Strategies for Developers in Urban Area Projects on Climate Change Adaptations.

Implementation of Climate Change Adaptations on a Corporate, Development, and Collaboration level

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Preface

When I came to Delft to study Architecture in 2018 , almost everyone was certain that they were going to be architects. Throughout the bachelor's, I discovered that my interest extended beyond design alone. Through some of the courses I learned that I was particularly drawn to the complex relationships between stakeholders, organisational problems of large-scale projects, and the social impact of the built environment. After two years, it became clear to me that I wanted to pursue a masters in Management in the Built Environment.

To further explore the field, I spent a semester abroad in Cincinnati, where I followed a minor in real estate development. This experience broadened my understanding of the international development process and confirmed my interest in the economic, strategic and collaborative aspects of shaping our cities. It was a valuable step that brought me closer to the perspective of developers, and the role they can play in tackling societal challenges.

This thesis focuses on climate change adaptation in urban area developments. It explores how real estate developers can strategically embed climate resilience, particularly water management, in the corporate, project, and collaborative layers of development. As cities face more extreme weather, the private sector's role in enabling long-term adaptation becomes increasingly important. I hope my research contributes to that discussion, through the strategy design.

I would like to thank my Mentors, Erwin Heurkens and Erwin Mlecnik, for their continuous guidance and encouraging meetings. Your feedback and sometimes light conversations helped me through this process and clarify the complexity of writing a thesis.

Furthermore, I would like to thank all the professionals who participated in the interviews. Your openness and insights were essential in shaping the core of this research. Finally, to my family, friends, and fellow graduates, thank you for your support during this final stretch of my academic journey.

Merijn Jansen

Abstract

Cities are facing the impacts of climate change now more than ever. The increase in extreme weather events, rise in sea level and temperature have a great impact on the built environment. This is mainly due to the usage of fossil fuels and deforestation. The construction sector is one of the largest users of energy and emission of CO2 (IEA, 2019). Therefore, the urban environment has to adapt to the effects of climate change. Multiple actors can take responsibility in implementing these adaptations to climate change. In this thesis, the focus is put on the role of the real estate developer and how he can adapt to the minimization of climate impact through strategies and partnerships in urban development projects.

After an extensive literature review, there seems to be a gap in the role of real estate developers in implementing adaptation strategies, which was also confirmed by the work of ten Brinke et al. (2022). From this gap the following research question is formulated: "*What development strategies can real estate developers use to implement climate change adaptations in urban development projects?*". To answer this question, a literature review is conducted to gain knowledge on the role of developers in urban development, climate change adaptation, and partnerships. Parallel an exploratory interview will be done to gain more insights. After, case studies will be analysed with interviews, and with the conclusions from the literature and interview a strategy will be formed. Thereafter, an expert panel will be held to validate the findings from the research and analysis of the cases. Lastly, everything is put together in the conclusion.

Keywords: Climate Change Adaptations, Real estate Developers, Urban Development, Collaboration

Personal Motivation

My personal motivation to write about this topic comes from the belief that buildings and cities should not only withstand the challenges posed by climate change but also contribute positively to the environment. It is clear that there needs to be change, but who is going to take charge? From this standpoint, I came to see that it cannot be done solely by the governing parties but also by other stakeholders. Create awareness in a new and relatively unknown field. I would like to discover and gain more knowledge on an important topic that is apparent today. Discovering understandings and key challenges in implementing this in an organisation.

When thinking of a topic for this thesis I quickly came to realise that I wanted to investigate the developer's role in the urban environment, while in the first year of the master it became apparent that there are a lot of regulations and demands from the public side, especially the municipalities. My interest in climate change comes from the belief that we must act in order to better the planet. Adding the two together, my initial question was developers not going beyond what's needed in their designs in order to contribute as much as possible to stop climate change. I think collaboration is the best tool to book success, especially when it comes to changing the current stress on the environment. With this thesis, I hope to create better insights into this problem for myself and everyone who will read this.

Executive Summary

Introduction

As climate change intensifies, urban areas face increasing risk from extreme weather events, such as heavy rainfall, drought, and rising groundwater levels. In the Netherlands water management has historically been a key concern, but the need for climate adaptive urban development is now more urgent than ever. Real estate developers are expected to take responsibility in making developments more climate-adaptive. Developers have this specific role because they are the major initiators of spatial transformation. However, it remains unclear how developers can integrate climate change adaptation, especially water management, into their Projects. This thesis investigates the strategic role that developers can plan and aims to provide concrete guidance to facilitate climate adaptation.

While public authorities are increasingly formulating adaptation policies, the implementation on the ground often relies on the willingness and capacity of private parties to integrate such measures in their projects. This study seeks to understand how real estate developers can actively contribute to climate-adaptive urban developments, and how they collaborate with municipalities and other stakeholders to do so.

The main research question guiding this study is: “what strategies can real estate developers use to implement climate change adaptation in urban development projects?”.

To answer this question, the research is divided into seven sub-questions, which examine both the theoretical foundation and empirical findings from two case studies, leading to a strategic model for developers.

1. What is the importance of climate change adaptation, specifically water management?
2. How do developers collaborate with other stakeholders in developments?
3. What is the role of a real estate developer in the context of urban development projects?
4. What are development companies’ corporate positions on climate change adaptation?
5. How do real estate developers integrate climate change adaptation in real estate projects?
6. How do real estate developers experience collaboration with external parties in implementing climate adaptations in urban development projects?
7. How do corporate, development, and collaboration strategies contribute to the integration of climate adaptation in urban area developments?

Research methods

This research combines theoretical and empirical methods using a multi-step design. The study begins with a literature review to identify key concepts and categories relevant to climate adaptation, urban governance, and the role of private developers. These insights form the foundation for a conceptual framework. Subsequently, two Dutch case studies are analysed using semi-structured interviews with developers, consultants, and public partners. A cross-case analysis identifies patterns and differences in how developers approach climate adaptation in practice. These findings are synthesized into a strategic model that is validated through an expert panel composed of industry professionals.

Research design

In Figure 1, the Research design that is used for this thesis is presented. In this figure you can see the relationship between each sub-question. It also shows what method is used and what the expected outcomes are.

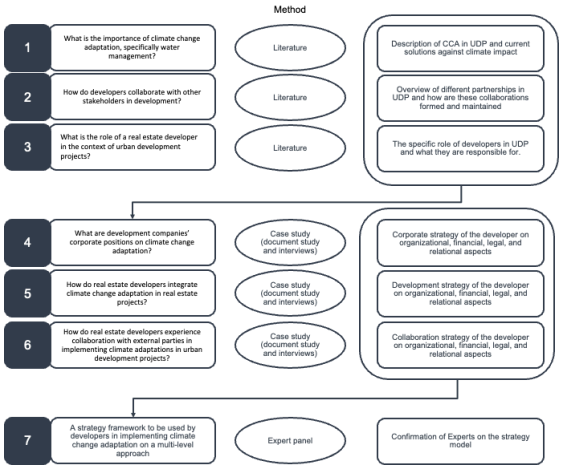

Figure 1, own work (2025)

Theoretical research

The first three sub-questions are addressed through theoretical research. Literature was collected using academic databases such as Scopus and Google Scholar. Search terms were based on key concepts derived from the sub-questions, such as “climate change adaptation”, “real estate developers”, “urban water management”, and “collaboration in urban development”. Because the research is mainly based on the dutch context, additional sources were consulted such as gebiedsontwikkeling.nu, the climate adaptation knowledge portal (KAN) and reports from the dutch government.

To provide a conceptual framework, the thesis applies Heurkens’ (2012) conceptual steering model. This model offers a structured lens to understand how developers operate in a governance network and how they can exert strategic influence. The conceptual framework serves to categorize barriers, drivers, and strategies for adaptation across organizational, legal, financial, and relational dimensions.

Empirical research

The second part of the research aims to get an answer to sub-question 4 till 6. This is done through the use of case studies. Two Dutch urban area developments were selected based on predefined case criteria: relevance to water-related climate adaptation, urban scale, stage of development, and willingness of key stakeholders to participate. One case is situated in the exploitation phase, and the other in an earlier planning stage. This provides insights into both early strategic choices and outcomes of long-term implementation.

Data was collected through semi-structured interviews with key actors involved in both projects. Interviewees included project developers, corporate strategists, municipal planners, and external advisors. The interview protocol was designed to allow flexibility in discussion while ensuring thematic coverage across collaboration, corporate policy, and project-level strategy.

Synthesis

The synthesis phase brings together insights from both theoretical and empirical research. The results are combined into a strategy model that outlines how real estate developers can contribute to climate-adaptive urban development through corporate, development, and collaboration strategies. The model is structured across four dimensions, organizational, legal, financial, and relational, and aims to support developers in operationalizing climate adaptation.

To validate and refine the model, an expert panel was conducted. The expert panel consisted of professionals with experience in sustainable urban development, municipal governance, and real estate strategy. Each expert reflected on the model's readability and applicability, and their feedback was used to finalize the strategic framework. This panel served as a qualitative group interview emphasizing the critical input of experts in the field.

Theoretical

The conceptual framework, adapted from Heurkens (2012), illustrates a systems-based approach to private-sector-led urban development. It identifies four interrelated elements: context, real estate developers (organization), climate-adaptive urban area development (process), and development strategy (management). These elements together form an overarching system that links external influences, organizational structure, strategic decisions, and project-level outcomes. The framework helps position the developer's role within broader systemic influences.

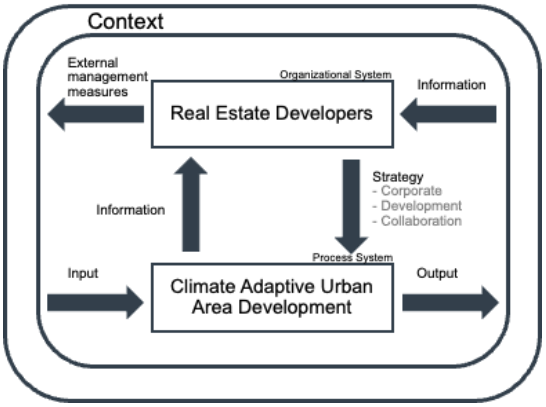

Figure 2: Conceptual Model (own work)

The Dutch context is shaped by economic and political dynamics, urban governance structures, and multi-level planning systems. This context integrates theories from planning, economics, geography, law, and design. Economic changes and political shifts influence development objectives and tools, while governance transitions from centralized to collaborative models redefine stakeholders' roles. This Dutch setting provides regulatory tools (e.g. ecology instruments), knowledge flows (e.g. stress tests), and input/output interactions between projects and the wider urban environment.

Developers are central to urban development processes. They initiate projects, assemble stakeholders, and coordinate design, financing, and delivery (Robin, 2022). Their actions shape the physical, social, and environmental form of cities. Five developer types are identified: independent, construction-linked, investor-linked, bank-linked, and miscellaneous others (Heurkens, 2012). These differ in scope, motivation, and risk tolerance.

Although developers acknowledge the relevance of climate adaptation, internal motivations are often weak unless adaptation yields market or branding benefits (Storbjörk et al., 2018). Barriers such as uncertain returns and limited demand prevent proactive climate strategies.

Strategic management enables developers to respond to climate challenges. Urban strategies evolve continuously through public-private interactions. Nguyen et al. (2017) argue that strategy formation depends on relational dynamics and institutional context.

Public-private partnerships (PPPs) are increasingly viewed as vehicles for climate adaptation. Buso & Stenger (2018) propose that PPPs outperform subsidies in high-risk contexts, offering more balanced outcomes through co-investment and shared governance. Legal, financial, and relational dimensions must be aligned for successful PPPs (Heurkens, 2012).

Urban area development transforms physical environments over long periods and involves multiple actors. Developers orchestrate this transformation, aligning interests, funding, and project phases (Franzen et al., 2011; De Zeeuw, 2018).

Climate adaptation in the built environment includes both planned and autonomous strategies. These are further divided into anticipatory and reactive actions. Built examples include reflective facades, green roofs, and water-resistant materials. Adaptation measures are

grouped as grey (technical), green (nature-based), and soft (policy or behavioral) (Depietri & McPhearson, 2017).

Water management is a critical adaptation theme in the Dutch context. It includes dealing with excess rain, groundwater, and drought. Muller (2007) emphasizes adaptive infrastructure that anticipates variability in supply and flood risks. Green infrastructure, above-ground storage, and natural drainage systems form part of a preferred hierarchy: use > hold > store > dispose. Yet, current regulations offer only guidelines, not mandatory obligations for developers.

According to Ten Brinke et al. (2022), developers' incentives for adaptation remain limited without policy pressure or market demand. While some implement adaptation for branding, there is little large-scale uptake. Municipalities employ various tools, but effectiveness varies. Public awareness campaigns and collaborative planning are suggested as pathways to more effective adaptation integration.

Empirical

To explore how real estate developers implement climate adaptation in practice, this study conducted a multiple-case analysis of two Dutch urban developments: *De Glasfabriek* (Schiedam) and *Erasmusveld* (The Hague). These cases were selected for their relevance and contrast in development approach and stakeholder collaboration.

Seven semi-structured interviews were held with developers, municipal officials, and advisors. The interviews were analysed across three strategy types(corporate, development, and collaboration) and four dimensions: organisational, legal, financial, and relational.

The Erasmusveld case, led by a development consortium, showed how long-term land ownership and early agreements foster continuity and climate integration. The Glasfabriek, developed by developer 1, illustrated a more flexible, innovation-driven approach with strong stakeholder co-creation. Both cases highlighted persistent barriers such as unclear financial incentives and fragmented governance.

The findings show that climate adaptation depends heavily on collaboration, strategic alignment, and the ability of developers to embed sustainability not just in vision, but in concrete project and investment decisions. These insights directly informed the strategy model developed in the final synthesis.

Synthesis

The model was developed iteratively and validated through an expert panel of seasoned real estate professionals. These experts confirmed the model's realism and usability, offering suggestions to improve clarity and emphasise issues such as organisational capacity, legal fragmentation, and long-term coalition building.

The corporate strategy focuses on anchoring sustainability ambitions and internal expertise. The development strategy provides actionable steps per project phase, from early feasibility to post-delivery evaluation. The collaboration strategy highlights long-term governance and trust-building between public and private actors. Throughout, the model acknowledges the complexity of climate adaptation and encourages continuous improvement.

In this way, the synthesis translates the fragmented efforts seen in practice into an integrated approach that developers can use to systematically implement climate adaptation in urban development projects.

Figure 3: strategy model (own work)

Conclusion

"What strategies can real estate developers use to implement climate change adaptations in urban development projects?"

Real estate developers can significantly influence climate adaptation in urban development by adopting a multi-level strategy that integrates corporate vision, project execution, and collaboration. These strategies are interconnected and mutually reinforcing.

At the **corporate level**, developers must embed climate adaptation in their mission and strategic priorities. Building internal expertise and awareness supports implementation at the project level. As seen in Erasmusveld and Glasfabriek, early strategic commitment facilitates smoother integration of adaptation in future developments.

The **development strategy** translates corporate goals into practice. Adaptation should be embedded from the earliest phases, especially during conceptual and design stages, where the influence is greatest. Technical and spatial solutions for water management must be explored and integrated early, as illustrated in both case studies.

Collaboration is essential. Developers must engage municipalities, water boards, and other stakeholders from the outset. Establishing shared ambitions, clear roles, and formal agreements ensures alignment and prevents fragmentation. Both cases showed the importance of trust and structured cooperation through joint ventures.

In conclusion, developers must take a strategic approach to adaptation, starting at the organisational level, acting early in project design, and fostering long-term partnerships. This integrated approach allows them to effectively lead in climate-adaptive urban development.

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Glossary

Climate adaptation - The actions taken to prepare for and adjust to the current and future impacts of climate change (IPCC, 2022).

Climate mitigation - The actions taken to reduce or prevent the release of greenhouse gases into the atmosphere, thereby slowing down or reversing the effects of climate change (IPCC, 2022).

Stormwater - Surface water in abnormal quantities from heavy falls of rain or snow (EPA, 2021).

Urban area - A geographical space characterized by a continuous human settlement with a high population density and a developed built environment (wikipedia, 2025).

Urban heat island effect - The phenomenon where densely populated areas experience higher temperatures than surrounding rural areas (wikipedia, 2025).

Abbreviation

CCA - Climate change Adaptation

01 Introduction

In the first chapter, the research problem based on literature is presented together with the output and goals. Followed by the research questions and the societal and scientific relevance. lastly, the conceptual model is presented.

1. Introduction

In recent years there has been an increase in extreme weather events (Stott, 2016), this is mostly due to the change in climate (NASA, 2024). The impacts of climate change are not only the increase in extreme weather but also the rise in sea levels and temperature rises, all these problems also influence the built environment. Over the last twenty years there has been a fast growth in the development of adaptation methods to climate change (Arnott et al., 2016). More financial incentives improved scientific understanding, and higher public awareness all aided in the establishment of a variety of adaptation projects involving government, international development, non-profit, and community organisations (Owen, 2020). In practice, there is little agreement on what effective adaptation is. There are three main factors that challenge the implementation in practice: uncertainty, lack of agreement, and attribution (de Coninck et al., 2018). Climate adaptation refers to the adjustment in behaviour, actions, and decisions made within the biological, social, and built systems in response to climate changes (Smit and Pilifosova, 2001). These adjustments can be reactive and anticipatory. Reactive addressing the events that have already happened and anticipatory preparing for expected future events (Smit et al., 2000).

Climate change adaptation is a long-term global issue that requires a coordinated response between government, businesses and societal actors (Adgar et al., 2005). However, much literature on climate change adaptation in urban environments is focussed on the public-sector (Betsill & Bulkeley, 2006). Around a decade ago non-state actors were left outside of the formal decision-making arenas, this created the need for an improvement of how private actors position themselves in relation to climate policy (Bulkeley, 2010). At a national level the reference to private actors, such as the property development industry, have not been crooked if not absent. Property developers have a huge influence in shaping urban landscapes and thus environmental impacts (Beuschel & Rudel, 2010). Regardless of this significant influence of the sector, there have been few discussions in literature that criticises the connection between the sector's involvement in policy making in the built environment and the benefits it could have on communities (Moore & Bunce, 2009). Studies on partnerships in the urban environment are also uncertain about the position and motives of business in urban governance (Cook, 2009).

Governance is an important piece in the puzzle of climate adaptation in the urban environment. Governance, as pointed out by Stroker (1998), is the reference to the development of governing styles in which the boundaries between and within public and private sectors have become blurred. Governance can change the traditional mechanisms of steering and regulations through an interorganizational network of government and other actors (Taylor et al., 2012). Governance is seen in the context of politics, economics, social and institutional transformations on all scale levels (Hohn & Neuer, 2006). The networks and balance of power among stakeholders of the private, public and civil society sectors keep changing and transforming. This can result in new innovative strategies, processes and stimulate the formation of new formal and informal actor networks (Hohn & Neuer, 2006). In theory it is important to have a good relationship between actors and working methods of governance to be able to implement climate change adaptability in the urban environment.

