goal intertwinement.

Table 5. Cross-case analysis: specific context (necessary conditions in bold, necessary conditions in italics)

	Case A	Case B	Case C	Case D
Risk	**High (urban flooding)**	**Very High (urban flooding)**	**High (urban flooding)**	**Very High (urban flooding)**
Inclusive project objectives	**Yes**	**Yes**	**Yes**	**Yes**
Political will at the municipal level	**Strong**	**Very strong**	**Strong**	**Very strong**
Availability of experts at the municipal level	**Yes**	**Yes**	**Yes**	**Yes**
Availability of data and projections at the municipal level	**Yes**	**Yes**	**Yes**	**Yes**
Collaborative mindset of the core group of actors	*Very strong*	*Moderate*	*Very strong*	*Moderate*
Commitment of the core group of actors	**Strong**	**Very strong**	**Very strong**	**Strong**
Awareness of the core group of actors	**Relatively high**	**Relatively high**	**Relatively high**	**Relatively high**
Awareness of the other stakeholders	*Relatively low*	*Relatively low*	*Relatively high*	*Relatively high*

Multi-actor interaction process

Table 6 presents the final part of the cross-case analysis. There it can be seen that only the factor "flexibility of process design" is present, and thus it is a necessary condition for goal intertwinement. I can assume that the rest of the factors are only supportive conditions. However, according to the interviewees, the process design is perhaps the most important variable in achieving synergies between various objectives in urban development projects. From all the cases, case B is the only one that reported a not effective process design that had to be adjusted; also, this is the only case that scored "High" and not "Very High" in terms of goal intertwinement. Furthermore, the same case is the only one where the climate adaptation experts were not involved early in the process, issues emerged, and parts of the project had to be adjusted later. The interviewees suggested that climate adaptation experts should be involved as early as possible. Thus, it can be concluded that the process design and the early involvement of experts are also necessary conditions in achieving goal intertwinement. Finally, the factors "integrated project team" and "early involvement of relevant actors to the core group" seem to be supportive and not necessary in achieving goal intertwinement.

Table 6. Cross-case analysis: multi-actor interaction process (necessary conditions in bold, necessary conditions in italics)

	Case A	Case B	Case C	Case D
Process design	**Effective**	**Not effective, had to be adjusted**	**Effective**	**Effective**
Flexibility of the process design	**Yes**	**Yes**	**Yes**	**Yes**
Role allocation	*Clear role allocation (but also with a degree of flexibility)*	*At times unclear role allocation*	*At times unclear role allocation*	*Clear role allocation*
Integrated project team	*Yes*	*Yes*	*Yes*	*Close coordination between the involved departments and various involved disciplines*
Rules of collaboration	*Yes*	*No*	*Yes*	*No*
Early involvement of climate adaptation experts	**Yes**	**No (They were involved later and that resulted in many changes)**	**Yes**	**Yes**
Early involvement of relevant actors to the core group	*Yes*	*No*	*Yes*	*Yes*

Conclusion

In each stage of the cross-case analysis, the investigated factors were distinguished between necessary or supportive. This resulted in a distinction of 12 necessary factors, 9 supportive factors and 1 factor for which conclusions cannot be drawn due to insufficient data. In more detail, the necessary factors are 2 out of 6 in the policy context stage, 7 out of 9 in the specific context stage, and 3 out of 7 in the multi-actor interaction process stage. From this, it is possible to conclude that all the stages are important for the achievement of synergies between climate adaptation and other goals, and especially the specific context and multi-actor interaction process stages where the vast majority of the factors were identified as necessary conditions. A detailed description regarding which factor is a necessary or supportive condition can be found in Appendix C.

5. Discussion

This section is comprised of four parts. The first discusses the findings of the present research and the second one introduces two hypotheses to be tested by future research. The next two parts focus on the contribution of this research and the limitations of its methodology.

5.1 Findings

The findings of the present research include a conceptual model that illustrates the process of achieving synergies between climate adaptation objectives and other goals in the project level and the identification of 22 factors which influence the aforementioned process. Those were derived by investigating the existing literature from the domains of climate adaptation and process management, and were validated by studying practical examples. Furthermore, the findings involve the separation of the 22 identified factors into necessary or supportive to the achievement of a successful outcome. For this I relied on the data collected by studying four relevant cases in the Netherlands and Germany.