The IPCC (2018a) report defines adaptation as follows: Climate change adaptation refers to the actions taken to manage impacts of climate change by reducing vulnerability and exposure to its harmful effects and exploiting any potential benefits. Adaptation takes place at international, national and local levels. The Paris agreement on climate change, signed in 2015, calls for action on both the causes and consequences of climate change. The causes of climate change are to be addressed through a drastic reduction in greenhouse gas emissions (mitigation), and its consequences will be addressed through an

equal emphasis on investment in climate resilience (adaptation) (Frankhauser, 2017). The debate between mitigation and adaptation has been going on for some time, but the attention of policy makers has focussed more on mitigation (Frankhauser, 2017). So there is a difference to be made in mitigation and adaptation, these two terms are closely related and are often mixed. Mitigation measures, simply put, aim to prevent negative climate effects from taking place and adaptation measures focus on dealing with the negative climate effects that have already taken place (Laukkonen et al., 2009). In the field of risk management the term of mitigation is often used to describe the actions that reduce climate risk, instead of adaptation and in the literature of development, it has become common to talk about climate-resilience development rather than adaptation (Frankhauser, 2017). The Intergovernmental Panel on Climate Change (IPCC) defines resilience as a system's ability to anticipate, absorb, accommodate, or recover from a hazardous event (Field et al. 2012). Despite the slight difference in resilience and adaptation, the two are often used interchangeably.

The paper of Owen (2020) categorized climate change adaptations into three main categories: social-, Institutional-, and Physical and Structural Adaptation Activities. The built environment falls under the physical and structural adaptation activity category. In this category the paper highlights water as the most prominent problem. Too often mitigation and adaptation are treated as independent strategies; in reality, even if we could somehow stop all greenhouse gas emissions right now, some degree of warming will still result. Additionally, even at 1.5°C and 2°C warming, impacts will still be felt. Therefore, it is critical that society adapts to future impacts of climate change (Murphy et al., 2019). Climate change adaptation requires a multi-stakeholder approach that involves collaboration between different actors, including civil society, governments, private sector and communities (Buso & Stenger, 2018). Collaboration can lead to more efficient risk and incentives among public and private actors in climate change adaptation (Klein et al., 2017). Adaptation to climate change in urban areas requires public and private actors to engage in governance of complex problems in conditions of uncertainty (Taloy et al., 2011).

In essence, urban area developments are about adaptability (Vermeulen et al., 2019). Especially when it comes to climate adaptation. De Zeeuws (2018) defines area development as ‘area development is the art of connecting functions, disciplines, parties, interests, and financial flows, for the purpose of developing or transforming an area.’. This definition in some parts aligns with collaborating to implement climate change in the developments within the area.

The development of climate-adaptive areas is increasingly influenced by the growing role and responsibility of private parties (Heurkens, 2019). Where previously public actors such as governments often took the lead in urban development and sustainability, we now see a shift where private companies play a central role in achieving sustainable, adaptable areas. This is reinforced by a changing governance relationship between public, private and societal parties, in which the government increasingly plays a facilitating and regulatory role, while market players and civic initiatives initiate the development of our urban environment.

In this new reality, the private sector is taking an active role in addressing major challenges such as climate adaptation and energy transition. Market players are stimulated by legislation, such as the Environment Act, which emphasizes private and civic initiatives, but also by societal pressure and changing market conditions that require sustainable innovations to remain competitive (Heurkens, 2019). Sustainability is no longer a precondition, but an integral part of the strategy and operations of many private organizations.

The increasing role and responsibility of private parties in the development of climate-adaptive areas is a crucial step towards a sustainable future. By working together with governments and social actors, and by making sustainable business an integral part of their strategy, private parties can make an important contribution to creating resilient, future-proof cities and areas.

1.1 Problem Statement

Despite growing awareness about climate change, there is a significant information gap on the role of real estate developers in implementing adaptation strategies (ten Brinke et al., 2022). While there has been considerable research on national and global attempts to mitigate climate change, there has been little in-depth examination of the roles and responsibilities of real estate developers in this context. This research challenge emphasises the importance of investigating real estate developers' responses to climate change and assessing their ability to enhance sustainability in urban development. Many developing parties are concerned about adaptation, and the opportunities it gives for the development of new commercial activities are largely unknown. (Driessen et al. 2015) The temperature in the Netherlands is rising, winters are getting hotter and the same goes for the summer. Extreme temperature fluctuations are becoming more frequent. The Netherlands has a higher flood risk than the rest of the world (IEA, 2022).

Risk reduction is essential in the context of climate change adaptation. On the one hand, minimising the vulnerabilities of the urban area to the impacts of climate change is important to take into consideration. But on the other hand, implementing adaptation measures incur costs. These costs must be weighed against the benefits of risk reduction. The different types of risk must be looked at to make sure that they can be avoided or slimmed down. ''The property development 'industry' consists of diverse private actors with considerable financial, political or technical resources. However, there is no empirical research on the potential contribution of these actors, and particularly property developers, to climate adaptation, in terms of their preferences, capabilities and perceptions.'' (Taylor, 2011).

Real estate developers face significant challenges in implementing climate change adaptations, which complicate sustainable urban development. The increase in extreme water showers and the risk of flooding calls for sustainable water management. Regulations are getting stricter, which raises costs and adds complexity (Wieteska-Rosiak, 2020). Ganeshu et al. (2023) suggests that collaboration can break the barriers that developers are facing in development projects.

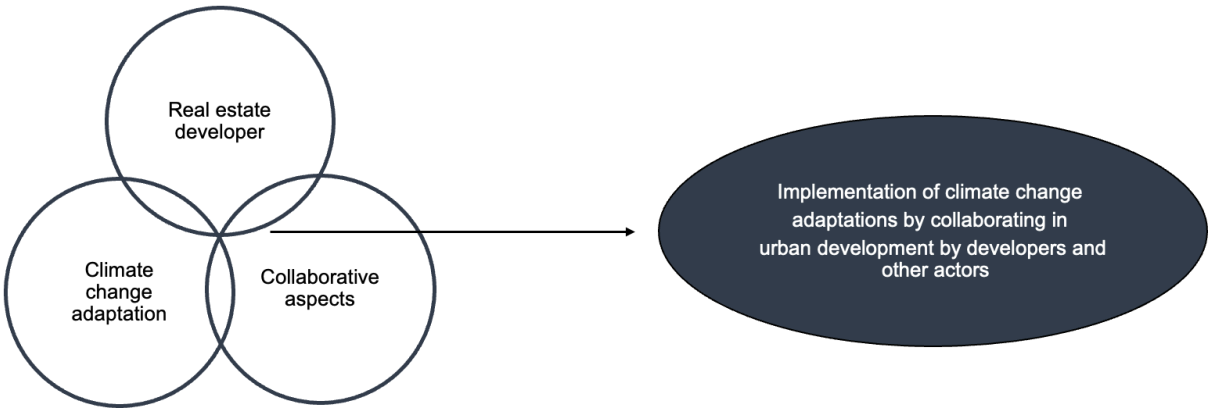

Figure 1.1 Research gap and topics (own figure)

1.2 Research output and goals

The goal of this research is to find out what real estate developers can do to decrease the impact of climate change by implementing adaptation into their development projects and how partnerships with public and private actors can contribute as incentives to implement adaptations. To do so, the responsibilities of all actors in a public-private partnership of urban development projects must be looked at. This will be done through extensive literature study, exploratory interview, and case study interviews. In the end, the goal is to construct a strategy that can be used in the decision-making of climate adaptive measurements for developers, validated by an expert panel.

In the first phase of the research, a literature study will be conducted. This part of the research will form the basis for the case studies analysis. This will help with creating a general overview of the current position of developers on the topic of climate change adaptation. The case studies will be done through document study and interviews with stakeholders in the developments. The findings from the literature and case studies will form the basis for the strategy. This will be validated with an expert panel.

The main target audience for this research is real estate developers in urban development projects. Other stakeholders who are involved in urban development projects are the secondary audience, due to the fact that they are involved in the urban environment, especially within a public-private partnership. This research will provide helpful insights for developers on how to use climate adaptations within partnerships, so a better collaboration is created. The collaboration will hopefully break the climate adaptive barriers and challenges that developers face in urban development, bridging the gap of interaction between stakeholders (Le et al., 2022).

1.3 Research Question & Sub questions:

Answering the main research question: ''What strategies can real estate developers use to implement climate change adaptations in urban development projects?'', sub-questions have been formed. Through these sub-questions, conclusions and recommendations can be made.

SQ1: What is the importance of climate change adaptation, specifically water management?

SQ2: How do developers collaborate with other stakeholders in urban developments?

SQ3: What is the role of a real estate developer in the context of urban development projects?

SQ4: What are development companies' corporate positions on climate change adaptation?

SQ5: How do real estate developers integrate climate change adaptation in real estate projects?

SQ6: How do real estate developers experience collaboration with external parties in implementing climate adaptations in urban development projects?

SQ7: How do corporate, development, and collaboration strategies contribute to the integration of climate adaptation in urban area developments?

These sub-questions accumulate the required information to answer the main research question at the end of this thesis. how these questions will be answered can be found in the research methodology, chapter 2.

1.4 Relevance: Societal and scientific

Societal
The societal relevance of climate change adaptation encompasses the impact on human societies, communities, and social systems. Adaptation is crucial for reducing the risks posed by changing environmental conditions and extreme weather events. As seen recently with the risk of flooding in the Netherlands (Beuken, 2023). By enhancing resilience through adaptation, communities can be helped to withstand and recover from climate related impacts. Climate change adaptation can also contribute to a better economic stability, by eliminating risks posed by environmental impacts (Adger et al., 2009). For developers this could be a guide on how to incorporate CCA into their core business and developments.

Scientific
Partnerships and in particular public-private partnerships in urban development, have been a topic of recent years. The literature that is out there extensively talks about the importance of collaboration, but not on how PPPs can improve urban developments in implementing climate change adaptations. These partnerships are often researched in the financial context or societal context, the Collaboration in these partnerships between developers and municipalities or other stakeholders is usually underexposed.

Researching the role of developers in implementing climate change adaptation in an area development is relevant because there isn't yet a clear environmental law requirement on what they must comply with. An article by KAN (2024) suggests that developers need a process strategy to determine the right scale and type of adaptation.

1.5 Conceptual Model

The conceptual model outlining the key factors and relationships involved in private developer contributions to climate change adaptations. In the context of urban development, the three main concepts are shown in relation to each other.

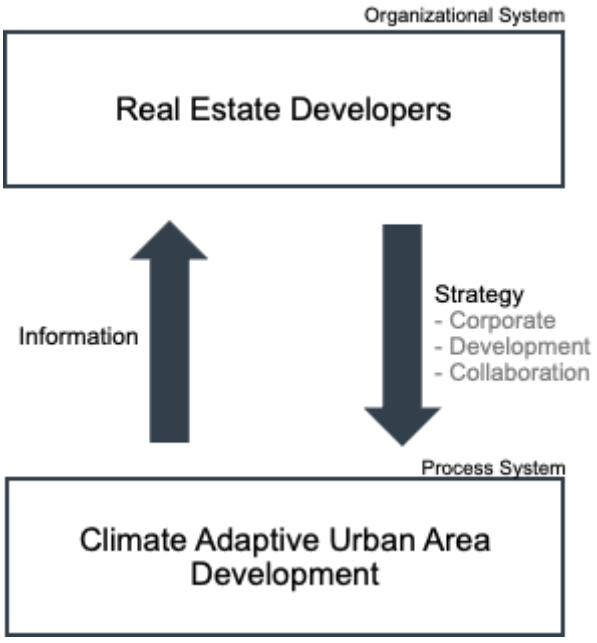

Figure 1.2 Conceptual model (own work)

02 Research Methodology

In the second chapter, the methodology is explained, what types of research are used in this study to get an answer to the research question.

2. Research Methodology

This research is based on a qualitative method-based approach, including a literature review, case studies with document analysis, semi-structured interviews, and an expert panel. The literature review provides an understanding of climate change adaptations in urban development, the role of real estate developers, and collaborative aspects. After setting the parameters of the research in the literature review, case studies are done through document analysis and semi-structured interviews. This will provide insights into the practice of real estate developers. From the case study, recommendations will be made of what strategy can best be implemented to get the best collaboration on climate change adaptations in urban development.

2.1 Qualitative Research Methods

The Book of Berg and Lune, Qualitative Research Methods (2012) describes the purpose of research as discovering answers to questions through the application of systematic procedures. Qualitative research properly seeks answers by examining various settings and the groups or individuals who inhabit these settings. Qualitative procedures seek patterns among cases but do not reduce these cases to their averages.

Qualitative research refers to the meaning, concepts, definitions, and characteristics (Berg & Lune, 2012). Boeije (2010) defines qualitative research as follows: *The purpose of qualitative research is to describe and understand social phenomena in terms of the meaning people bring to them. The research questions are studied through flexible methods, enabling contact with people involved to an extent that is necessary to grasp what is going on in the field. The methods produce rich, descriptive data that needs to be interpreted through the identification and coding of themes and categories, leading to findings that can contribute to theoretical knowledge and practical use.* The definition has three key elements: 1) looking for meaning, 2) using flexible research methods enabling contact, and 3) providing qualitative findings.

First, by looking for meaning by using qualitative research, you try to find out about the participant's point of view. The researcher must collect data that captures this view. When analyzing this data they have to be sensitive to only extract the relevant (Boeije, 2010). In this research, the methods of data collection are used to enable close contact with the field of research. Two of the primary ways of collecting qualitative data are interviewing and case studies (Berg & Lune, 2012). Lastly, providing qualitative findings, raw data cannot be presented alone. Instead, they are required to re-interpret the information while preserving the participant's meaning (boeije, 2010). When analyzing the data, the researcher reduces, selects, interprets and, decides what they will use to convey their message to the reader.

Qualitative research and qualitative analysis are not the same, although they are closely related. Qualitative research refers to the overall methodology or approach aiming to explore and understand experiences and behavior. Qualitative analysis refers to the process of analyzing the collected data through qualitative research.

Before diving further into qualitative analysis, it first has to be defined. Boeije (2010) has formulated the following definition: qualitative analysis is the segmenting of data into relevant categories and the naming of these categories with codes while simultaneously generating the categories from the data. In the reassembling phase, the categories are related to one another to generate a theoretical understanding of the social phenomenon under study in terms of the research question.

Rapley, in Chapter 15 of Qualitative Research (2011), describes four types of approaches to qualitative data analysis: Framework analysis, Thematic Analysis, interpretive phenomenological analysis, and constructivist theory. Of these four approaches, the first, Framework analysis, seems to be the most suitable for this thesis. Because it is more applied and policy-oriented than the other options. It starts with familiarizing yourself with the dataset, and noting the initial themes or concepts. Second, generate a thematic framework, themes, and sub-themes from data and interviews. Thirdly, indexing, applying the thematic framework, and labeling data with numbers or terms. Fourth is sorting the data by theme or concept and summarizing. Thereafter, developing descriptive accounts, developing and refining categories. Lastly, develop explanatory accounts and look for patterns, associations, clustering, and explanations.

In interviews, the researcher is the main instrument. A definition of interviews given in Boeije (2010): *a form of conversation in which one person, the interviewer, restricts oneself to posing questions concerning behavior, ideas, attitudes, and experiences of social phenomena to one or more others, the interviewees, who mainly limit themselves to providing answers to these questions*. A qualitative interview takes place in a reciprocal relationship. They provide a researcher to learn about practices through perspective and experience on the topic.

The qualitative interviews are meant to look for a true understanding of the topic. Therefore, the interviews are usually not entirely pre-structured with respect to the content, formulation, sequence, and answers. Neither are they left entirely open (Boeije, 2010). This type of interview is known as a semi-structured interview.

Figure 2.1 shows the methods that are used to answer the main research question, for each question one or two methods are used to find the answer to the sub-questions. The content is the questions asked, with the methods being the means to find an answer. The outcomes from these methods will then be used with the methods of the next question to further the research.

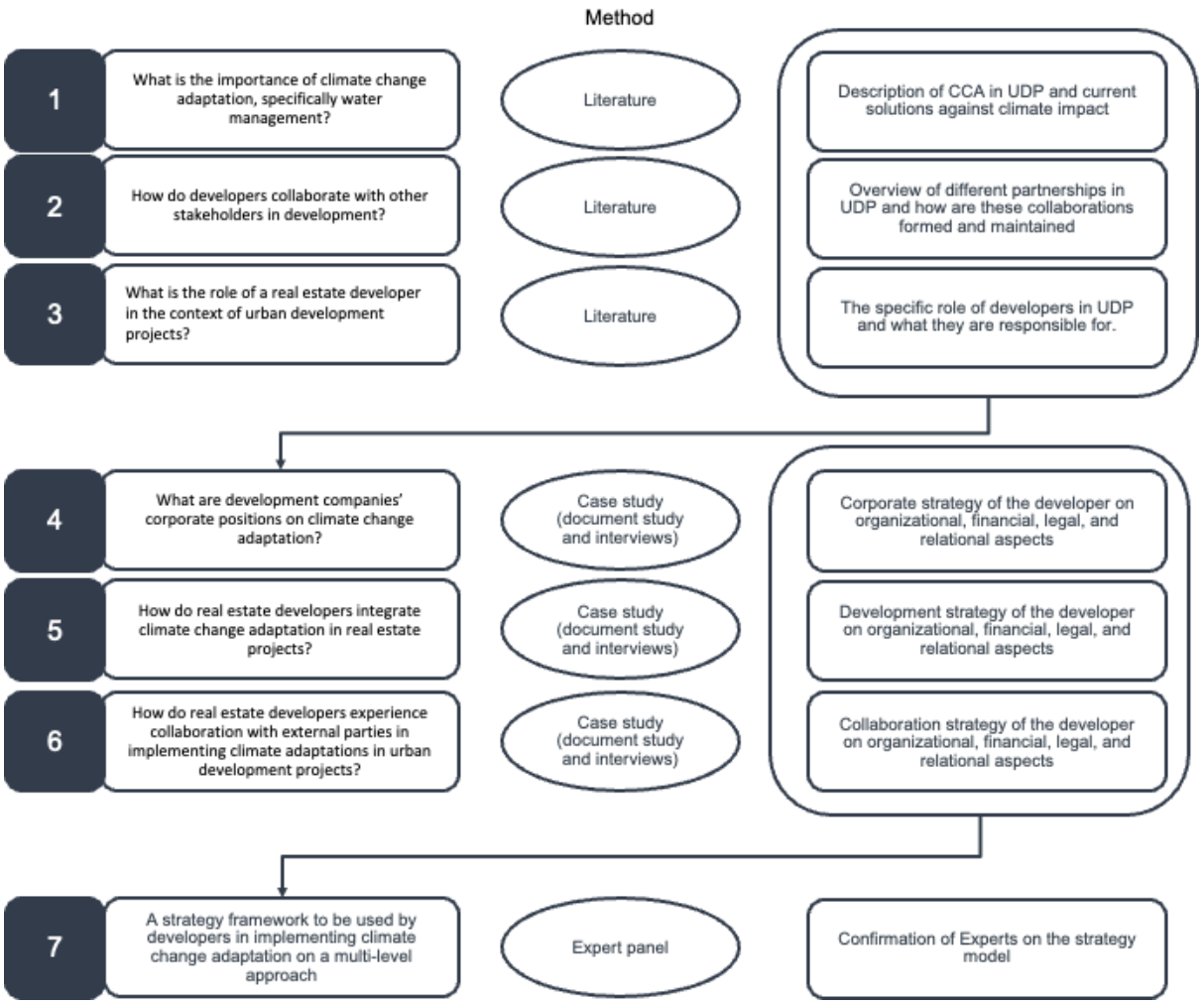

Figure 2.1: Research Methodology (own work)

2.2. Literature review

The first method of research that is conducted is the literature review. With studying literature, important information is collected to understand the topic. In the literature review, a broader context is used to collect all important data for the overall view on climate change adaptations, developers in urban area development, and the collaboration of these developers with other (public) actors. As Snyder (2019) emphasizes, selecting the appropriate methodology and maintaining rigor throughout the process ensures the review's quality and contribution. By synthesizing the prior knowledge effectively, the literature review not only supports the research question but also lays the groundwork for meaningful and impactful research.

Following the taxonomy of Snyder (2019), the study adopts a *semi-systematic (state-of-the-art) review*. This format is recommended when a field is rapidly expanding, derives information from different takes (planning, real-estate, climate science and governance studies) and when the objective is to map concepts rather than to test a single hypothesis. A semi-systematic review allows broad coverage of peer-reviewed and high-quality grey literature while still applying transparent, replicable selection rules.

The search engines that were used are divided in scholarly databases such as Scopus and Web of Science, institutional & grey literature portals, and Supplementary engines such as Google scholar. The three concept blocks were combined with AND; synonyms within each block were linked with OR. the prompts that were used are: *"climate change adaptation" OR "climate-resilience*" OR "water management", *"real-estate developer*" OR "property developer" OR "private actor", and *"urban development" OR "area development" OR "public-private partnership" OR "collaboration strategy*".

2.3 Case study

The second research method is a case study. Using case study research that includes interviews is an effective method for examining real-world challenges and risks faced by real estate developers regarding climate change adaptations. This method aligns well with the goals of case study research as outlined by Glynis Cousin (2005), aiming to explore and depict settings to advance understanding.

The case studies will provide insight into the practice of a development firm on the corporate level on climate adaptation, the development strategy used in urban development projects, and the collaboration strategy of a developer in area developments.

Semi-structures interviews

Case study research in the context of real estate development and climate change adaptations can fall under the "instrumental" category. Here, specific instances of real estate projects that have attempted to integrate climate change adaptations can be studied in-depth to get insights into the broader class of such development projects. Interviews with real estate developers within these case studies can provide "thick descriptions" that capture the nuanced challenges they face, such as financial, regulatory, and technical barriers (cousins, 2005).

By conducting interviews, researchers can collect qualitative data that provide a rich, contextual understanding of the developers' experiences. These interviews can reveal the subjective values, perceptions, and decision-making processes of the developers, which are crucial for understanding the complexities of implementing climate change adaptations. This qualitative approach is also beneficial in identifying the emergent themes and patterns related to the developers' challenges and risks, which might not be immediately apparent through quantitative methods alone (cousins, 2005).

Moreover, interviews can help validate findings from other data sources, contributing to the triangulation of data and enhancing the credibility of the research. They also offer the opportunity for researchers to engage with participants, allowing them to clarify and delve deeper into issues raised during the data collection process.

Document study
Brown's paper (2009) gives the following definition: Document analysis is a systematic procedure for reviewing or evaluating documents, both printed and electronic. Like other qualitative research methods, it involves examining and interpreting data to elicit meaning, gain understanding, and develop empirical knowledge. Documents used in document analysis contain text and images that have been recorded without the intervention of the researcher.

2.4 Expert panel

To validate the knowledge gained from the case studies an expert panel will be held to have triangulation. Triangulation can significantly contribute to qualitative research by providing a robust framework for data collection and analysis (Klein & Olbrecht, 2011). The use of an expert panel is a robust approach to answering complex research questions (Carter et al., 2014), such as identifying strategies to foster collaboration between real estate developers and public actors for climate change adaptation in urban development projects.

The data from the previously held case study (interview and document analysis) can be used to find out what relational strategy best can be used to improve the connection between public and private in implementing climate change adaptation.

2.5 Data management and Human research ethics

This research adheres to the ethical standards for human-subject research as outlined by the TU Delft Human Research Ethics Committee. All participants in the interviews were informed about the purpose and scope of the research and gave informed consent prior to participation. Data collected during the interviews were anonymized to protect the identities of the interviewees, and no sensitive personal information was stored. Audio recordings were transcribed and securely stored on an encrypted, university-approved cloud service, with access restricted to the researcher. The data will be retained for a period consistent with TU Delft's data retention guidelines and will only be used for academic purposes. Furthermore, the study followed principles of confidentiality, voluntary participation, and the right to withdraw at any time. The semi-structured interviews were designed to be non-intrusive and respectful of the participants' professional roles, ensuring that the research process remained transparent and ethically sound throughout.

03 Theoretical Research

In the Third chapter the conceptual model is explained. thereafter the context of this research. Followed by the rest of the literature review to get an answer to the first three sub-questions.

3. Theoretical Research

This chapter will answer the first three sub-questions. In this literature review this is done by first describing the conceptual model and context. then the three main topics are looked at.

3.1 Conceptual Model

The conceptual framework illustrated in Figure 3.1 represents a systems-based approach to managing private-sector–led urban development projects (Heurkens, 2012). For this research, the conceptual model focuses on four key elements:

- **Context**
- **Real estate developers** (in terms of organization)
- **Climate-adaptive urban area development** (as a process)
- **Development strategy** (in terms of management)

These elements connect to form an overarching framework showing how external influences (context), organizational structures (the developer), strategic decisions (strategies), and the specific goals of climate adaptation (climate-adaptive urban area development) all interrelate.

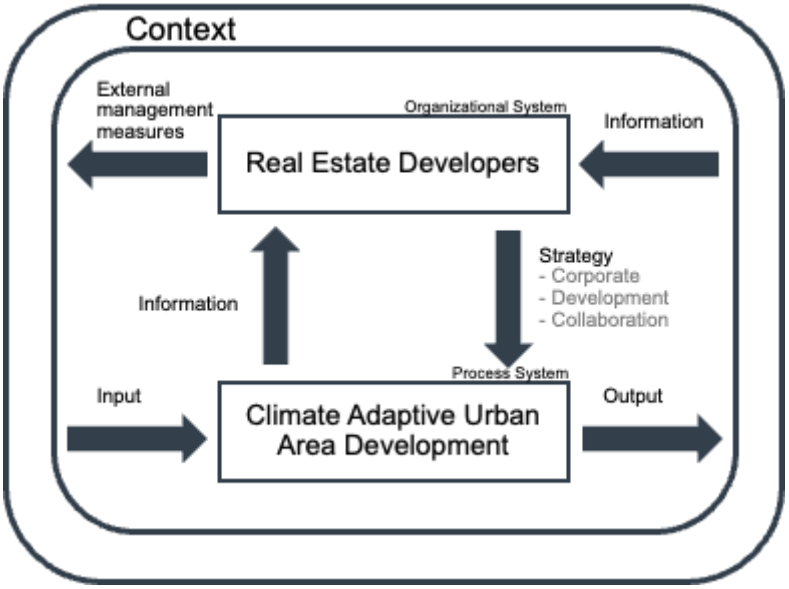

Figure 3.1. Conceptual Model (own work)

3.2 Context

Understanding the conceptual model is important; therefore, the thesis context is described. The work of Heurkens (2012) suggests that urban development builds upon several theories ranging from planning, economics, political science, geography, law, public administration, organization, and design. These aspects all affect the organizational and process system. These aspects are simplified in the conceptual framework into economics,

& policies, urban governance, and planning systems & policies. In this research, the context takes place in the Netherlands.

The context forms the external environment that shapes and influences how development projects are managed, organized, and executed. Changes in economic conditions, and political landscapes, for example, impact the goals and methods of development. The context serves as a foundation affecting all interactions and decisions within the framework.

Figure 3.1 shows the project's "system" sitting inside a wider Dutch Context. This is connected through 4 continuous exchange links. The external management measures such as regulations, market norms, and financial incentives. Think of municipal point tools on ecology or a banks 'green mortgage' discount. Second is the information flow, a constant stream of knowledge: climate scenarios, stress-tests and/or housing-market analytics. thirdly the input. that can be tangible and intangible resources that can be drawn from the context into the project. Finally, the project exports products and externalities to its surroundings. New dwellings, public space, and a flagship example of climate-proof design all leave the site boundaries and influence the wider city.

3.2.1 Economy and Politics

There is an urgent need for large-scale investments on climate change adaptation. Adaptation economics emphasizes the need for a comprehensive, economy-wide approach to resilience, combining private and public sector efforts to address climate risks. Effective adaptation not only involves immediate, context-specific measures but also requires long-term planning and investment, particularly as climate risks become more severe with higher levels of warming (Frankshauser, 2017). This highlights the importance of continued research into both the economic impacts of climate change and the most effective strategies for climate adaptation.

Climate adaptation is inherently political, as it raises questions about who benefits and who bears the costs (Dolšak & Prakash, 2018). The politics of climate change are present on various levels. On a bigger scale, the Paris Climate Agreement is an international treaty that sets the goal of fighting climate change (UNFCCC, 2016). The Dutch government has developed a robust and collaborative approach to climate adaptation. National-level policy and incentives are in place to address the problems of climate change (Dabrowski, 2018), such as the coalition accord 2021-2025.

3.2.3 social dynamics

Dutch society is no longer passive to climate-adaptation policy, but actually an active driver. A 2024 European Investment Bank survey shows that 94% of Europeans respondents say their country must adapt to climate change even if it costs money (EIB, 2024). That willingness is shown in the Netherlands with the recent blockades of The Hagues highways. Consumer behaviour is shifting in the same direction. De Nederlandsche Bank calculates that 95 % of Dutch homeowners could already finance basic climate-resilience upgrades (insulation, heat-pump, etc.) through savings or green loans (DNB, 2024).

3.2.2 Urban Governance

There has been a notable shift of roles and relations in the context of urban governance (Heurkens, 2012), from state-centered control to a more decentralized, collaborative approach involving the public, private, and civic actors. Figure 3.2 shows that shift. The

collaboration of the three actors in a group or individually is very important in urban governance. Effective governance ensures that all relevant stakeholders work toward a shared objective, balancing the needs of public actors with private interest. The changing balance of power explains why real-estate developers today face a more facilitating role rather than a directive to public partners.

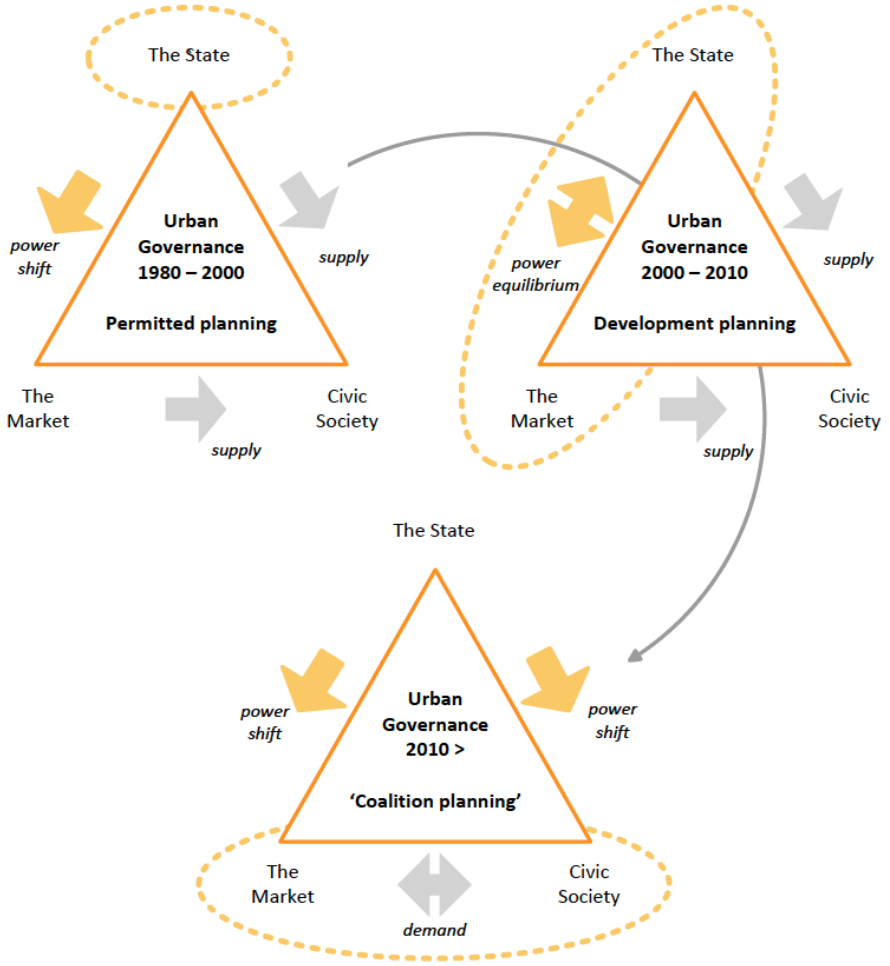

Figure 3.2: Dutch urban governance shifts over time (Heurkens, 2012)

3.2.4 Planning System and Policies

The planning system for climate adaptation in the Netherlands operates across multiple governing levels. There are strategies for the national, provincial, and municipal level (Kennisportaal klimaatadaptatie, 2024). On the national level, the National Climate Adaptation Strategy (NAS) and the Delta Programme for Spatial Adaptation (DRA) (Deltaplan Ruimtelijke Adaptatie, 2024) are the programmes that help the climate adaptation efforts. The NAS shapes development in the Netherlands requiring resilience in all projects, the NAS (2016) states that urban transformation must be based on climate-proof design. On the provincial level, strategies have been implemented with the municipalities and district water boards that the Netherlands must be climate-proof and water resilient by no later than 2050. Every province has their own policy on climate adaptation, for the urban area and how real estate is developed.

3.3 Real Estate Developer

3.3.1 Role and Significance of Real Estate Developers

Real estate developers play a crucial role in shaping urban environments, contributing not only to the physical landscape but also to the social and economic aspects of cities. Their impact on urban development is multifaceted, involving the selection of projects, acquisition of land, design and construction of buildings, and ultimately, the sale or leasing of properties. Real estate developers have become the key drivers of the production of space, the type of urban environment that developers create can be seen as the physical manifestation of real estate values (Robin, 2022).

Real estate development acts as a catalyst for urban transformation, driving the regeneration of underutilised or neglected areas, thereby contributing to economic revitalization. Through the development of residential, commercial, and mixed-use projects, developers not only address the demand for space but also stimulate local economies by creating jobs, attracting investments, and enhancing the tax base (Ratcliffe, 2021). This process, regulated through planning policies and development management systems, ensures that development aligns with broader strategic objectives, such as sustainability, community well-being, and inclusive growth.

3.3.2 Types of developers

The work of Heurkens (2012) indicated that there are 5 different types of project developers: independent developers, developers related to construction firms, developers related to investors, developers related to banks and other developers. We will go through them one by one.

The first group comprises independent developers, usually smaller or medium-sized firms that remain unaffiliated with larger conglomerates. Their market presence often hinges on niche specialization: housing, offices, or retail, for example and is sometimes confined to a particular geographic area. Because they frequently achieve success by honing expertise in a specialized segment, these independent firms can become attractive takeover targets for bigger developers affiliated with the construction sector.

In contrast, developers related to construction firms are typically larger players who dominate a substantial portion of the development output. Their fundamental connection to building processes means that securing a steady cash flow to keep operations running is paramount. Although this integration allows for greater efficiency and control over the production process, recent shifts in the construction market and a rise in scale have placed downward pressure on their profit margins.

Another type of developer is closely tied to institutional investors. For these companies, the ultimate purpose is to secure and enhance the returns of a long-term real estate portfolio. They tend to keep the assets under management rather than selling them immediately upon completion, which alters their risk profile in comparison with the more short-term strategies favored by purely market-driven, independent developers. Their involvement of end users, such as tenants or pension fund beneficiaries, serves to maintain stable and continuous revenues.

Developers linked to banks are similarly large-scale operations, but rather than being primarily focused on building, they benefit from their unique access to capital. Historically, these bank-related developers acquired extensive land positions during periods of strong market demand, and their strategies often emphasize continuity and volume. Although they share with construction-linked developers a desire to maintain cash flow and turnover, their special relationship with financial institutions also shapes their approach to risk, project selection, and broader corporate goals.

Finally, Heurkens (2012) identifies a more miscellaneous category referred to as "other developers." These companies originate in other industries ranging from railway to retail and typically enter real estate development because they own or control strategically located land. Their core business is not real estate per se, yet they find themselves in the role of a developer by virtue of their existing property holdings. Although less conventional, their market presence can be significant depending on how integral those land positions are to broader urban development plans.

3.3.3 Developers' Internal Motivations for Climate Adaptation

Literature (Ten Brinke et al., 2022) suggests that developers often incorporate climate-adaptive features when they see clear indirect benefits, such as market differentiation or corporate image enhancement, or when policy instruments effectively incentivize these features. According to Storbjörk, Hjerpe, and Isaksson (2018), property developers' internal motives for climate change adaptation often revolve around perceived market demand and financial feasibility rather than a proactive sense of environmental responsibility. Although developers may feature "leadership ambitions" in their formal policies, in practice they frequently cite risk aversion and limited consumer demand as primary reasons for not pursuing innovative or cutting-edge climate measures (Storbjörk et al., 2018). Specifically, the developers interviewed in their study emphasized uncertainty around returns on investment in green solutions, as well as the belief that clients were unwilling to pay more for climate-oriented features.

3.4 Strategies

3.4.1 Strategy and Management in Urban Development

Strategies offer a theoretical framework and managerial practice that claims to be capable of addressing concerns that present themselves in cities (Kornberger & Carter, 2010). These arenas include struggles with environmental sustainability, economic growth, social inclusion, and cultural diversion (Kornberger, 2012).

The book of Mintzberg, Tracking Strategies: toward a General Theory (2007), describes the form of strategies that can be found that make a difference in the deliberate and emergent strategy process. Deliberate strategies are intentions that are released into actions. If the pattern realised in actions was not intended the strategy is shown as emergent. Both processes form a realised strategy. The book describes a continuum, strategies that keep on going changing slowly over time, the deliberate strategies on the one hand and emergent strategies on the other.

Nguyen et al. (2017) underscores the pivotal role of partnerships and the relational dynamics of urban development, especially in environments involved with economic

changes and urbanisation. The complexity of managing urban growth necessitates a cooperative approach between public and private sector. These dynamics are directly linked to the organisational, legal, financial and relational frameworks steering those partnerships.

3.4.2 Public-Private Partnerships (PPPs) as a Strategy

The potential financial and socio-economic harm in urban areas due to climate change makes it risky to simply wait for property owners to implement autonomous or reactive adaptations. There's an urgent need for governance strategies promoting anticipatory climate change adaptation. Currently, while climate change mitigation (reducing greenhouse gases) has a well-developed framework, adaptation is lagging. Mitigation strategies like the Kyoto Protocol have successfully raised global awareness, but a governance structure for adaptation is still under construction. The European Union proposed a European Adaptation Strategy in 2009, with Member States expected to develop their National Adaptation Strategies (NAS) by 2013. However, many of these strategies lacked concrete implementation or evaluation plans. The deadline has been extended to 2017. Despite the absence of an overarching policy, countries like the Netherlands, Germany, and the UK have introduced measures for more public green spaces and open water. But for systematic, large-scale implementation of adaptation measures, a well-defined policy framework is essential. Without it, urban environments and residences remain susceptible to climate change's detrimental effects. Adapting to climate change requires efforts at every level: national, regional, city, neighbourhood, and individual building.

Climate change is leading to rising global temperatures, resulting in warmer summers, drier conditions, and extreme rainfall. In response, housing associations are making their homes more climate-resilient to safeguard against the adverse impacts of these changes and to ensure the safety and comfort of their tenants. This not only maintains the future value of their buildings but also fulfills their societal responsibilities (Roders & Straub, 2015). Specifically, it examines the potential of using construction and maintenance procedures to do so, as these tasks are executed by the construction sector.