The findings of this research prove the decision to dive into not only climate adaptation literature, but also into process management, as correct. According to them, all the factors identified in the two domains are relevant and influential to the process. Furthermore, it is interesting to note that each domain is relevant to a different stage of the conceptual model. Specifically, the findings from the process management literature are relevant to the multi-actor interaction process stage of the conceptual model, one of the most important stages since the actual decisions regarding the project are made there. The role of previous stages - where climate adaptation literature is relevant - is to support and influence the multi-actor interaction process.

Moreover, the findings indicate that in order to achieve climate adaptation objectives alongside other goals, all stages - policy context, specific context, multi-actor interaction process - are important and contribute to the process. This is indicated by the fact that every stage has at least two necessary factors. Nevertheless, it is essential to note that all the necessary factors identified by this study concern what is happening on the city level, and not on the regional and national one (e.g. policy objectives, information, etc.). This is in alignment with the academic papers which support that the most crucial level for achieving climate adaptation is the city-level (Chu et al., 2016; Hoppe et al., 2014).

Finally, it is relevant to discuss the link between the findings of the present research and the topic of climate adaptation mainstreaming. In more detail, climate adaptation mainstreaming is a holistic approach which concerns that integration of climate adaptation to all sector policies (Archer et al., 2014; Mickwitz et al., 2009; Mogelgaard et al., 2018; Persson & Klein, 2009; Uittenbroek et al., 2013). According to Uittenbroek et al (2013), potential synergies between climate adaptation objectives and other goals can increase the performance of the mainstreaming process. Considering this, the findings of the present research are relevant to the aforementioned topic and can also be applicable to the process of achieving climate adaptation mainstreaming not only into projects, but also into municipal policies. The latter applies in cases that can be described by the conceptual model of the present research; cases where policy-making is a process which a) involves various stakeholders, b) tries to achieve diverse and occasionally opposing objectives, and c) includes multi-actor interaction activities.

5.2 Hypotheses

Through investigating the cases and the factors that influence the realization of synergies between climate adaptation objectives and other goals, I observed two phenomena that currently lack scientific support. In this part, I discuss my observations and then introduce a hypothesis for each. The hypotheses can be tested in the future in order to validate the observations and gain further insights on the topic.

First, by studying the four cases in the Netherlands and Germany, I observed that a) the national and regional policy is much less influential compared to the local one and b) the national and regional policy goals can be supportive and influential regarding the realization of climate

adaptation objectives that are not considered as crucial by the local municipality (e.g. in this case biodiversity, urban heat island). The first is evident in all the cases and is also implied in literature, where the city-level is presented as the most crucial one for achieving climate adaptation (see part 5.1), whereas the second was observed only in case A. To understand whether the second observation is valid, I propose to test this hypothesis:

Hypothesis 1:

The national and/or regional climate adaptation policy enables the achievement of climate adaptation objectives which are not considered to be crucial by the local municipalities.

Further, through the interviews, I was able to get insights regarding the influence that the risk an area is experiencing due to the impacts of climate change has on the realization of synergies between climate adaptation objectives and other goals. This factor was initially identified in climate adaptation literature (Appendix A, table 9). However, by studying the four cases, I came to the realization that the perception of this risk by the local leaders and municipal employees is much more influential compared to the actual risk an area is experiencing. This is also confirmed by van den Berg (2013). The perception of risk seems to be influenced by personal experiences (van den Berg, 2013), as well as how close the hazards may be in time and space (Leiserowitz, 2006). Therefore, the perception of risk may vary from individual to individual, something that can impede the achievement of climate adaptation in general since other goals can be perceived as more important. A way to align the perceptions and priorities of the various individuals is to increase their awareness regarding the impacts of climate change and the importance to adapt in order to protect a city and its citizens. This assumption, however, lacks scientific support and requires further research in order to be proved.

To test whether my assumptions are correct, I propose to test the following hypothesis:

Hypothesis 2:

a) To achieve a high or very high score in goal intertwinement, the risk perceived by the local municipality, concerning the impacts of climate change, should be high or very high.

b) For a local municipality to perceive the risk of climate change impacts as high or very high, the awareness of the local leaders and municipal employees, regarding this topic, should be at least relatively high.