The article of Buso & Stenger (2018) explores the effectiveness of PPPs as a response to climate change It delves into the challenges associated with private and public sector investments in energy efficiency and climate adaptation projects. The authors argue that private sector investments in these areas are often suboptimal due to various market failures, including environmental externalities and misinformation. Meanwhile, traditional public interventions like subsidies have not consistently yielded effective outcomes.

To address these issues, the article proposes the use of PPPs where the public regulator plays a more active role in investment decisions through a process modelled on Nash bargaining (Buso & stenger, 2018). The study finds that PPPs can lead to better outcomes than public subsidies, especially in situations characterised by high uncertainty and incomplete contracts. The effectiveness of PPPs, however, depends on a fair allocation of bargaining power between public and private entities and the cost-effectiveness of the bargaining process.

Using numerical examples, the authors conduct a comparative analysis of different governance arrangements – private governance, public subsidy, and PPPs. This analysis shows that PPPs generally result in higher levels of investment and effort in comparison to private governance and public subsidies, particularly in contexts of high uncertainty. The paper concludes that PPPs could be a more effective and cost-efficient policy tool for promoting private investments in climate change adaptation and energy efficiency.

What can be subtracted from this article that could be useful for this research is that climate change poses risks to the built environment, such as increased frequency of extreme weather events. PPPs can promote the integration of climate adaptation measures in building designs, such as enhanced flood defences, heat-resistant materials, and sustainable drainage systems. As well as In the context of the built environment, PPPs require a careful balance of public and private interests. This balance ensures that developments not only provide financial returns but also serve broader societal goals like environmental sustainability and community well-being.

3.4.3 Developers and partnerships

The work of Heurkens (2012) describes these partnerships, which have become central to urban development, are multifaceted and encompass organizational, legal, and financial. Each of these dimensions plays a critical role in shaping the outcomes of urban development projects, influencing their efficiency, effectiveness, and overall success.

Organisational aspect
The organisational dimension involves the structuring and governance of the partnership. It addresses how public and private entities organise themselves to manage and execute urban development projects. This includes the creation of joint ventures or other collaborative structures that facilitate the integration of resources, expertise, and efforts. Challenges in this aspect often arise from differing objectives, cultures, and operational modes between public and private partners. The organisational structure must be designed to accommodate these differences, allowing for effective collaboration while also enabling each party to contribute its strengths to the project.

Legal Aspects
Legal considerations form the backbone of Partnerships, providing the framework within which these partnerships operate. This encompasses the contracts, agreements, and regulatory compliance issues that govern the relationship between public and private entities. The legal structure must clearly define the roles, responsibilities, and expectations of each party, including provisions for risk sharing, dispute resolution, and project delivery. European Union regulations on tendering and procurement, for example, emphasise the principles of competition, transparency, and equality, which must be embedded in the legal agreements guiding partnerships. Adhering to these legal requirements ensures that the partnership operates within the bounds of the law, maintaining legitimacy and public trust.

Financial Aspects
Financial arrangements are at the heart of Partnerships, determining the feasibility and viability of urban development projects. This aspect covers the financing mechanisms,

investment models, and revenue-sharing agreements that underpin the partnership. The economic downturn and subsequent recession have highlighted the vulnerabilities of traditional financing models, necessitating innovative financial solutions. These might include leveraging private investment, utilising public funds more strategically, or exploring alternative financing mechanisms such as land value capture. Financial sustainability is paramount, with the partnership needing to balance the risk and reward between public and private entities to ensure mutual benefits.

Relational Aspects

Additional to the work of heurkens' (2012), Deloitte (2017) also highlights the importance of the relational part of collaboration. It underscores the importance of trust, communication, and mutual understanding between partners. It involves managing the interpersonal and inter-organizational dynamics that influence the partnership's functioning. Misconceptions and biases between public and private actors can hinder collaboration, making it essential to foster a culture of openness, respect, and shared objectives. Successful Partnerships are characterised by strong relationships built on clear communication, joint decision-making, and a commitment to overcoming challenges together.

By explicitly addressing the relational dimension alongside organisational, legal, and financial aspects, developers and public actors can establish durable forms of cooperation. This is especially important in climate-adaptive urban development, where integrated solutions depend on long-term alignment across sectors and disciplines.

3.5 Climate-Adaptive Urban Area Developments

3.5.1 Urban Area Development

Urban area development is a complex, long-term process that can span five to twenty years. Such projects involve a wide range of significant interests, from the needs of residents and users to broader socio-economic, political, and financial concerns. The development often leads to substantial transformations in the area, including demolishing old structures, constructing new ones, rerouting roads, and rezoning land (Franzen et al., 2011). These physical changes reshape the area's structure, whether it's a neighborhood, urban district, or entire region, and will influence its usage, perception, and economic potential for decades to come. Urban area development is the cumulative result of numerous intricate processes, carried out by multiple actors and organizations, each with its own interests.

De Zeeuw (2018) describes area development as "the art of connecting functions, disciplines, parties, interests, and financial flows, for the purpose of developing or transforming an area." Urban area development fundamentally revolves around adaptability, particularly in the context of climate adaptation (Vermeulen et al., 2019). The book brown (2015) describes the 5 phases of development: concept, approval, design, construction, and sales. The developer is involved in all of these phases and serves a different role in each.

One pitfall in the public-private process is that governments are traditionally used to regulatory work. However, the social challenge to a climate-adaptive living environment requires a process of public and private effort and thus cooperation. An example of

public-private developed instruments and projects is the Building Adaptive Covenant (klimaatadaptief bouwen, 2019).

3.5.2 Climate Change Adaptation

The built environment plays a crucial role in relation to the climate, the sector has a major stake in the emission of greenhouse gas. climate change and the built environment are closely connected to each other. The built environment is very vulnerable to the impacts of climate change (Andrić et al., 2019). Potential impacts can be categorised in four main groups: impacts on building structure, building construction, building material, and indoor climate (energy use) (Hrabovszky et al., 2013). Nowadays, city planners and municipal decision makers have a significant role and responsibility in adaptation to climate change (Jones et al., 2007). Multiple researchers have studied the increase in total energy demand (heat and cooling demand), from multiple places on earth. The results were that because of global warming the increase in cooling outweighed the decrease in heating (Andrić et al., 2019). The global response to the environmental impact of climate change only became evident in the 1970s. The World Meteorological Organisation (WMO) began to express a concern that human activity might lead to a warming of the earth and a rise in carbon dioxide emissions (MacGregor et al., 2018). Due to these concerns the United Nations established the International Panel on Climate Change (IPCC), this panel was set up to investigate and report on the scientific evidence on climate change and develop possible responses to the issue.

Climate change will impact the built environment in numerous ways, Hunt & Watkiss (2011) put these impacts within the international context as, sea level rises and storm surges; extreme weather events, such as heat waves, flooding and stronger winds; and changes to water availability. Climate change significantly impacts the built environment, especially in urban areas. This is evident from the conclusions drawn in the 2001 and 2007 IPCC reports, which focus on city-scale perspectives.

The 2001 report, authored by Scott et al., emphasised that climate change would particularly affect settlements in resource-dependent, coastal, or riverine areas. It highlighted that while some regions might experience positive impacts, most would face negative consequences, especially in terms of economic growth and development. The vulnerability of these settlements was attributed to three main factors: their location, which makes them prone to coastal and riverine flooding; their economy, particularly for those reliant on weather-sensitive sectors; and their size, with larger settlements facing greater aggregate risks but possibly possessing more resources for adaptation. Building on these findings, the 2007 report by Wilbanks et al. placed climate change impacts within the broader context of socio-economic change. It stressed that the effects of climate change on industry, settlements, and society would vary but generally be more negative with greater climatic changes. The report also noted that extreme weather events, becoming more intense and frequent, would significantly increase economic and social costs, particularly in directly affected areas. Moreover, it highlighted the specific vulnerability of poor communities in high-risk areas due to their limited adaptive capacities and reliance on climate-sensitive resources.

These reports underscored the complexity of evaluating climate change impacts at the city scale. They identified the need to consider gradual climate changes, such as rising mean temperatures or sea level, alongside the changing intensity and frequency of extreme events. The reports also acknowledged the varying degrees of confidence in climate models, especially regarding regional precipitation and extreme weather events. City-scale studies often focus on quantitative analysis, primarily on large cities facing rapid growth or significant vulnerabilities to climate change. A review of such studies indicates a

concentration on coastal cities, with common themes like sea level rise and the impacts of heat extremes. These studies, while indicative of the priorities faced by cities globally, suggest a need for a broader scope of research to cover other significant impacts not yet fully recognized or reported.

The text, "Climate Urbanism as Critical Urban Theory" by Castán Broto & Robin (2021), discusses the concept of climate urbanism, proposing it as a critical theory to understand and address the urban responses to climate change and the resulting inequalities. Climate change alters urban geographies, leading to new risks like extreme temperatures, flooding, and droughts, and exacerbating urban injustices. Affluent residents often escape these risks, while vulnerable populations suffer disproportionately.

Climate urbanism redefines urban living in the context of climate change. Urban interventions, such as greening projects and changes in energy systems, are not only environmental actions but also political, often reinforcing existing inequalities. The authors argue for a rethinking of urbanism, considering its role in shaping social life, urban development, and responses to climate change. The paper highlights the contradiction in climate urbanism: it aims for urgent climate action but often fails to address deep-rooted urban injustices. It emphasises the need for research beyond state, business, or individual initiatives, and instead focuses on the broader socio-political dynamics shaping urban life under climate change.

Ultimately, climate urbanism is seen to critique contemporary urban management and foster a more equitable and sustainable urban future. It suggests the necessity of a political coalition that connects various urban sectors, especially focusing on the most vulnerable, to build a more just and climate-resilient urban landscape.

What does this mean for the built environment? Climate urbanism is significant for the transformation of the physical aspects of cities, such as the layout and the natural environment. Furthermore, the built environment is being reshaped by various urban projects, aiming to form a response against the effects of climate change. Lastly, the text emphasises that the interventions in the built environment are often political. This could be seen as an important consideration that there need to be more social implications in the change in the built environment.

Buildings and urban areas undergo continuous adaptations over time, both to combat natural wear and tear and to address changing needs such as improving energy efficiency and minimising CO2 emissions. This thesis concentrates on adjustments made in anticipation of climate change, which is the process of modifying structures based on current or expected climate changes and their effects (Darjee & Neupane, 2023).

Two main types of climate change adaptation are identified:
Autonomous Adaptation: A spontaneous response to ongoing climate changes.
Planned Adaptation: Deliberate actions designed to adapt the impacts of climate change.

Further, adaptations can be categorised based on their timing:
Anticipatory Adaptation: Implemented before any climate change impact is felt.
Reactive Adaptation: Implemented after the effects of climate change are experienced.

Examples of planned adaptation include using lighter colours on building facades to reflect sunlight and reduce heat, applying 'green roofs' that temporarily hold water to lessen strain on sewage systems during heavy rainfall, and using water-resistant materials to prevent water damage.

In the context of climate change, adaptation in the built environment is crucial for resilience. Adaptation strategies aim to manage the impacts of climate change by reducing vulnerability and exploiting potential benefits. This is particularly important given that even with effective mitigation strategies to reduce greenhouse gas emissions, some warming and climate impact is inevitable.

The concept of adaptation encompasses a variety of strategies, tailored to specific contexts and threats. It's about planning and anticipating the effects of climate change and taking actions to minimise adverse impacts while maximising opportunities. In the built environment, this involves a range of measures, often categorised as grey, green, and soft adaptations (Depietri & McPhearson, 2017).

Grey Adaptation: These are technical or engineering solutions to climate impacts. They include large-scale urban interventions like flood defences, as well as building-scale modifications like designing for increased rainfall or wind loads. Grey adaptation also extends to retrofitting existing structures to improve resilience against climate change.

Green Adaptation: This strategy uses ecological properties to enhance resilience. It involves integrating ecosystem services into the design of the built environment through nature-based solutions. Green adaptation can be particularly cost-effective compared to engineered solutions and can provide co-benefits like enhancing local biodiversity, and recreation, and reducing urban noise and air pollution.

Soft Adaptation: Soft adaptation measures involve changes in behaviour, regulation, or systems of management. These may include extending planning time frames, zoning development away from sensitive areas, and strengthening building codes. Soft measures often facilitate and finance hard adaptation measures, making socio-political infrastructure as vital as physical infrastructure.

As Murphy et al., described in the 2019 Climate Action Plan treats adaptation as separate from mitigation but acknowledges that they overlap and can yield multiple benefits. Building resilience in the built environment requires flexibility in adapting to changing conditions, which involves institutional learning and the latest scientific research translating into policy. This process is supported by adaptive capacity, which is contingent on available financial and other resources.

3.5.3 Water Management

In the Netherlands, there are a few different problems with flooding. Some of these are water storage, excessive groundwater, and excessive rainwater. On the other side, the drought that can occur in drier periods during the year also raises questions about adequate water management. In the report *Accelerating Climate Adaptation* (2023), consisting of several financial, real estate, government, and consulting entities, the focus is put on the financial sectors' impact on climate change. The document also discusses the current policy on climate adaptation and what strikes out is that for real estate development no real policy is implemented where developers have to comply by. There are norms and guidelines, but these don't obligate the developer to implement climate adaptive measures in their projects.

Muller (2007) highlights the importance of adapting water management strategies in urban development to address the increasing unpredictability brought by climate change. This adaptation is crucial for urban resilience, as shifts in temperature, rainfall, and extreme weather events significantly affect water availability and infrastructure demands. Effective urban area development must incorporate water management that anticipates these

changes, with infrastructure designed to handle variations in both water supply and flood risks. For instance, Muller (2007) notes that increases in temperature can lead to more evaporation, reducing water availability in rivers and aquifers, while intense rainfall events can cause floods, stressing the need for flood mitigation in urban planning. Additionally, changes in land use and vegetation cover, driven by both natural and human factors, further complicate water flow patterns, requiring more integrated planning approaches that align urban development with sustainable water resource management.

This alignment is particularly relevant in urban area development, where collaboration between public and private stakeholders is essential to integrate climate-adaptive infrastructure that addresses water availability, waste management, and flood control. The green Climate-adaptive built environment benchmark specifies flooding on a nation-wide norm and a regional norm with the guideline being 'natural and above-ground drainage is present in the area as much as possible'. The preferred order in which this is done is usage and saving, holding and infiltrating, storage of water, and lastly disposal.

3.5.4 Role of Real Estate Developers in Climate Change Adaptation

The text from Ten Brinke et al. (2022) goes into detail into the topic of integrating climate adaptation into urban development projects in the Netherlands. It primarily focuses on understanding the incentives for the private sector, such as developers and investors, to incorporate climate adaptation into their large-scale urban projects. Additionally, it explores the various policy instruments that municipal governments can use to encourage this integration.

Multiple sources in the article state that despite a growing awareness of the topic of climate adaptability, inclusion on a large scale is not yet common. The lack of inclusion is primarily attributed to the lack of financial benefits for the private sector. When climate adaptation measurements are implemented, it is often due to indirect benefits like enhancing the living environment or improving its corporate image.

The article also critically examines the role of municipal governments in this process. It notes that Dutch municipalities employ a variety of policy instruments to promote climate adaptation in the private sector, but these tools vary in effectiveness. The research suggests that these municipalities could be more effective by focusing on policies that elevate consumer awareness and demand for climate-adaptive properties. This approach, coupled with active participation and collaboration with the private sector, is recommended to develop clear and feasible adaptation requirements.

- **Motivations for Adaptation:** Branding, market differentiation, corporate social responsibility.
- **Barriers:** Perceived cost, unclear ROI, fragmented policy instruments.
- **Opportunities:** Public image, competitive advantage, synergy with ESG (Environmental, Social, and Governance) investing trends.

3.6 Conclusion and Main Takeaways

This literature review explored the four main components that underpin climate-adaptive urban development: context, real estate developers, strategies, and climate-adaptive processes in urban areas. The key observations include:

- **Multi-level Approach:** Climate adaptation requires collaboration across national, provincial, and municipal levels, as well as private actors.
- **Governance Shift:** Urban governance in the Netherlands has moved toward decentralized, collaborative models.
- **Developers' Role:** Real estate developers are key drivers but need clearer incentives or obligations to fully integrate climate adaptation.
- **Strategic Collaboration:** Partnerships (especially PPPs) and strategic visioning can align actors around shared adaptation goals.

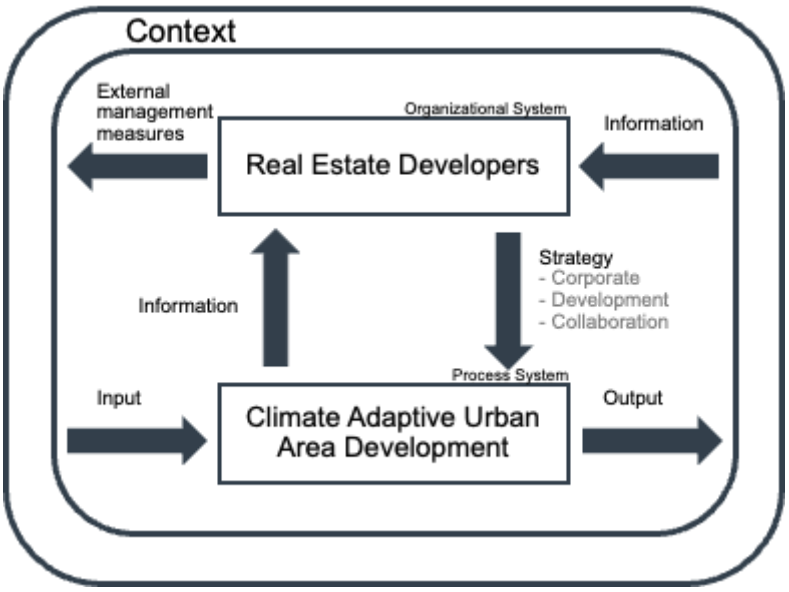

Figure 3.3: Conceptual Model (own work)

To conclude, this literature chapter has provided the theoretical foundation for the empirical analysis. It has identified the relevance of climate change adaptation, particularly water management, the importance of collaboration in urban development projects, and the role of real estate developers as initiators of spatial transformation. Building on these theoretical insights, the next chapters will examine climate adaptation at three distinct levels: (1) the corporate level, (2) the development/project level, and (3) the collaborative level. In doing so, the thesis will employ the conceptual framework introduced earlier and investigate how these strategies and partnership dynamics converge to facilitate or hinder climate adaptation in urban development. Each of which can be assessed through four recurring themes: **organisational**, **legal**, **financial**, and **relational**. These dimensions will form the analytical framework for the empirical research. In the following chapter, this model will guide the analysis of two case studies and their corresponding interviews, allowing for a structured comparison of how developers integrate climate adaptation into their strategic practices. The barriers found in the literature can be found in appendix 3.

04 Empirical Research

Chapter 4 introduces the case studies. First, there is a quick case overview, with the selection criteria. Then the cases are explained, the context and a timeline of the project. This is followed by the in-case analysis. Lastly, the two cases are compared through the cross-case analysis.

4. Empirical research

This chapter will answer the fourth, fifth and sixth sub-questions. First, it explains which cases were selected based on the selection criteria. Based on document analysis, the selected cases will be discussed substantively in terms of development type and the ambitions for climate change adaptation, specifically water management, in the urban area and the project. After, the semi-structured interviews provided insights into the three strategies: corporate, development, and collaboration.

Case overview

2 cases are analyzed as the basis for this research basis for SQ4, SQ5, and SQ6. The selection of the cases is based on a few criteria. There are a few overall criteria that they first have to abide by.

Case study criteria

This thesis is mainly focussed on the Dutch market, with the regulations and laws also being in Dutch, so it is important to find cases that are based in the Netherlands. Furthermore, it is important to look at the different phases of development, so at least one of the cases has to be at the end of the realization phase or already in the exploitation phase. to also see the early engagement it would be preferred if another case would be in an earlier stage of development.

This thesis is also focussed on the corporate strategy, the developing party has to be willing to share some insight into their company's policy. So, it would also be preferred if the cases were being developed by different developers. Furthermore, the urge for climate change adaptation has to be of the essence in these cases. Especially when it comes to water management, there has to be a significant water problem or need for implementation in the area development.

Table 4.1: case selection criteria

Criteria	description
Relevance to climate change adaptation	The case must involve climate change adaptation, water management in their projects.
Scale of urban development	The developer must be actively involved with the development of both the project site and its surrounding urban area
Collaboration	The developer must actively collaborate with at least one public or private stakeholder during the development process.
Type of analysis	Interviews and document analysis
Type of development	development in the metropol area Randstad

Collaboration Criteria

Next to the Case criteria, it is important to note the parties that are involved in the development and the company's policies on internal and development.

Table 4.2: Stakeholder selection criteria

Actor	Role
Real estate developers (company)	Developer on the used case, collaboration strategy and development strategy
Company representative (Company)	Knows company policy on corporate strategy.
Collaborating party (public/private, municipality)	Has knowledge of the collaboration with the developing party
Collaborating party (developer, advisors)	Has knowledge of the collaboration with the developing party

Case Study Selection

The choice of these criteria was guided by the previously described criteria to make sure that every case would provide relevant data. first and foremost, the cases both are located in the netherlands. which is important because the thesis is described in the dutch context. governance structures, regulations and policies on climate are therefore relatively the same.

To reflect on the full spectrum of the development process, it was important to select cases that were in different stages of development. Erasmusveld being in the usage phase, which allows for a more mature approach to this topic. This is in contrast with the Glasfabriek, where they are still in the early phase of development. This helps to get an understanding on how CCA is embedded in the start of a project. Together these cases can create a more complete picture of the opportunities and challenges developers face.

The cases also meet substantive thematic criteria. Both Erasmusveld and Glasfabriek actively engage with climate change adaptation, particularly in relation to water management. In both developments water related challenges are central to the design and implementation of adaptation measurements.

Finally, the selected cases involve multi-actor collaboration. Each project includes partnerships between private developers, public authorities (such as municipalities or water boards), and other private or advisory stakeholders. This collaborative context is essential for analysing the relational and governance aspects of climate-adaptive urban development.

Case 1: Glasfabriek

1. Located in Schiedam
2. In the Design phase
3. Significant water storage problem
4. Developer partnered with another developer

Case 2: Erasmusveld

1. Located in The Hague
2. Completion in 2024
3. smart water integration system
4. PPP with municipality of The Hague

4.1 Glasfabriek, Schiedam

Once the largest glass factory in the Netherlands, the Glasfabriek in Schiedam is undergoing a major transformation. Known for producing millions of bottles for brands like Heineken, the factory was a key industrial center in the early 20th century. Founded in 1987, it grew into a symbol of Schiedam's industrial strength, earning the city the nickname "Glass City."

After closing in 2017, the site remained unused for several years. Now, it is being redeveloped into a mixed-use area featuring homes, terraces, shops, and spaces for culture and arts. Historic elements like the factory hall, silos, and transport systems will be preserved and integrated into the design, connecting the area's industrial past. This development not only honors Glasfabriek's rich heritage but also envisions a sustainable, dynamic urban district in Schiedam. The plan area has been a brownfield, with concrete surroundings and industrial use of the land has made it difficult, causing the ground to have poor infiltration for rainwater.

Developer profile

The involved developer identifies as a mid-sized real estate company, primarily focused on residential area development throughout the Netherlands. In some cases, they also act as investor-developers. For the Glasfabriek project, the company co-owns part of the site and collaborates with a second developer on the area's transformation.

Chronological description & climate adaptation

- **2017** – The glass factory officially closes. The site becomes available for redevelopment.
- **2018–2019** – The developer acquires co-ownership of the Glasfabriek and initiates preliminary planning. Climate adaptation is not yet a prominent element in this phase.
- **2020** – The developer partners with a sustainability and climate advisory firm. From this point forward, certified sustainability assessments begin to influence the development strategy.
- **2021** – Urban design phase begins. Climate adaptation is integrated into the design process through:
    - Wadi systems for rainwater infiltration
    - Green roofs on apartment buildings
    - Reuse of industrial structures as passive cooling and shading elements
- **2022** – The urban plan is aligned with local policy frameworks such as Schiedam's climate adaptation plan and the municipal sewage and water management program (vGRP). The developer actively participates in planning consultations with the municipality and stakeholders.

- **2023–2025** – Preparation and implementation of the first construction phases. Sustainability performance is monitored through indicators linked to the advisory partner's certification system.

Developer's role in climate adaptation

The developer applies climate adaptation measures as part of a broader sustainability strategy, guided by external consultants. Measures such as stormwater management, nature-inclusive design, and green infrastructure are incorporated. However, these measures are primarily driven by market positioning, regulatory compliance, and certification incentives, rather than intrinsic environmental motivations.

VROM transformation and water management plan.

The former site of transportation, Cleaning, Disinfection, and Market services (VROM) in Schiedam is set to undergo significant transformation by a real estate development company. This development is part of a broader effort to repurpose industrial land into a vibrant urban area with residential spaces. The total area of the Glasfabriek is 62.270 m2, with VROM covering about 6.164 square meters. Seen in image 4.1 in the left corner of the plan area. Together with a strategy and urbanism company, they have come up with a water management plan; this project aligns with regional policies to adapt urban spaces for sustainability and resilience.

Background and vision

Located near the Buitenhaven Canal, the VROM site has been identified as a prime area for redevelopment, offering opportunities to balance urban density with green infrastructure. The vision includes several residential buildings integrated with public and green spaces. The development aims to create a dynamic urban environment, adhering to local and regional sustainability frameworks, including the omgevingswet (2024) and the klimaatadaptatieplan Schiedam (SO team Rob, 2019).

The master plan proposes multi-story residential blocks with mixed housing options. Implementing green roofs, permeable surfaces, and urban vegetation for climate adaptation. Integrating wadi systems and retention areas to manage stormwater effectively.

Policy frameworks

The transformation aligns with multiple policy layers, including the waterwet (2009), ensuring sustainable management of surface and groundwater. Regional water program 2022-2027 which addresses water quality, flood risks, and biodiversity goals. Lastly, municipal guidelines that adopts the verbreed gemeentelijk rioleringsplan (vGRP) and ensure urban spaces withstand heavy rainfall (60 mm/hour).

Stakeholders

Real estate development company

The company identifies itself as a midsize development company (interviewee 1, 2025), who develop mainly residential real estate, they are also developer investors for some of the projects. They operate throughout most of the Netherlands and they are partially owners of the Glasfariek in Schiedam. They share some of the area with another developer. This development is one of the biggest they have done so far and incorporates not only residential but also commercial and retail. Something they are not very familiar with.

Municipality of Schiedam
This development is inside the jurisdiction of the municipality of Schiedam.

Real estate development company (partner)
As mentioned before, company 2 also has a stake in the Development of the glasfabriek. This means that they have a close relationship and have to agree on the policies they want to carry out.

The advisory company on sustainability and climate
Company 1 has a partnership with the advisory company. From the initial phase of this project they have been involved by helping them achieve goals on sustainability and climate, which the advisory company has an certificate for. If the development company incorporates these into their project, they will get a good score.

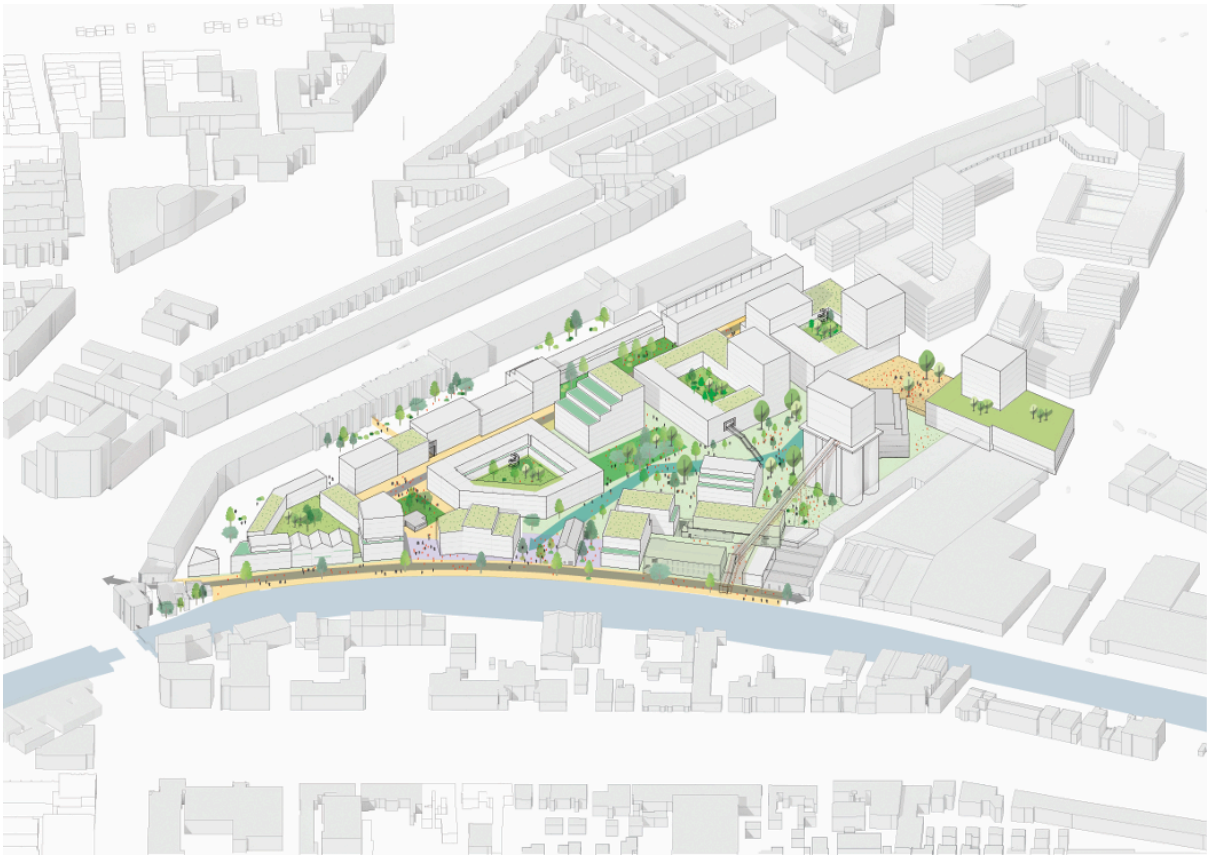

Image 4.1, Plan area (from development company 1)

The plan area is divided into four phases, the first (ENTREE) is developed by developer 1. It's the area on the left of the map. As seen on the image, green roofs are implemented as well as greenspace between the buildings. The silo on the right side is proposed as a water tower to store water locally.

4.2 Erasmusveld, Den haag

Once a green buffer zone on the western edge of The Hague, Erasmusveld is now the site of an ambitious urban transformation. Originally part of the city's peri-urban agricultural zone, Erasmusveld remained largely undeveloped for decades. It was known for its open meadows and function as a transition area between the dense city and the surrounding landscapes.

Now, it is being redeveloped into a sustainable residential neighborhood with a strong emphasis on circularity, biodiversity, and climate adaptation. The plan includes hundreds of family homes, community facilities, and green public spaces. Designed as a "living lab," the area is meant to test and demonstrate innovative solutions for sustainable urban living. The urban plan aims to balance compact housing development with ecological value, creating a blueprint for future-proof urbanism in The Hague.

Developer profile

The Erasmusveld area is being developed by a consortium of real estate developers selected through a competitive process led by the Municipality of The Hague. Selection was based on a commitment to circular construction, climate-resilient urban design, and innovation. The developers collaborate closely with the municipality, which acts as the initiator and coordinating authority.

Chronological description & climate adaptation

- **2016** – The Municipality of The Hague presents its development vision for Erasmusveld, prioritizing sustainability, circularity, and climate resilience.

- **2017–2018** – Tendering and selection phase. Only developer consortia proposing circular and climate-adaptive plans are admitted to the project.

- **2019** – The developers start urban design planning. Climate adaptation becomes a mandatory component of the design brief. Integrated strategies include:

    - Wadi systems and rain gardens for stormwater retention

    - Permeable surfaces for infiltration

    - Green roofs and façade vegetation

    - Vegetation for reducing urban heat stress

- **2020-2023** – Start of construction. Climate adaptation performance is monitored using effect maps and sustainability indicators.

- **2024** – First residential blocks are delivered. The municipality evaluates the approach as a successful example of a 'living lab' for sustainable urban development.

- 2025 – Last dwelling is finished, public space handed over to the municipality.

Developer's role in climate adaptation

The developers embed climate adaptation structurally within their strategies, driven by municipal requirements and supported by expert partners. Their approach includes technical solutions (e.g. water storage, heat reduction) and process innovations (e.g. co-creation, monitoring). Climate adaptation is seen as an integral part of area development rather than an add-on.

Circular strategy and climate-adaptive design

Erasmusveld is a flagship project in the municipality's strategy for sustainable urban growth. The area spans approximately 6,8 hectares and will eventually house around 370 new dwellings. From the start, the development has focused on circular construction methods, reuse of materials, and low-energy building standards. The neighborhood is designed to be car-light, with shared mobility hubs, slow traffic routes, and green corridors that double as water retention and biodiversity zones.

Climate adaptation is integrated into the urban fabric. Green roofs, rain gardens, and wadi systems are central elements of the design. Buildings are positioned to optimize natural ventilation and cooling, while permeable paving and retention basins help manage stormwater runoff. These strategies support the broader ambition of creating a climate-resilient city district in line with The Hague's Klimaatadaptatiestrategie (Gemeente Den Haag, 2025b) and the 2021 Omgevingsvisie (Ministerie van Algemene Zaken, 2025).

Policy frameworks

The development of Erasmusveld aligns with several national and local policy instruments. These include the National Environment vision (NOVI) (Ministerie van Algemene Zaken, 2025), which promotes compact, green, and climate-resilient urban development, and the Waterwet (2009), which mandates sustainable water use. Locally, the project is part of the Hague climate agenda (Gemeente Den Haag, 2025b) and follows the city's greenery plan and urbanisation strategy 2040 (gemeente Den Haag, 2025). Additionally, Erasmusveld contributes to the goals of the regional climate agreement for Zuid-Holland.

Stakeholders

Municipality of The Hague

The city of The Hague is both initiator and lead partner in the Erasmusveld project. They oversee urban planning, enforce climate adaptation targets, and coordinate collaboration between involved actors. Their aim is to set a new standard for integrated, sustainable urban development in the city.

Real estate development company

A consortium of real estate developers is responsible for the construction and marketing of residential units. These developers were selected based on their commitment to circular

building practices and environmental innovation. The municipality has included strict sustainability criteria in the development agreement to ensure long-term ecological performance.

Advisory and design firms

Urban planners and landscape architects play a crucial role in Erasmusveld. They have developed the masterplan in close coordination with environmental advisors, ensuring that design solutions support both climate adaptation and nature inclusivity. An environmental consultancy monitors performance metrics, including heat stress reduction, rainwater buffering, and biodiversity enhancement.

Residents and local initiatives

Future residents have been involved through co-creation sessions and neighborhood labs, giving them influence over public space design and community programming. Local initiatives on urban farming and sustainable energy are actively encouraged to participate in shaping the identity of Erasmusveld as a self-sufficient, green urban village.

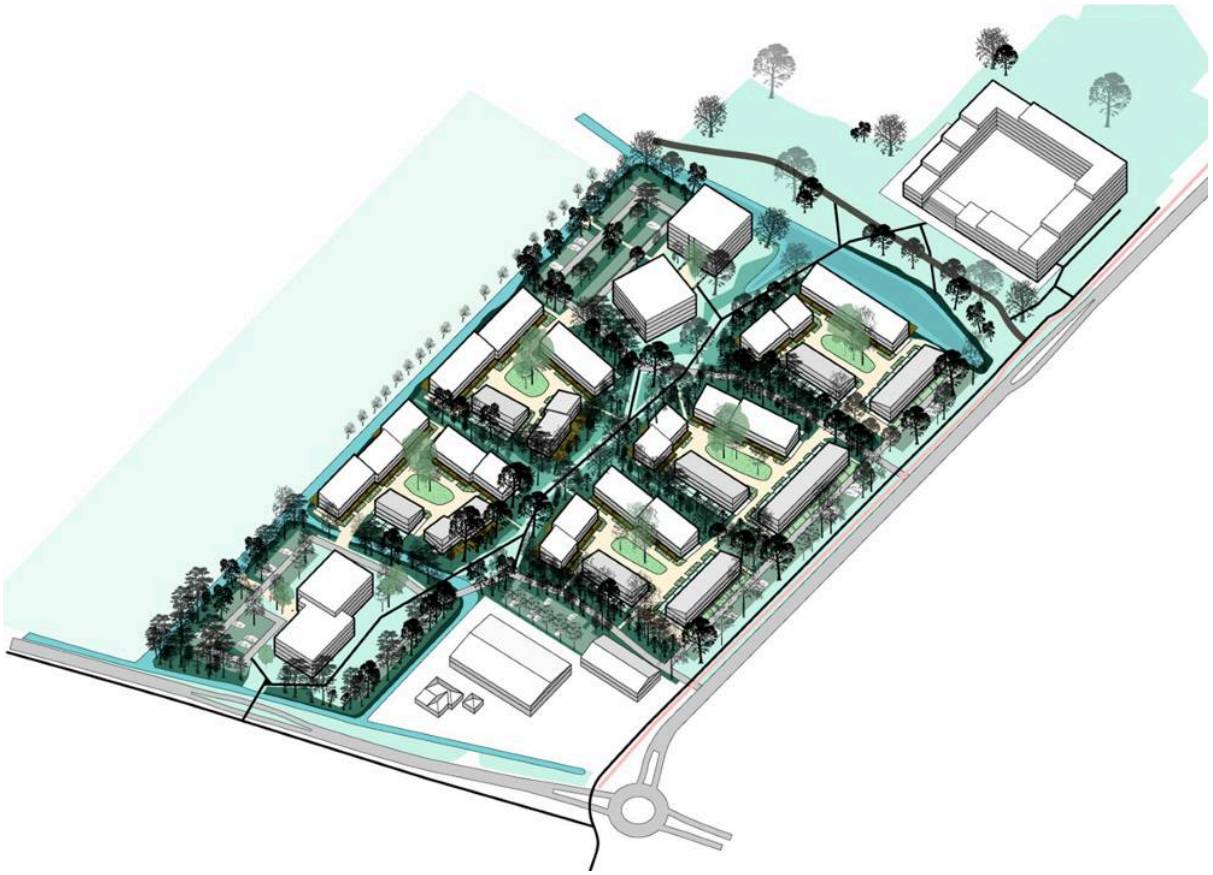

Image 4.2: plan area (from development company 2)

This area is divided into two pieces. the top right and the rest of the map. The top right is Leyhof and the rest is called De Velden. The plan uses wadi's throughout the part of De Velden and has a significant water storage part on the division of Leyhof and De Velden. Leyhof has green roofs to store water.