The second component of hypothesis 2 is based on the results shown in table 6. Specifically, there, it is possible to see that awareness of the core group of actors - which is defined as those who influence the project both operationally and strategic - is a necessary factor with a score of "relatively high" in all the cases. In consistency with the conceptual model of this research, I use goal intertwinement as the dependent variable for hypothesis 2.

5.3 Contributions

The present research contributes in four ways. First, it provides a conceptual model that explains how synergies between climate adaptation objectives and other goals can be achieved. The model is reliable since it was based on state-of-the art literature and was validated via a study io four relevant cases. Furthermore, the model can be applied to other types of projects as it is not tailored to urban development projects. Specifically, it can be applied on cases that are a) municipal projects, b) involve various stakeholders, c) try to achieve diverse and occasionally opposing objectives, and d) include multi-actor decision making activities.

The second contribution concerns the identification of the 22 factors. All of those factors were derived by existing academic articles; however, this is the first time they are all present and organized into stages that influence one another. This provides a first indication regarding how the aforementioned factors influence one another. Moreover, this is the first research that attempts to prioritize those factors depending on how influential they are. This was done by distinguishing them into necessary and supportive conditions for achieving synergies between climate adaptation

objectives and other goals. The 22 factors, as with the conceptual model, can also be applied to other situations beyond the context of urban development projects.

Furthermore, the research contributes by presenting two hypotheses to be tested in the future with the aim to expand the boundaries of knowledge we currently have on the subject of achieving climate adaptation. Finally, the research presents practitioners with a roadmap that has as a purpose to assist them in achieving synergies between climate adaptation objectives and other goals in practice. More information regarding this can be found in part 6.2.

5.4 Limitations

The nature of the present research is exploratory and thus its aim was to gain insights on an unexplored territory rather than derive concrete conclusions (Stebbins, 2011). Therefore, further research is needed in order to reach concrete conclusions regarding the extent to which the identified factors influence the achievement of synergies between climate adaptation objectives and other goals.

Furthermore, in this study I investigated only successful cases and not those that failed in achieving synergies between climate adaptation objectives and other goals. Since, to my knowledge, this is the first research addressing this topic, to identify the necessary factors I decided to study successful cases because I was confident that the necessary factors would be present there. To further consolidate the findings of the present research, it is necessary to also investigate cases that failed in achieving synergies between climate adaptation objectives and other goals. In addition to this, I defined as necessary factors those that were present in every case. I cannot exclude the possibility – however tiny – that one or more factors coincidentally were found in every case without being necessary conditions. This can be clarified by investigating cases that failed to achieve synergies between climate adaptation objectives and other goals.

Finally, in this research, only one of the interviewees held the position of the project manager. This is considered a limitation because this research aimed to interview the project manager of each case and then validate the collected information with the narrative of another project member or another stakeholder. Since it was possible to interview the project manager of only one case, important data may have been missed because the other interviewees were either not familiar with certain concepts or simply did not have an answer because their role was different.

6. Recommendations

In this section, I present my recommendations for future research as well as for practitioners. The section is organized into two parts with the first addressing the scientific implications and the second providing advice to practitioners.

6.1 Recommendations for future research

To further gain insights on how to achieve synergies between climate adaptation objectives and other goals in urban development projects, I recommend to conduct a conclusive research in order to provide concrete conclusions regarding the extent to which each of the factors influences the outcome. Additionally, I recommend to conduct the same study and focus on investigating cases that failed to achieve the aforementioned synergies, as well as to test the hypothesis provided in the discussion section. Moreover, I recommend to test the two hypotheses I presented in the discussion of this paper. Finally, the present research focused only on investigating the relationship between the factors and goal intertwinement. Future research should focus on exploring the relationship among the aforementioned factors, and especially among the necessary factors in order to provide municipalities with solid advice on how to achieve synergies between climate adaptation objectives in practice.

6.2 Recommendations for practitioners

To assist the practitioners working at municipalities, I generated a roadmap that has as a purpose to guide project managers of urban development projects in achieving climate adaptation

objectives next to others. To achieve this, I focused on the content that concerns the multi-actor interaction process stage - the stage that a project manager can influence - and incorporate advice I received from the interviewees. The roadmap follows the steps of the Royal Institute of British Architects plan of work 2013 (Royal Institute of British Architects, 2013) and can be found in Appendix E.