4.3 Analysis Interviews

To get a good overview of climate change adaptation strategies on multiple levels within a real estate development company semi-structured interviews are conducted for the case studies. These case studies are looked at from a corporate strategy, development strategy and collaboration strategy.

Participant selection

To make sure that accurate data is selected participants are selected on a few criteria. In the conceptual model the focus is on developers, development companies and their collaboration parties. They must be involved inside the development company or be involved in the development of the cases. Because of these different perspectives there are a few different type of people who can be selected to be interviewed. These participants must have an expertise on the themes of 'urban area development', 'climate change adaptation' and/or 'sustainability'. The possible interviewees can be:

- Real estate developers
- Partner companies
- Municipalities
- Advisors
- Someone with knowledge of the corporate ambitions

When the interviewees are selected and have agreed to participate, they will receive information and the content of the interview. There were two interviewees that were unable to participate in the interviews, due to timescheduling and the other for changing jobs. These interviews are categorized in different themes that are described in the previous texts. In addition to the information and content of the interview, they will also receive a consent form (Appendix 2) where they have to agree that the data can be used and will be made public.

Table 4.3: Interview dates & time

Interviewee	Date and time	Online/Physical
real estate Developer 1	22-01-2025 11:00-12:00 and 16-03-2025 (follow-up) 16:00-17:00	physical/physical
Innovation and corporate strategist	28-01-2025 12:00-13:00 and 18-03-2025 (follow-up) 14:00-14:30	online/online
Advisor	30-01-2025, 09:00-10:00	online
municipality of schiedam	08-05-2025, 15:00-16:00	online
development consortium	11-04-2025, 10:00-11:00	physical
real estate developer 2	22-03-2025, 13:00-14:00	physical
corporate policy maker	27-02-2025, 10:00-11:00	online

Analysis method

The interviews that have been taking place are transcribed and analysed. These then will be used to answer the research questions two and three. The analysis will be divided into the previously named three strategies: corporate, development and collaboration. the strategies will be analysed on the basis of the organisational, financial, legal and relational aspects (Heurkens, 2012; Deloitte, 2017).

In-case analysis

Each case will be analysed on the scheme described above. By filling in the tables, the cases' different strategies can be analysed. The insights from the interviews will provide valuable information on these cases. Together with the theoretical research this will aim to provide findings.

Cross-case analysis

All the components of the different cases will be compared to find similarities, with these similarities conclusions can be drawn to provide to the expert panel.

Data allocation

The interviews were recorded through teams or audio recording. The teams recordings have been transcribed automatically and the audio recording transcribed by hand. In the transcription the relevant information is linked to the different strategy and one of the four components. The categorized information will be put in the tables.

4.3.1 In-case analysis Glasfabriek

Corporate strategy

Organisational
At the organisational level, climate adaptation is embedded in the developer's broader strategic themes, which are formalised annually through an internal document known as the "OGCM". This document outlines short- and mid-term ambitions across all departments. "The directorial team sets the goals together with a core team of developers and members of the internal innovation studio," (interviewee 2). While there are no individuals solely responsible for each theme, the studio plays a supporting role across projects. "Developers are responsible for integrating these ambitions into practice, we support them with specific knowledge." (interviewee 2).

Legal
There is currently no overarching legal framework at the corporate level to enforce sustainability ambitions across all projects. However, the organisation is moving towards stronger integration of climate goals in contractual agreements. "We're working on a programme of requirements that includes standards for CO2 emissions and materials like low-carbon concrete, and waterstorage." (interviewee 2). These ambitions are currently described in non-binding terms but are expected to be formalised in future project contracts.

Financial
Corporate strategy acknowledges that climate adaptation efforts typically result in higher costs without direct financial returns. "It's mostly additional cost and that's why ambitions are often the first to be cut when budgets tighten" (interviewee 2). The developer is not externally constrained by institutional investors but reports to a board of shareholders. While project-level decisions remain flexible, targets are increasingly quantified at corporate level: "We're starting to assign actual values to ambitions, like maximum CO2 emissions per square metre."

Relational
The company is gradually shifting toward selecting partners who share its values on sustainability. While partnerships are still often based on past experience and trust, there is a growing recognition of the value in aligned ambition. "We're developing a list of preferred partners with similar sustainability goals," (interviewee 2). Transparent communication about these ambitions is still informal, but this is likely to evolve as ambitions become more integrated into selection procedures.

Development strategy

organisational
The developer structured the project into various phases, each with clear responsibilities between the joint parties. The area development is led by two companies within a joint executive board, responsible for planning and coordination. "We work with a landscape architect, and each development phase includes its own planning, budgeting, and design team." (interviewee 1). The division between public space and building plots is key in how climate adaptation is integrated into planning.

Legal
Legally, climate adaptation measures are minimally enforced by the municipality. The main requirement is to manage heavy rainfall: "We need to buffer 60 mm of rainwater per hour in the public space." (interviewee 1). Additionally, the municipality applies an ecological

assessment tool, adapted from The Hague, which developers must meet to obtain permits. “We agreed with the municipality on a minimum of 20 points in this ecological score, but internally I aim higher.”

Financial
The financial structure relies on a comprehensive land exploitation plan, which is regularly updated. There is no separate climate adaptation budget: “It falls under the general category of public space development.” (interviewee 1). Increasing construction costs are absorbed in later project phases due to prior sales. “The revised land exploitation increases costs, but we cannot charge those to the already sold phases.” Instead, the developer includes climate-related risks in a contingency budget. “We are considering a drainage system because of compacted soil that doesn’t infiltrate water well.” There is no direct financial return expected from climate investments, though the developer believes long-term value will emerge: “We want to build a reference project. That’s a shared ambition.” (Interviewee1).

Relational
Collaboration with advisors and the municipality is frequent but not always smooth. “The municipality tends to delay when final approval is needed.” (Interviewee 1). However, the developer stresses open communication: “If something’s off, we bring it up in the steering group before it escalates.” The long-term relationship has built mutual trust, with regular joint meetings: “About 15 people are involved; four are consistently present.” Climate ambitions are maintained through this shared governance. “We agreed that decisions go through the joint executive board.”

Collaboration strategy

Organisational
The organisational structure of the collaboration in Glasfabriek is designed to ensure shared decision-making and active involvement of expert advisors. A joint executive board, consisting of representatives from both development firms, governs the process and meets monthly. “Major decisions go through that board,” (interviewee 1). Advisors, such as the party responsible for the sustainability label, are structurally involved in the process: “We’re not classic consultants – we follow a methodology and give recommendations based on the label. It’s up to the developer to apply them” (interviewee 3). This allows for continuity while maintaining each party’s specific responsibilities.

Legal
Legal arrangements within the collaboration are formalised through a separate development entity, with both the developers being shareholders and both having a seat at the table, that holds the shares and outlines responsibilities and ownership rules. This is done through a consortium formed by the two developers, with each having a seat in the board. The responsibilities are shared. Advisors are not directly involved in drafting or enforcing contracts but are indirectly connected through the sustainability performance obligations linked to the project’s ambitions. The municipality plays a limited role in monitoring execution but is involved in evaluating whether legal spatial standards are met. As interviewee 3 notes, “We request a five-year maintenance and monitoring plan to ensure the design’s goals are upheld.”

Financial
The collaboration includes financial partnerships with external investors, which imposes reporting and accountability obligations. Internally, costs for sustainability efforts such as climate adaptation are embedded in the broader public space development budget. Advisors such as NL Greenlabel help developers define realistic ambitions in relation to

financial feasibility. “We don’t get involved in finances, but we recommend setting lower targets when needed – say 10% sustainable materials instead of 50% – to help them build experience and awareness” (interviewee 3). This reflects a pragmatic approach to long-term transformation.

Relational
The relational dynamic within the collaboration is characterised by growing trust, transparency, and mutual learning. Open dialogue is encouraged and seen as essential to maintaining alignment: “If something’s off, we bring it up in the steering group before it escalates” (interviewee 1). From the advisor’s perspective, collaboration with the developer is constructive, although occasionally delayed due to other priorities: “A developer has a lot on their plate… but once we’re scheduled, the meetings are productive” (interviewee 3). Over time, shared ambitions and repeated interaction have strengthened the relationship, fostering a culture where sustainability is not just a requirement but a common goal.

Barriers to Climate Adaptive Urban Development in Glasfabriek

Table 4.4: Barriers of the Glasfabriek

Glasfabriek	Corporate	Development	Collaboration
Organisational (tasks & responsibilities)	No fixed roles	Time and capacity constraints	Late advisor involvement
Legal (rules & requirements)	Soft sustainability clauses	Fragmented municipal norms	Unclear partner responsibilities
financial (risk & revenue)	No financial returns	High costs, limited gains	No shared budget structure
Relational (trust, transparency & commitment	Informal partner selection	Unequal ambition among parties	Inconsistent municipal coordination

1. Corporate Strategy

Organisational
At the corporate level, responsibilities for climate adaptation are not embedded in dedicated roles or monitored centrally. While ambitions are outlined in internal documents such as the OGCM, actual implementation is delegated to project teams without clear accountability mechanisms. *"There's no one who's accountable if it doesn't happen."* (interviewee 2)

Legal
Sustainability goals are currently formulated as soft ambitions rather than binding contractual requirements. Although a Programme of Requirements is in development, legal enforcement remains limited, leaving room for inconsistency in application. *"We'd like to formalise it in contracts, but for now it's mostly written as: 'we aim to...'"* (interviewee 2)

Financial
Climate adaptive measures are largely seen as cost-inducing without clear financial returns, making them vulnerable to budget cuts. While shareholders support long-term goals, there is no financial structure that incentivises sustainability across all projects. *"It's mostly additional cost and that's why ambitions are often the first to be cut."* (interviewee 2).

Relational
Partner selection still occurs based on experience rather than formalised sustainability criteria. Without structured evaluation of a partner's environmental commitment, ambitions can erode when external parties deprioritise climate goals. *"It's still based on experience and intuition, not formal frameworks."* (interviewee 2).

2. Development Strategy

Organisational
At the project level, limited time and capacity hinder the integration of climate adaptation. Sustainability is often deprioritised due to the pressure of design deadlines, permitting processes, and construction logistics. *"Developers have a lot on their plate. Green ambitions are not always top of mind."* (interviewee 3).

Legal
A lack of harmonised climate regulations across municipalities creates inefficiencies. Developers must adjust strategies per location, making it difficult to apply standardised climate measures. *"Every city requires something different sometimes 60 mm, sometimes 100."* (interviewee 2).

Financial
Increased construction and land development costs, combined with limited cost recovery through higher sales prices, create tension between ambition and feasibility. Projects often lack earmarked funding for climate adaptation. *"We try to fit green measures into the general public space budget, there is no separate fund."* (interviewee 1).

Relational

Projects involving partners with lower climate ambitions often struggle to maintain high environmental standards throughout development. *"If you work with someone who doesn't believe in it, they'll be the first to drop the green façade."* (interviewee 2).

3. Collaboration Strategy

Organisational
Advisors such as NL Greenlabel are not always included early enough to shape spatial designs. Late-stage involvement limits their influence and makes retroactive adjustments costly or impractical. *"Ideally, we're included at the ambition phase, not after the design is done."* (interviewee 3).

Legal
Existing collaborative agreements between developers are often historic and not updated to reflect new climate ambitions. Sustainability responsibilities are not always formally distributed between partners.

Financial
There is no shared budget structure for climate adaptation across the collaborating entities. Costs and risks are managed individually, which can lead to uneven investment and responsibility. *"We include risks in contingency, but that doesn't mean others do."* (interviewee 1).

Relational
Communication with public partners like the municipality is sometimes inconsistent or delayed, especially during critical decision-making phases. This can stall implementation of climate-sensitive designs. *"They're supportive until final approval, then things stall."* (interviewee 1).

Drivers to Climate Adaptive Urban Development in Glasfabriek

Table 4.5: drivers of the Glasfabriek

Glasfabriek	Corporate	Development	Collaboration
Organisational (tasks & responsibilities)	Strategic goals formalised in OGCM Cross-team coordination	Intrinsic motivation of developers Shared ambition	Advisor frameworks structure ambitions Early involvement increases impact
Legal (rules & requirements)	Development of internal PvE with CO_2 norms and material standards	Ambitions exceed legal baselines Previous successes guide new standards	Ambitions influence partner requirements informally
financial (risk & revenue)	Internal KPIs quantify sustainability Long-term value mindset	Risks covered by contingency Brand value as indirect return	Gradual ambition scaling Cost-sensitive recommendations from advisors

Relational (trust, transparency & commitment	Growing partner alignment culture Preferred partner lists	Internal trust maintains ambition in tight conditions	Open communication and long-term collaboration enable trust

1. Corporate Strategy

Organisational
At the organisational level, climate adaptation is structurally embedded through recurring internal planning processes. The OGCM document ensures that sustainability themes are part of strategic goal setting. This process is led by a cross-functional team from the studio, development, and management layers. *"The board defines our strategic goals annually, and climate themes are part of that structure."* (interviewee 2)

Legal
The developer is currently working on internal legal tools such as a Programme of Requirements (PvE) to institutionalise climate goals across projects. This approach aims to eventually translate ambitions into contractual obligations with builders and consultants. *"We're developing a PvE that includes CO2 limits and sustainable material use as standard requirements."* (interviewee 2)

Financial
While direct returns are difficult to quantify, the developer views climate investments as essential to future-proofing and long-term value. Clearer internal targets, such as per-m² CO2 caps, are helping to make sustainability measurable and manageable. *"We're assigning hard numbers to our goals, once it's in the system, it's harder to ignore."* (interviewee 2)

Relational
A growing preference for working with like-minded partners is emerging. Although informal, this cultural shift supports more consistent sustainability performance across collaborations. *"We're forming a list of preferred partners who share our values on sustainability."* (interviewee 2)

2. Development Strategy

Organisational
Developers show intrinsic motivation to realise future-proof and green urban environments. Sustainability is not only project-driven but part of a shared ambition across teams. *"We want to build something that we can be proud of, not just something that ticks the boxes."* (interviewee 1)

Legal
In most projects, the legal baseline (e.g. for water buffering or ecological scores) is exceeded voluntarily. Prior success stories become internal benchmarks for raising the bar in future phases. *"If we managed 100 mm in one project, we can use that as our new internal standard."* (interviewee 2)

Financial
Although climate adaptation adds to the cost, developers accept this as part of delivering quality. Risks are covered in general contingency budgets, and indirect returns: such as

improved brand reputation, are seen as worth the investment. *"It's a shared ambition, we want to set a new standard."* (interviewee 1)

Relational
There is a high level of trust and alignment within the project team, allowing green ambitions to remain intact even during financial or logistical pressures. *"We don't want to be the developer who cuts every green element when money gets tight."* (interviewee 1)

3. Collaboration Strategy

Organisational
Collaborations with expert advisors introduce structured tools and external benchmarks into the development process. NL Greenlabel, for example, uses screening tools that guide design choices and assess performance. *"We simulate designs before implementation. It's like playing SimCity, but for real-world impact."* (interviewee 3)

Legal
Although not yet formalised in all contracts, the developer's climate ambitions increasingly influence procurement and collaboration terms. There is a trend toward making environmental ambitions part of the shared process logic. *"We don't just want to meet the minimum, we want our advisors to push us further."* (interviewee 1)

Financial
Advisors help optimise sustainability measures to fit within realistic budgets, making ambitions more implementable. Tailoring ambition levels, e.g. starting with 10% sustainable procurement, encourages gradual transformation. *"Start low, learn, and improve. You don't need to do 75% sustainable materials right away."* (interviewee 3)

Relational
Open communication and long-term partnerships strengthen collaboration. Trust between developers, advisors, and public stakeholders supports iterative improvement and ambition over time. *"If something's off, we escalate it before it becomes a problem. That transparency helps us grow."* (interviewee 1)

4.3.2 In-case analysis Erasmusveld

Corporate strategy

Organisational
At the development company, climate adaptation is embedded in the corporate sustainability framework under the theme "climate and landscape". This strategy is intended to apply universally across project types and locations: "Our strategy must always be applicable, whether we're building a row of houses in the east of the country or a 70-metre-high apartment tower in Rotterdam" (interviewee 7). A dedicated internal team of five technical specialists, including experts in hydrology, ecology, and building physics, supports project teams in translating ambitions into plans: "We don't do the technical work ourselves but reflect on the content and guide developers in decision-making" (interviewee 8).

Legal
There is no standardised national legal framework, which development company 2 sees as problematic. "Every municipality has its own point system. We call for more standardisation from the national government" (interviewee 7). The developer warns against regulations that confuse goals with specific measures: "The goal was 'no damage' – not necessarily to store 50mm on one's own plot. That's a measure, not a goal" (interviewee 7).

Financial
Development company 2 notes that climate adaptation is currently perceived as a cost, without direct financial return: "Climate adaptation is still mostly seen as a cost" (interviewee 8). They see innovation more in financial structuring than in technology: "If I sell a home with extra solar panels, a bank might offer an interest discount. For climate adaptation, there is no such mechanism" (interviewee 8). Investments in public space are not reflected in financial models: "We buy a tree for €1,000 and give it to the municipality for €1 the next day" (interviewee 7).

Relational
Relationally the developer is moving toward collaboration with partners who share sustainability ambitions. Internal advisors act as translators between technical consultants and project developers: "We reflect on content and help developers understand what to do" (interviewee 8). Knowledge sharing across regions is a key function: "Something we learn in Amsterdam should also benefit Rotterdam" (interviewee 7).

Development strategy

Organisational
The Erasmusveld project was developed by development company 2 within the framework of the joint development consortium. "The consortium provides the development framework and delivers the plots. the development company takes care of the housing" (interviewee 6). Within the housing plots, the developer experimented with sustainable solutions: "We called it 'Proeftuin Erasmusveld' – to explore what sustainability means and what it costs" (interviewee 6).

Legal
Legal responsibilities were shared between development company 2 and the joint development consortium, with the latter defining sustainability ambitions. "They supplied the conditions I had to meet" (interviewee 6). However, there were difficulties in aligning ambitions with city departments: "We wanted semi-paved surfaces in the courtyards, but the city rejected it" (interviewee 6).

Financial
There was no separate climate budget, but development company 2 made internal investments: "We just did it. There were no financial reallocations" (interviewee 6). Some innovations were financed without subsidies or compensation: "I don't know if we got a discount on the land price for our measures" (interviewee 6). Development costs for public space were covered by joint development consortium; development company 2 paid for the buildings.

Relational
Initial collaboration between development company 2 and the joint development consortium required trust-building. "There was some distrust – so we wrote a sustainability document stating: 'This is what we will do.' That helped" (interviewee 6). Open communication was emphasised: "If there's a problem, I put it on the table – even if we don't have the solution yet" (interviewee 6).

Collaboration strategy

Organisational
The collaboration between the development company and the municipality was formalised through a joint development consortium. "OCWV is a joint venture between development company 2 and the municipality of The Hague" (interviewee 5). Coordination between development company 2 and the joint development consortium was continuous: "We had ongoing consultations with the developer to ensure the agreed ambitions were embedded" (interviewee 6).

Legal
The joint development consortium developed a shared ambition document, but enforcement was limited: "We could not legally enforce ambitions beyond the land-use plan. We relied on shared commitment" (interviewee 5). Internal conflicts within the municipality also posed challenges: "One department would reject what another had approved" (interviewee 5).

Financial
There were no financial incentives or shared profit models related to climate adaptation. "We had a joint ambition, but there were no financial reallocations" (interviewee 5). The financial division was clear: the joint development consortium funded the public space; the development company the buildings.

Relational
The collaboration evolved through personal relationships and institutional continuity. "People change, but a good handover and documentation helped us keep going" (interviewee 6). Trust was maintained through open dialogue and shared governance: "We aligned on principles, but were also pragmatic when needed" (interviewee 5).

Barriers to Climate Adaptive Urban Development in Erasmusveld

Table 4.6: Barriers of Erasmusveld

Erasmusveld	Corporate	Development	Collaboration
Organisational (tasks & responsibilities)	Fragmented knowledge and internal coordination	Divided responsibilities between the consortium and the developer	Limited role clarity across phases
Legal (rules & requirements)	Absence of uniform national regulation	Inflexibility of public handbooks	Sustainability not always binding in contracts
financial (risk & revenue)	No direct financial incentives for adaptation	Adaptation costs fall outside financial return logic	Cost-bearing is unevenly distributed
Relational (trust, transparency & commitment	Misalignment between project ambition and partner understanding	Internal misalignment within the municipality	Trust is person-dependent and sensitive to turnover

1. corporate strategy

Organisational
While the development company has a strong internal team of specialists, the knowledge is not always evenly distributed or shared across regional offices. “It’s really hard within an organisation like ours to make sure that what we learn in a project in Amsterdam is actually used in Rotterdam” (interviewee 7).

Legal
Development company 2 faces difficulties due to the growing patchwork of local policies and assessment tools. The lack of overarching legal alignment complicates consistent implementation. “We are in favour of national standardisation, but now every municipality is inventing their own point system” (interviewee 7).

Financial
Climate adaptation measures don’t result in lower insurance premiums or tangible buyer incentives. “If I tell you this neighbourhood is designed for extreme rainfall, your insurance premium will still be the same” (interviewee 7).

Relational
Although developer 2 aims for high ambitions, this is not always matched by partners or local departments. “We had high ambitions with the municipality, but then the department for public space says: ‘we don’t build with that material’” (interviewee 6).

2. Development strategy

Organisational
The development process is split between OCWV (public space) and development company 2 (buildings), creating a risk of fragmented implementation. “They do the infrastructure, I do the buildings, sometimes it’s a bit siloed” (interviewee 6).

Legal
Strict municipal guidelines limit innovation in public space, even when sustainable alternatives are proposed. “We proposed semi-paving for a natural look, but the public works department rejected it because they can’t maintain it properly” (interviewee 6).

Financial
Additional sustainability investments were not offset through subsidies or price adjustments. “We just did it, but there was no direct return. I’m not even sure if we got a discount on the land” (interviewee 6).

Relational
Although the OCWV includes the municipality, coordination with other departments often caused delays or rejections. “You make agreements with one municipal team, and then another says: ‘you should have followed our manual instead’” (interviewee 6).

3. Collaboration strategy

Organisational
Although collaboration exists, not all actors are equally involved across stages, leading to gaps in continuity. “Advisors are involved early on, but sometimes disappear in later phases when decisions are finalised” (interviewee 7).

Legal
Despite shared ambitions, climate adaptation was often agreed upon informally or described in non-binding terms. “We wrote a sustainability document ourselves just to make sure it was clear what we intended to do” (interviewee 6).

Financial

Public investments are handled by the OCWV or municipality, but Developer 2 bears all private building costs, limiting flexibility. “There’s no cost redistribution, what happens in the buildings is our responsibility, and what’s outside is theirs” (interviewee 5).

Relational
Strong collaboration relies on individual relationships, which can be disrupted by staff changes. “We had someone great at the municipality. When she left, the dynamic changed completely” (interviewee 6).

Drivers to Climate Adaptive Urban Development in Erasmusveld

Table 4.7: drivers of Erasmusveld

Erasmusveld	Corporate	Development	Collaboration
Organisational (tasks & responsibilities)	Dedicated internal expertise and growing team	Integrated area and housing design	In-house strategic advisory role
Legal (rules & requirements)	Internal guidelines and national positioning	Sustainability embedded through development framework	Sustainability ambitions backed by municipal plans
financial (risk & revenue)	Long-term value framing in corporate decisions	Internal willingness to invest without direct returns	Shared ambition between developer 2 and OCWV
Relational (trust, transparency & commitment	Strategic influence through national dialogue	Constructive cooperation with the OCWV team	Long-term collaboration and learning

1. corporate strategy

Organisational
Developer 2 has a specialised internal team with diverse backgrounds (ecological, hydrological, technical), which supports projects across the Netherlands. “We are a team of five technical specialists – we don’t do the designs ourselves, but we support and challenge our developers” (interviewee 7).

Legal
Development company 2 has committed itself to national frameworks like the **Toekomstbestendig Bouwen convenant**, which acts as a guiding benchmark. “We signed that in 2018, and we assess dozens of our projects against it” (interviewee 7).

Financial
Although not always quantifiable, climate adaptation is framed as a long-term asset that enhances liveability and attractiveness. “Everyone wants a green environment around their house, that’s how we sell it, even if we don’t call it ‘climate adaptation’” (interviewee 7).

Relational
Developer 2 is actively involved in national discussions, advising the Ministry and advocating for policy improvements. “I’m in a working group advising the government on better national regulation for climate adaptation” (interviewee 7).

2. Development strategy

Organisational
The Erasmusveld development included both public and private responsibilities, coordinated through OCWV, allowing for integrated planning. “We called it the Proeftuin, it was a way for us to experiment with what’s possible and what it costs” (interviewee 6).

Legal
OCWV provided clear sustainability ambitions that developers had to follow, including water and nature objectives. “They gave us a document with all the ambition themes: energy, climate, green, inclusive building, circularity…” (interviewee 6).

Financial
Development company 2 decided to invest in climate measures like green roofs and water basins even without direct financial incentives. “There wasn’t a special pot or subsidy. We just did it because we believed it was the right thing” (interviewee 6).

Relational
Trust and alignment grew throughout the process thanks to clear communication and shared goals. “We made a sustainability document ourselves because we felt there was no trust and after that, the relationship improved” (interviewee 6).

3. collabortion strategy

Organisational
Rather than relying entirely on external advice, developer 2 has embedded advisors who act as internal knowledge brokers. “We don’t do the calculations, but we make sure the project developer understands what they need to know from the report” (interviewee 7).

Legal
While not always formally enforced, municipalities support sustainability objectives in ambition documents, helping push them through. “The OCWV had clear expectations for green and climate themes. That really helped us structure our plan” (interviewee 6).

Financial
The joint ambition to build something exemplary helped motivate both sides to go beyond the minimum. “We didn’t split the costs line-by-line, we just said: let’s make something good together” (interviewee 6).

Relational
The collaboration benefited from continuity and a shared mission, even when roles shifted. “You do build up trust and even if someone leaves, the ambition stays in the project” (interviewee 6).

4.3.3 cross-case analysis

Corporate Strategy

Organisational
Both Development Company 1 and Development Company 2 integrate sustainability and climate adaptation structurally at the organisational level, though in different ways. Company 1 embeds ambitions in an annually updated internal strategy document (OGCM) across all departments, set by the directorial team in collaboration with developers and the internal studio. “Developers are responsible for integrating these ambitions into practice, we support them with specific knowledge” (Interviewee 2).

Company 2 works with a team of internal strategic advisors, each with technical expertise in themes like ecology, water management, and materials. This team reflects on externally developed advice to help translate it to project teams. “We don’t do the calculations ourselves, but we interpret and guide decisions based on external input” (Interviewee 8). The commonality is that both companies treat sustainability as an integral, company-wide process rather than a project-specific add-on.

Legal
Neither company operates within a strict internal legal framework enforcing sustainability. Company 1 is gradually moving toward integrating ambitions into contractual project requirements, but currently these remain mostly non-binding. “We’re working on a programme of requirements that includes standards for CO2 emissions and materials like low-carbon concrete” (Interviewee 2).

Company 2 faces similar limitations, as legal obligations are largely external. Their projects are guided by local governmental rules and covenants, but not always by uniform national frameworks. “We’re calling on the national government for more standardisation, as each municipality currently has their own rules” (Interviewee 8). This fragmentation is a shared challenge.

Financial
For both companies, climate adaptation typically results in higher costs without direct financial returns, and ambitions can be deprioritised under budget pressure. “It’s mostly additional cost and that’s why ambitions are often the first to be cut when budgets tighten” (Interviewee 2).

Company 2 stresses that innovations in climate adaptation often need to come from financial mechanisms rather than technical novelties. “The innovation should be in financial arrangements, technical solutions often just add cost” (Interviewee 8). Company 2 also notes the lack of monetary incentives for climate resilience compared to energy efficiency. This shared perspective underlines the financial tension between ambition and feasibility.

Relational
In both companies, there is a trend toward choosing partners who align with sustainability values. Company 1 is developing a preferred partners list to facilitate this alignment. “We’re developing a list of preferred partners with similar sustainability goals” (Interviewee 2).

Company 2 collaborates frequently with a recurring group of civil engineering firms and architectural offices, often based on personal working relationships rather than formalised frameworks. “It’s more about the people we know than the organisation” (Interviewee 8). Both companies underline the importance of long-term relationships and mutual understanding in achieving sustainability objectives.

Table 4.8: Comparison of corporate strategy

Theme	Development Company 1	Development company 2	Comparison Summary
Organisational	Strategy formalised in OGCM; supported by studio team	Internal technical experts reflect on project input	Both embed climate goals across organisation
legal	Moving towards embedding ambitions in contracts	Works under external legal frameworks, calls for national uniformity	No strict internal legal enforcement, fragmentation
financial	Ambitions often first to go under pressure; working on CO2 targets	Emphasises innovation via finance, not technique	Both struggle with cost-reward imbalance
Relational	Building a preferred list of sustainability-minded partners	Works with ~25 firms based on trust and familiarity	Trust-based partner selection in both firms

Development Strategy

Organisational
Development Company 1 applies a phased development structure, where each stage involves distinct planning, design, and budgeting teams. Climate adaptation is considered early and integrated through collaboration with landscape architects and project managers. “We work with a landscape architect, and each development phase includes its own planning, budgeting, and design team” (Interviewee 1).

In contrast, Company 2 embeds climate adaptation into the core planning process by default. Every project starts with a climate stress test and considers spatial layout, elevation, and soil conditions from the beginning. “From the very first designs, we work with external advisors to assess risks and determine adaptive measures” (Interviewee 8). While both companies take climate adaptation seriously at an early stage, Company 2 has a more standardised and mandatory process.

Legal
Both companies must comply with municipal and water authority requirements, but enforcement levels vary. Company 1 highlights that ecological assessment tools and water buffering requirements guide legal compliance. “We need to buffer 60 mm of rainwater per hour in the public space” (Interviewee 1).

Company 2 deals with a wider variety of legal tools and sees inconsistency in regional enforcement. “There’s a wild growth of regulations; one municipality asks 60 mm, another

asks 90 mm, this makes it hard to plan" (Interviewee 8). Both experience legal fragmentation, but Company 2 appears more critical of the lack of national standardisation.

Financial
For Company 1, climate adaptation measures fall under the public space development budget and are included in the broader land exploitation model. There's no separate budget for climate actions, but costs are absorbed strategically. "It falls under the general category of public space development" (Interviewee 1).

Company 2 also finances adaptation through public space budgets and emphasises that all climate-related infrastructure, from water storage to street trees, is eventually paid by the homeowners through property sales. "Our only revenue is the sale of homes; every climate investment has to be covered there" (Interviewee 8).

Both face similar issues of covering high climate adaptation costs under conventional financial models.

Relational
Company 1 coordinates with public partners through joint steering groups and maintains open communication to prevent conflicts. "If something's off, we bring it up in the steering group before it escalates" (Interviewee 1).

Company 2 works intensively with municipalities, water boards, and consultants from the start, integrating their input into technical design and permits. Collaboration is embedded in their iterative development approach. "We always involve municipalities, even when we are not yet required to just to stay ahead" (Interviewee 8).

Both see proactive collaboration as essential but differ in intensity and institutionalisation.

Table 4.9: comparison of development strategy

Theme	Development Company 1	Development company 2	Comparison Summary
Organisational	Phased project setup with climate goals per phase	Climate adaptation starts with stress tests and spatial planning	Both integrate climate adaptation early in design
Legal	Complies with municipal rules (e.g. 60mm buffer, ecological score)	Criticises inconsistent and escalating local regulations	Both face fragmented legal requirements
Financial	Costs embedded in public space budget; no climate-specific budget	All investments paid through home sales; no separate budget	Both lack specific funding for climate adaptation

Relational	Works with municipality in steering groups; open dialogue	Intensively collaborates with public parties and advisors from the start	Both value early collaboration, Company 2 more formal

Collaboration Strategy

Organisational
Development Company 1 operates through a **joint executive board** with its development partner, ensuring that all major decisions are co-managed. Advisors like NL Greenlabel are structurally involved and guide decisions through predefined label methodologies. "We're not classic consultants – we follow a methodology and give recommendations based on the label. It's up to the developer to apply them" (Interviewee 3).

Development Company 2 works with a **decentralised but embedded structure**, involving external consultants from the start of each project. These consultants perform climate stress tests and influence design through ongoing technical advice. "We always involve municipalities, engineers, and sustainability experts from the early design phase onward" (Interviewee 8).

While both companies embed collaboration structurally, Company 1 uses a formalised board structure, whereas Company 2 takes a networked, iterative approach.

Legal
For Company 1, legal structures within collaborations are defined through a development entity that allocates responsibilities and ownership. Legal sustainability criteria are indirectly enforced through design performance obligations. "We request a five-year maintenance and monitoring plan to ensure the design's goals are upheld" (Interviewee 3).

Company 2 engages in legal agreements primarily through **anterior agreements** with municipalities, detailing responsibilities and desired outcomes. Public space is typically transferred to the municipality for a symbolic fee, provided it meets all requirements. "That public space is usually handed over for €1, after we've made it exactly to municipal specifications" (Interviewee 8).

Both use legal instruments to structure collaboration, but Company 2's legal engagement focuses more on municipal agreements than on internal partner structures.

Financial
Company 1 integrates sustainability costs into the public space development budget and negotiates ambitions in consultation with advisors. Budget flexibility is necessary to adjust sustainability goals to financial feasibility. "We recommend setting lower targets when needed – say 10% sustainable materials instead of 50% – to help them build experience and awareness" (Interviewee 3).

Company 2's financial model is strongly shaped by public-private arrangements and the singular revenue stream of home sales. There is no distinct climate adaptation budget; financial negotiations include contractor and municipal expectations. "All costs go back to the buyer, the only income we have is selling homes" (Interviewee 8).

Both align their financial strategies with broader project economics, but Company 1 shows more flexibility through advisor-supported trade-offs.

Relational
Company 1 emphasises growing trust among project partners. Regular steering meetings, open communication, and long-term relationships are key. “If something’s off, we bring it up in the steering group before it escalates” (Interviewee 1).

Company 2 values durable relationships with a select pool of about 25 engineering firms, tailored to regional needs and personal working history. “It’s more about the people than the company, long-term collaboration helps ensure knowledge is reused across projects” (Interviewee 8).

Both cases underscore the importance of strong relational dynamics, but Company 2 focuses more on consistent partnerships across projects and regions.

Table 4.10: comparison of Collaboration strategy

Theme	Development Company 1	Development company 2	Comparison Summary
Organisational	Joint board and structured advisor roles via label methodologies	Embedded external experts across design phases	Company 1 more formal; Company 2 more network-based
legal	Company 1 more formal; Company 2 more network-based	Focused on municipal agreements and legal compliance for public space	Both formalise roles, but in different structures
financial	Sustainability costs discussed with advisors; adjusted per feasibility	All project costs financed via home sales; tight budget	Similar cost pressures, but Company 1 is more adaptive
Relational	Emphasises open dialogue and trust in project teams	Long-standing relationships with regionally active advisors	Both build on trust; Company 2 more regionally consistent

5. Synthesis

In this chapter the strategy model is shown and evaluated through an expert panel. answering the last sub question: ‘’How do corporate, development, and collaboration strategies contribute to the integration of climate adaptation in urban area developments?’’

5.1 Designing the Strategy Model

The strategy design presented in this thesis is the result of an iterative process from both the theoretical insights and empirical evidence. The goal of the design was to formulate an actionable framework that supports real estate developers in systematically integrating climate change adaptations into urban development projects. The design process is done in several phases, each building upon the former to ensure the strategy is both applicable to the theory and practice.

Theoretical foundation and framework structure

The process began with an extensive literature review to understand the existing knowledge on climate change adaptation, particularly the importance of water management, and the role of real estate developers in urban development. The key themes that emerged from the literature formed the foundation of the strategy model. From the work of Heurkens (2012) and other sources the conceptual framework was created that identifies four recurring themes: organisational, legal, financial and relational. These were put in the three identified primary strategy domains: corporate strategy, development strategy and collaboration strategy.

Both cases demonstrated that the type of climate adaptation was planned and the timing was done through anticipatory adaptation strategies. Erasmusveld showed strong anticipatory integration through early design-phase actions like stress testing, while Glasfabriek embedded planned goals in strategic frameworks (e.g., OGCM).

In terms of content, grey adaptation measures dominated in both cases, particularly in technical water buffering solutions. However, elements of green adaptation (e.g., urban greenery, nature-based retention) and soft adaptation (e.g., municipal covenants and zoning flexibility) were also present. The relative dominance of grey solutions appears to relate to institutional familiarity and clearer technical standards, while green and soft measures are more context-dependent and require stronger inter-party trust and coordination.

Empirical Case study analysis

To test and contextualise this framework, two urban development projects in the Netherlands were selected as case studies: Erasmusveld and Glasfabriek. These cases were chosen based on criteria that ensured diversity in the development phase, relevance to climate adaptation, and the willingness of project stakeholders to participate in in-depth interviews. Through semi-structured interviews with developers, municipal actors, and

advisors, detailed insights were gathered on how climate adaptation was being approached at both the company level and within the projects.

These interviews were coded using thematic analysis, with specific attention to the four analytical themes. The coding process enabled the identification of both drivers and barriers for climate adaptation across the three strategy types. For example, organisational drivers included internal sustainability ambitions and expert capacity, while relational barriers included a lack of long-term cooperation frameworks with municipalities. This analysis resulted in a rich, comparative dataset across the two cases.

Synthesis and visualizing the model

After synthesising the empirical data, a visual strategy model was developed to represent the key findings in an actionable format. The model was structured in three layers, corporate, development, and collaboration, mirroring the strategic levels identified earlier. For each layer, practical steps and considerations were integrated that corresponded with the organisational, legal, financial, and relational dimensions.

To ensure the model's relevance and clarity, a draft version of the design was shared with an expert panel composed of three professionals from real estate development firms. Their feedback helped refine the sequencing of actions, the terminology used, and the level of abstraction. For example, based on their input, additional emphasis was placed on the need for internal organisational anchoring of climate goals and the use of trust-based collaboration as a structural rather than project-based practice.

Final strategy design

The final strategy design is not a static checklist but a flexible implementation guide that can be adapted to the specific context of each project. It starts at the corporate level, where ambitions and resources are anchored, proceeds through the development process with a phase-specific integration of climate goals, and culminates in a collaboration strategy that supports long-term alignment with public and private partners. This approach reflects the understanding that climate adaptation is a dynamic, multi-actor challenge that requires integrated and iterative action across multiple levels of decision-making.