7. Conclusion

In the present research, I explored how synergies between climate adaptation objectives and other goals can be achieved in practice. I achieved this by first, investigating academic articles from the domains of climate adaptation and process management, and then by conducting a multiple case study of four urban development projects in the Netherlands and Germany. The results include a conceptual model that illustrates how those synergies can be achieved and 22 factors that influence their realization either as necessary or supportive conditions. In addition to this, I formulated two hypotheses that should be tested in the future in order to enhance our current understanding regarding how synergies can be achieved alongside other goals in practice. To my knowledge, this is the first research that studies the aforementioned topic in such depth and presents a conceptual model that illustrates the process of achieving synergies next to other goals. Furthermore, this is the first research that attempts to prioritize the influential factors based on how important they are, by differentiating them into necessary and supportive conditions to the achievement of a successful outcome.

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Appendix A

Table 7. Description of factors that consist each element of the conceptual model

STAGE	GROUP	FACTOR	DESCRIPTION
Policy Context	**National / Regional**	National / regional policy objectives	The influence of the national / regional policy objectives which focus on climate adaptation.
		Information / knowledge provided by the national / regional policy	The presence of any form of information and knowledge (e.g. guidelines, tools, etc.) provided by the national / regional government in order to assist municipalities in realizing climate adaptation objectives.
		Financial incentives provided by the national / regional policy	The presence of monetary incentives provided by the national / regional government in order to assist municipalities in realizing climate adaptation objectives.
	Municipal	Municipal policy objectives	The influence of the municipal policy objectives which focus on climate adaptation.
		Information / knowledge provided by the municipal policy	The presence of any form of Information and knowledge (e.g. guidelines, tools, process steps, etc.) provided by municipalities in order to assist project teams in realizing climate adaptation objectives.
		Municipal budget for adaptation	The presence of available municipal funding for realizing climate adaptation objectives.
Specific Context	**Risk**	Risk	The extent to which the city is experiencing extreme and hazardous weather phenomena.
	Input to the Process – Project Objectives	Inclusive project objectives	The objectives of the project – or its requirements – incorporate the achievement of climate adaptation.
	Input to the Process – Support / Resources	Political will at municipal level	The level of the decision makers' willingness (at the municipal level, e.g. Mayor, Municipal Council, Alderman, etc.) to realize climate adaptation objectives.
		Availability of experts at the municipal level	The presence of climate adaptation experts within municipality, who can support project teams in achieving climate adaptation objectives.
		Availability of data and projections at the municipal level	The presence of up-to-date projections about how the risks and impacts of climate change can affect the project area and its surroundings.
	Input to the Process – Core group of actors	Collaborative mindset of the core group of actors	The level of core group of actors' willingness to cooperate and work together ("we can all achieve more together").
		Commitment of the core group of actors	The level of the core group of actors' dedications to the achievement of climate adaptation objectives in order to enhance city resilience.

		Awareness of the core group of actors	The extent to which the core group of actors is informed about the risks and impacts of climate change on the city and project area, as well as the importance of achieving climate adaptation objectives.
	Input to the Process – Other Stakeholders	Awareness of the other stakeholders	The extent to which the other stakeholders are informed about the risks and impacts of climate change on the city and project area, as well as the importance of achieving climate adaptation objectives.
Multi-Actor Interaction Process	**Process & Governance**	Process design	The effectiveness of the steps that are followed in order to realize a project.
		Flexibility of the process design	The presence of a degree of a process design that can be adjusted to changing conditions and needs.
		Role allocation	The clarity regarding who is responsible for what in the project.
		Integrated project team	The presence of project teams where all relevant disciplines and municipal departments are involved, making decisions together and ensuring that their interests are taken into consideration.
		Rules of collaboration	The presence of conditions that guide the collaboration between the involved actors and how decisions are made (e.g. “we all make decisions together” or “for this kind of decision departments/actors/teams A and B should be involved”).
	Participation	Early involvement of climate adaptation experts	The presence of climate adaptation experts early in the decision-making activities of the project.
		Early involvement of relevant actors to the core group	The presence of all the relevant disciplines and municipal departments in the core group of actors early in the project.

Table 8. Scales of comparison per factor

FACTOR		SCALE FOR EACH FACTOR
Goal Intertwinement Score		Very low / Low / Moderate / High / Very high
Policy Context	National / regional policy objectives	No influence / Moderate influence / Strong influence
	Information / knowledge provided by the national / regional policy	Yes / No
	Financial incentives provided by the national / regional policy	Yes / No
	Municipal policy objectives	No influence / Moderate influence / Strong influence
	Information / knowledge provided by the municipal policy	Yes / No
	Municipal budget for adaptation	Yes / No
Specific Context	Risk	Very low / Low/ Moderate / High / Very high
	Inclusive project objectives	Text
	Political will at the municipal level	Very weak / Weak / Moderate / Strong / Very strong
	Availability of experts at the municipal level	Yes / No
	Availability of data and projections at the municipal level	Yes / No
	Collaborative mindset of the core group pf actors	Very weak / Weak / Moderate / Strong / Very strong
	Commitment of the core group of actors	Very weak / Weak / Moderate / Strong / Very strong
	Awareness of the core group of actors	Low / Relatively low / Relatively high / High
	Awareness of the other stakeholders	Low / Relatively low / Relatively high / High
Multi-Actor Interaction Process	Process design	Not Effective / Relatively effective / Effective
	Flexibility of the process design	Yes / No
	Role allocation	Unclear / At times unclear / Clear
	Integrated project team	Yes / No
	Rules of collaboration	Yes / No
	Early involvement of climate adaptation experts	Yes / No
	Early involvement of relevant actors to the core group	Yes / No

Table 9. Sources of the factors

FACTOR	CLIMATE ADAPTATION LITERATURE	PROCESS MANAGEMENT LITERATURE
National / regional policy objectives	(Lonsdale, Kretser, Chetkiewicz, & Cross, 2017; Reckien, Flacke, Olazabal, & Heidrich, 2015; Runhaar, Mees, & Wardekker, 2012; van der Berg, 2013)	---
Information / knowledge provided by the national / regional policy	(Anguelovski & Carmin, 2011; Runhaar et al., 2012; Runhaar, Wilk, Persson, Uittenbroek, & Wamsler, 2018; Uittenbroek, 2014)	---
Financial incentives provided by the national / regional policy	(Runhaar et al., 2012, 2018; Uittenbroek, 2014)	---
Municipal policy objectives	(Lonsdale et al., 2017; Reckien et al., 2015; Runhaar et al., 2012; van der Berg, 2013)	---
Information / knowledge provided by the municipal policy	(Runhaar et al., 2018; Uittenbroek, 2014)	---
Municipal budget for adaptation	(Lonsdale et al., 2017; Reckien et al., 2015; Uittenbroek et al., 2013; van der Berg, 2013)	---
Risk	(Reckien et al., 2015; Runhaar et al., 2012; Uittenbroek, 2014)	---
Inclusive project objectives	(Uittenbroek et al., 2013)	---
Political will at the municipal level	(Lonsdale et al., 2017; Reckien et al., 2015; Runhaar et al., 2012, 2018; Uittenbroek, 2014; van der Berg, 2013)	---
Availability of experts at the municipal level	(Anguelovski & Carmin, 2011; Lonsdale et al., 2017; Runhaar et al., 2018)	---
Availability of data and projections at the municipal level	(Galderisi, 2014; Mimura et al., 2014)	---

Collaborative mindset of the core group of actors	(Lonsdale et al., 2017; Uittenbroek, 2014)	---
Commitment of the core group of actors	(van der Berg, 2013)	---
Awareness of the core group of actors	(Anguelovski, Chu, & Carmin, 2014; Mogelgaard et al., 2018; Persson & Klein, 2009; Reckien et al., 2015; Runhaar et al., 2012, 2018; Uittenbroek et al., 2013; van der Berg, 2013)	---
Awareness of the other stakeholders	(Anguelovski et al., 2014; Mogelgaard et al., 2018; Persson & Klein, 2009; Reckien et al., 2015; Runhaar et al., 2012, 2018; Uittenbroek et al., 2013; van der Berg, 2013)	---
Process design	---	(Edelenbos & Klijn, 2005)
Flexibility of the process design	(Wardekker et al., 2010)	(Edelenbos & Klijn, 2005)
Role allocation	---	(Mimura et al., 2014)
Integrated project team	---	(Luyet, Schlaepfer, Parlange, & Buttler, 2012)
Rules of collaboration	---	(Luyet et al., 2012)
Early involvement of climate adaptation experts	(Chu et al., 2016)	---
Early involvement of relevant actors to the core group	---	(Luyet et al., 2012; Reed, 2008)

Appendix B

Table 10. Interview questionnaire

TOPIC	QUESTION
General (introduction)	How were you involved in the project and what was your role? When were you involved?
Outcome	What do you consider as the main outcome of the project? Do you believe that a synergy between Climate Adaptation objectives and other goals was achieved? Why?
Factors	Which factors helped to achieve the synergy between the climate adaptation objectives and the other goals?
Objectives	Which National Policy Objectives do you think influenced the realization of the synergy between climate adaptation objectives and other goals? How do you think they influenced the realization of the synergy?
	Which Municipal Policy Objectives do you think influenced the realization of the synergy between climate adaptation objectives and other goals? How do you think they influenced the realization of the synergy?
	How do you think the project objectives influenced the realization of the synergy between climate adaptation objectives and other goals? Did they change over time?
Process Design	Can you explain which steps did you follow in the process of achieving a synergy between the climate adaptation objectives and the other goals?
	In this research, the steps you just described are considered as process design. Why did you apply this process design?
	How effective was the applied process design? Would you change anything? Why?
	Overall, what was the influence of the process design on the realization of the synergy between the climate adaptation objectives and the other goals?
Process Management	At this stage, I would like to focus on the interaction between the various actors. How did you manage the interaction between them? Why?
	In this research, the management of the interaction between the various actors is defined as process management. How effective was the selected process management approach? Would you change anything? Why?
	Did you apply rules of collaboration in order to manage the process? If yes, which?
	Overall, what was the influence of the process management approach on the realization of the synergy between the climate adaptation objectives and the other goals?
Participation	Which actors were involved in the decision-making procedure, and why were they selected/invited to participate?
	Were groups of people who will be affected by the project excluded from the decision-making process? If yes, why?
	Overall, what was the influence of the included actors on the realization of the synergy between climate adaptation objectives and other goals?
	How were the actors involved in the decision-making process? Were different actors involved in a different way? If yes, why?

	Overall, what was the influence of the way the actors were included on the realization of the synergy between climate adaptation objectives and other goals?
Awareness	How aware were the internal actors (Municipality employees/officials) about the risks and impacts of climate change on the project before and during the decision-making process?
	Overall, what was the influence of the internal actors' awareness on the realization of the synergy between climate adaptation objectives and other goals?
	How aware were the external actors about the risks and impacts of climate change on the project before and during the decision-making process?
	Overall, what was the influence of the external actors' awareness on the realization of the synergy between climate adaptation objectives and other goals?
Roadmap	The second objective of this research is to design a roadmap that will help local governments to realize synergies between climate adaptation objectives and other goals in urban development projects. You would be one of this roadmaps' users. Considering this, what kind of requirements would you set for it? Or what kind of information would you like to see there?

Appendix C

Table 11. The condition - necessary or supportive - of the factors that influence goal intertwinement

STAGE	GROUP	FACTOR	CONDITION
Policy Context	**National / Regional**	National / regional policy objectives	*Supportive*
		Information / knowledge provided by the national / regional policy	*Supportive*
		Financial incentives provided by the national / regional policy	------
	Municipal	Municipal policy objectives	**Necessary**
		Information / knowledge provided by the municipal policy	*Supportive*
		Municipal budget for adaptation	**Necessary**
Specific Context	**Risk**	Risk	**Necessary**
	Input to the Process – Project Objectives	Inclusive project objectives	**Necessary**
	Input to the Process – Support / Resources	Political will at municipal level	**Necessary**
		Availability of experts at the municipal level	**Necessary**
		Availability of data and projections at the municipal level	**Necessary**
	Input to the Process – Core group of actors	Collaborative mindset of the core group of actors	*Supportive*
		Commitment of the core group of actors	**Necessary**
		Awareness of the core group of actors	**Necessary**
	Input to the Process – Other Stakeholders	Awareness of the other stakeholders	*Supportive*
Multi-Actor Interaction Process	**Process & Governance**	Process design	**Necessary**
		Flexibility of the process design	**Necessary**
		Role allocation	*Supportive*
		Integrated project team	*Supportive*
		Rules of collaboration	*Supportive*
	Participation	Early involvement of climate adaptation experts	**Necessary**
		Early involvement of relevant actors to the core group	*Supportive*