In sum, the strategy design is the result of a continuous back-and-forth between theory, practice, and reflection. It not only represents the empirical insights from the two cases but also incorporates the lessons and suggestions from practitioners, ensuring that it is grounded in the realities of Dutch urban development practice.

Figure 5.1: strategy model (own work)

5.2 Testing the Strategy Model: Expert Panel Reflections

To ensure the model's practical relevance, an expert panel of three seasoned professionals with experience in urban development, sustainability, and ESG integration was consulted without knowledge of the case specifics. Their feedback confirmed the strategy's completeness and its applicability in the field. The panel discussion was organised around the four themes of the model, using propositions and open-ended questions to test the assumptions and usability of the framework.

Organisational Alignment

All experts strongly agreed that internal expertise is crucial for innovation and proactive planning. Expert 1 stated, "Without internal expertise developers will stay reactive instead of proactive." According to this expert, real estate developers must embed climate knowledge structurally by forming internal teams or assigning sustainability managers to support each project team. This view was confirmed by Expert 2, who highlighted the importance of having an in-house water or climate advisor, especially in complex projects with high climate risk. However, he also stressed the need for structural collaboration with external parties, such as water boards, as internal capacity has limitations.

Stress testing as a process tool was broadly supported. While currently used mostly for validation, the experts agreed on the importance of integrating climate stress tests as design tools in the early project phases. As Expert 3 pointed out, large projects already do this during their sketch phase, calculating infiltration and buffering needs before the first technical drawings are made. However, smaller projects still lag behind.

Legal Fragmentation

The legal and regulatory theme generated both consensus and nuance. Expert 1 expressed strong concern about the inefficiency caused by varying local point systems: “The wild growth of municipal point systems hinders the scalability of Climate Adaptation.” He advocated for national harmonisation, referring to tools like the "landelijke maatlat" as more effective.

Expert 2, while more moderate, acknowledged that even when rules differ between municipalities, administrative solutions are often found. He argued that good coordination and decision-making matter more than uniformity. Expert 3 focused on the impact of inconsistent water buffering requirements (60mm here, 70mm there) and how it leads to confusion and slower development timelines.

All experts agreed that municipalities should structurally appoint sustainability advisors, provided they are pragmatic and capable of balancing ambition with feasibility. In cities like Amsterdam, this is already standard practice. The panel also agreed that too-rigid interpretations of local rules, especially by smaller municipalities, can delay and complicate development.

Financial Realism and Incentives

Financial barriers and incentives were central to the discussion. Expert 1 argued that climate adaptation is still mostly seen as a cost item, especially when it must be implemented on private plots in dense urban areas. He noted that cost-efficient solutions are more feasible in the public realm but pointed to examples where even public interventions, like crate systems for water buffering, are expensive and hard to maintain.

Expert 2 disagreed with the framing of adaptation as an extra cost. For him, it is a form of risk mitigation and value creation: "adaptation isn’t an ‘extra’ but a basic responsibility.” He emphasised the role of ESG metrics and the increasing importance of climate performance in investment decisions. While the panel agreed that interest rate discounts and insurance incentives could stimulate broader adoption, concrete examples were lacking. Expert 3 stressed that long-term investors are more likely to embrace adaptive measures because they benefit directly from lower operating costs and improved building performance.

Long-Term Collaboration and Governance

Relational factors were unanimously recognised as decisive. Trust, early commitment, and clear role division were all mentioned as critical enablers. Expert 2 highlighted that collaboration should not depend on "blauwe ogen" (blind trust), but on transparent agreements and mutual accountability. Expert 1 observed that smaller municipalities often lack the institutional trust needed for adaptive planning.

Post-project coalitions were another major topic. All experts acknowledged the risk of losing adaptation functionality if long-term governance is not arranged. Expert 3 emphasised the importance of including residents or associations of owners (VvE’s) in maintenance protocols. He also proposed creating time- and scale-bound agreements (5-15-30-45 years) for water systems, green infrastructure, and shared spaces. Expert 1 confirmed that knowledge is often lost in the transfer to municipalities and recommended developing formats for post-delivery engagement.

General Reflections on the Strategy Model

All three experts agreed that the model reflects the real-world complexity of urban development. They recognised the value of its phased approach and the thematic segmentation along organisational, legal, financial, and relational lines. The iterative centre of the model 'Improve' was praised as a realistic representation of how developers should continuously adjust their strategies.

Expert 2 noted that the model can be practically applied, provided responsibilities and KPIs are clearly assigned. Expert 3 recommended adding a specific reference to monitoring performance data, stressing that "measuring=knowledge" Without embedded measurement systems, the learning and adjustment functions of the strategy remain theoretical.

Experts also advised integrating the model with ESG objectives, internal policy frameworks, and external reporting standards. Internal ambassadors or sustainability champions are essential to keep the model operational over time.

05 Synthesis

In the fifth chapter, the results of the cases and the literature are combined to form the strategy design. This design is then discussed with experts to check the correctness and readability. This will take form in the final strategy design.

5.3 Refining the Model

The final strategy model offers a structured roadmap for climate-adaptive real estate development. It includes:

Corporate Strategy: aligning internal resources, expertise, and ambitions through policies, KPIs, and procurement criteria.

Corporate	Long-term embedding of Climate Adaptation into the core business
Organisational	Create a climate adaptation team (or designate experts in-house); embed goals in the company's KPI system and strategic roadmap (e.g. in annual OGCM-type reports). Promote shared learning across projects.
Legal	Anticipate regulatory shifts by standardising internal criteria based on national/international frameworks (e.g. NAS, EU taxonomy). Advocate for national uniformity.
Financial	Link climate ambitions to ESG finance metrics. Develop internal financial thresholds for adaptation investments (e.g. min. % of public realm budget).
Relational	Build and maintain a preferred partner network with aligned ambitions. Use early-stage alignment tools (e.g. sustainability charters). Foster internal collaboration across teams.

Figure 5.2: Corporate strategy

Internal capacity is critical. Developers must embed climate adaptation into the company mission, designate internal champions or sustainability managers, and establish interdepartmental alignment. This requires top-down commitment and knowledge dissemination across teams.

Developers should consider incorporating adaptation requirements into procurement policies and partner contracts. Although internal legal mechanisms remain limited, codifying sustainability as a core procurement criterion can drive compliance. Anticipation to regulatory shifts is crucial, this can be done through standardization of internal criteria based on national and international frameworks. What is also important is to advocate for national uniformity.

A deeper insight is the current absence of Total Cost of Ownership (TCO) thinking. Most developers divest after delivery and do not directly benefit from long-term operational savings. However, some begin exploring co-ownership structures or longer holding periods. Partnering with investors early, aligning ESG metrics, and developing climate-linked KPIs can help make the financial case for adaptation. This shift from short-term to long-term value creation is essential for embedding climate adaptation structurally.

Climate ambition must also be communicated externally, to signal reliability and attract like-minded partners. Public commitments and transparent ESG reporting can help developers position themselves as serious players in climate-adaptive development.

Development Strategy: offering detailed guidance per project phase, from initial feasibility to post-delivery evaluation.

Development	Concrete actions throughout the urban development process			
	Initiation	Design	Realisation	Post delivery
Organisational	Perform climate stress test and baseline scan	Apply adaptive design principles and iterative loops	Align contractor specs with adaptation targets	Plan for monitoring and feedback collection
Legal	Map local regulations and permit constraints	Integrate adaptation measures into premit design	Ensure delivery is legal compliant (e.g. LIOR)	Establish long-term VvE and public space agreements
Financial	Draft financial scenarios with and without adaptation	Budget for green/blue infra in the public realm	Monitor cost deviations; validate added value	Include O&M adaptation costs in VvE fees
Relational	Involve key stakeholders early (e.g. municipality, water board)	Co-design with experts, architects, and local community	Maintain joint steering groups, regular site reviews	Involve residents in feedback and stewardship mechanisms

Figure 5.3: Development strategy

Project teams must translate company-wide ambition into actionable measures. Internal advisors (e.g., climate or water experts) should be involved from early stages. Teams benefit from structured tools such as checklists, stress tests, and design briefs that foreground adaptation.

Developers must proactively respond to fragmented municipal requirements. By incorporating legal reviews into feasibility phases, and ensuring regulatory compliance during design, legal risks can be minimised. However, developers also advocate for national harmonisation to simplify the landscape.

Adaptation measures must be embedded into initial feasibility studies. By calculating climate measures alongside traditional investments, developers avoid expensive retrofits. Early alignment with financiers and municipalities can unlock subsidies or green loans. Experts recommend linking adaptation costs to risk mitigation and value preservation, an argument more readily embraced by institutional investors.

Iterative coordination with municipalities, advisors, and utility providers during all phases improves the integration of technical solutions. When climate goals are communicated transparently at design kick-off, friction later in the process can be avoided.

Collaboration Strategy: establishing stable coalitions with public and private actors, with attention to role clarity and long-term commitments.

Corporate	Structures for working with other stakeholders over time
Organisational	Set up joint boards or consortia where public/private actors co-decide on adaptation measures. Ensure continuity in roles beyond project life cycles.
Legal	Use clear development agreements (e.g. anterior contracts) with performance clauses. Include maintenance and monitoring provisions.
Financial	Align business case expectations with partners. Explore shared investment models (e.g. land value capture, public-private co-financing).
Relational	Invest in trust and continuity by building long-term partnerships with advisors and local authorities. Create governance tools for conflict mediation and ambition setting.

Figure 5.4: Collaboration strategy

Developers must be prepared to lead or co-lead governance structures. This requires clear roles, skilled staff, and open communication protocols. The model stresses that collaboration is not only about intention, but also structure and continuity.

Formal agreements, such as covenants, collaboration frameworks, and multi-party contracts, should address not only project delivery but also post-delivery performance. Developers recommend standardising formats to reduce transaction costs and confusion.

Maintenance responsibilities for adaptive infrastructure (e.g., wadi-systems, green roofs) must be defined upfront. Developers, municipalities, and, where relevant, investors and housing associations should co-create long-term agreements. These agreements could include 5-10-15-30 year checkpoints for reviewing functionality and costs. Including long-term asset owners enhances realism and accountability.

Trust, continuity, and early alignment were repeatedly mentioned as key enablers. Developers should not rely on informal goodwill but institutionalise coordination and data sharing. Post-project structures, including monitoring systems and resident engagement, help prevent loss of adaptation function over time.

What makes this model novel is its integration of design-phase actions with organisational, legal, financial, and relational levers. It does not just provide goals but details **how** developers can achieve them across the urban development timeline. Moreover, it provides a realistic governance lens: acknowledging limits, trade-offs, and the shared nature of responsibility.

The model is designed to be usable in practice. It can function as:

- A framework for internal project meetings.
- A checklist for KPI and ESG alignment.
- A tool for dialogue with municipalities and external advisors.
- A structure for monitoring and improving over time.

In conclusion, the strategy model helps answer the central research question: *How do real estate developers integrate climate-adaptive strategies into their urban development*

practices to ensure resilience against future risks? It also addresses the sub-question on collaboration by offering concrete practices for shared ownership and adaptive coalitions. With the right internal commitment and external cooperation, climate adaptation can become a standard, rather than an exception, in Dutch urban development practice.

06
Discussion

This chapter discusses the results of all the parts in this research. critically looking at the results.

6. Discussion

This chapter provides a critical reflection on the thesis findings. It is written as follows: first, it addresses the theoretical contributions of this study, then followed by an analysis of the empirical findings and a comparison with the literature. Next, the conceptual model and the role of context are discussed. The chapter then evaluates the quality of the research design, followed by an outline of the study's limitations. Finally, reflections on future research and practical implications are provided.

6.1 Theoretical Contribution

This research set out to understand how real estate developers integrate climate-adaptive strategies into urban development projects. Taking from Heurkens' (2012) conceptual model, the theoretical framework linked four core dimensions: context, developer, development strategy, and climate-adaptive processes. A literature review mapped out relevant theories on urban governance, public-private partnerships, private-private partnerships, developer typologies, and climate change adaptation practices.

The thesis contributes theoretically by integrating these dimensions into a coherent conceptual model that emphasizes the multi-level and multi-actor nature of climate-adaptive urban development. It supports the idea that real estate developers work in intricate institutional and physical settings that both limit and promote climate action. Furthermore, it distinguishes between three interrelated strategy levels: corporate (internal governance and ambition), development (project-based processes), and collaboration (multi-party engagement), all analysed across four key themes: organisational, legal, financial, and relational.

Notably, the literature largely described adaptation in technical or policy terms, while this thesis offers a more strategic, actor-centered perspective, highlighting the importance of internal structures, relational dynamics, and financial levers.

Beyond the structural model, the literature provided insights into the varying types and scales of climate adaptation, namely grey, green, and soft measures (Depietri & McPhearson, 2017), each requiring distinct technical, social, and financial responses. Additionally, adaptation can be either anticipatory or planned, depending on timing and uncertainty management (Darjee & Neupane, 2023).

6.2 Empirical Findings

Erasmusveld and Glasfabriek, the two case studies, provided different development structures and environments. Nonetheless, the comparative study identified important prospects and shared obstacles.

Organisationally, both Development Company 1 (Glasfabriek) and Development Company 2 (Erasmusveld) embed Climate adaptation in their operations, mainly trough sustainability goals. Company 1 relies on a strategic planning document (OGCM), while Company 2 employs an internal team of technical advisors. In both cases, climate adaptation ambitions are not incidental but systematically embedded.

Legally, both companies operate in a fragmented regulatory landscape. Municipal requirements vary, causing inefficiencies and confusion. Both developers advocate for national harmonisation of climate adaptation criteria. The lack of enforceable internal legal tools (e.g., binding contractual obligations for adaptation measures) remains a barrier.

Financially, Financially speaking, adaptation measures are usually viewed as extra expenses that don't yield a profit. These expenses are covered by regular budgets for both businesses. Incentives for adaptation, such as green mortgages or reduced insurance premiums, are underdeveloped. However, interviewees across both cases emphasized the long-term brand and reputational value of implementing climate change adaptation in development projects.

Relationally, trust and alignment with partners are crucial enablers. These instances demonstrate the importance of consistent cooperation, candid communication, and common goals. Advisors and public actors were involved from the beginning in Development Company 2, which in particular showed a more structured and iterative collaborative approach.

The comparative analysis of Erasmusveld and Glasfabriek offers valuable insights into how different types of real estate developers , one a consortium-driven public-private partnership (Company 2), the other a market-driven private developer (Company 1), embed climate adaptation across organisational, legal, financial, and relational domains. The cases highlight that while adaptation is increasingly seen as a strategic necessity, its implementation remains challenged by systemic barriers such as regulatory fragmentation and limited financial incentives. A key insight is that early internal anchoring of climate goals (through instruments such as the OGCM or dedicated technical teams) improves translation into project-level actions. Another valuable finding is that trust-based collaboration is more effective when institutionalised from the start, as seen in Company 2's structured engagement with advisors and public actors.

However, the findings are also subject to limitations. First, only two cases are analysed, which limits the generalisability of the insights. Second, the cases are situated in different development phases, one in planning, one just realised, which affects the type and depth of climate adaptation measures that could be observed. Third, the availability and roles of interviewees shaped the data, meaning some perspectives (e.g., of contractors or residents) remain underrepresented. These limitations suggest the need for further empirical research across more diverse development contexts and stakeholder groups.

6.3 Comparing Theory and Practice

In practice, developers act as facilitators rather than top-down initiators, which aligns with Heurkens' (2012) model of the private sector as both strategic actor and dependent partner. However, the empirical findings show that strategies are rarely deliberate alone; they often emerge through iterative negotiation, adaptation, and learning, echoing Mintzberg's (2007) concept of emergent strategy.

Public-private collaboration, as discussed in Buso & Stenger (2018), was evident in both cases but varied in structure. The Erasmusveld project demonstrated a well-organised PPP via a joint development combination, while Glasfabriek relied more on informal mechanisms and shared decision-making boards. The absence of formal enforcement mechanisms in both cases mirrors theoretical critiques of weak policy implementation tools.

While the literature identifies financial barriers as central (Ten Brinke et al., 2022), empirical findings emphasized the broader organisational and relational dynamics that often determine success or failure. This nuance adds to the theory by underlining the importance of 'soft' governance tools and interpersonal trust.

6.4 Reflection on Context and Scale

The context of Dutch urban development plays a central role in both constraining and enabling climate adaptation. The shift toward decentralised, collaborative governance in the Netherlands, as described by Heurkens (2012), was visible in both cases. However, municipal inconsistencies, conflicting internal departments, and varying enforcement standards were significant obstacles.

The scale of development also influences possibilities for adaptation. Smaller projects or those located in dense urban environments face space limitations and tighter financial margins. In Erasmusveld, with more public land and stronger municipal support, systemic adaptation was more feasible. Glasfabriek, being a brownfield redevelopment with complex ownership, required more negotiation and creative solutions.

6.5 Evaluation of the Conceptual Framework

The conceptual model proposed in this thesis proved effective in structuring both the literature and empirical analysis. By distinguishing between corporate, development, and collaboration strategy, it helped identify where barriers and drivers occur and where interventions are possible. The framework's thematic structure (organisational, legal, financial, relational) allowed for a comprehensive and systematic diagnosis of climate adaptation practices.

Importantly, the iterative nature of the framework, particularly in the "Implement & Improve" phase, resonates with real-world practices where strategies evolve through feedback and learning. The framework also helped integrate theoretical models with empirical observations, ensuring both academic rigour and practical applicability.

6.6 Research Design Quality

Construct validity was supported through triangulation: literature, document analysis, semi-structured interviews, and expert panel feedback all contributed to data richness. External validity is limited to the Dutch context but is strengthened through the use of theory-based case comparison. Reliability was enhanced through consistent coding practices and structured analysis tables.

However, challenges remain. Some interviews relied on subjective interpretation, and the project stages varied, making direct comparisons difficult. Yet, the methodological transparency and clear structure support the credibility of findings.

6.7 Limitations

Case studies

This study is based on two in-depth case studies (Glasfabriek and Erasmusveld). Although the cases were selected based on their relevance, urban characteristics and significance. The limited number of cases can affect the weight of the research. More case studies from different developer profiles, urban typologies and project stages could have made this research more impactful.

Development stages

As mentioned before the development stages of the research play an important part. It can be said that the cases were examined during different development stages. The Glasfabriek is still in progress and Erasmusveld has just been completed. To measure the complete effectiveness of the implementations there must have been some time that has passed.

Participant availability and time constraints

The data of the case studies was dependent on the availability and willingness of key stakeholders to participate in this research. While a diverse group of professionals was interviewed, including developers, municipal representatives, and advisors, not all participants were able to contribute due to scheduling conflicts, limited availability or due to the fact that they weren't working at the same position anymore. Additionally, the time frame of the graduation period imposed natural constraints on the number and length of interviews that could be conducted and analysed.

07
Conclusion

In this chapter the research questions are answered.

7. Conclusion

SQ1: What is the importance of climate change adaptation, specifically water management?

Climate change adaptation has become more and more crucial in urban development. Rising temperatures, more intense rainfall, and longer periods of drought are some of the problems we face today. Adaptation through water management involves anticipating future scenarios and designing infrastructure accordingly. This includes green-blue networks, natural drainage systems, and building-level interventions such as green roofs. Literature emphasises a need for anticipatory, rather than reactive, strategies to reduce vulnerabilities in the built environment. Despite its importance, developers are not legally required to implement water management solutions, which limits their widespread adoption unless incentivised or required through municipal planning frameworks.

SQ2: How do developers collaborate with other stakeholders in developments?

Urban governance has shifted from a state-led to a more decentralised and collaborative model. Developers today operate in multi-actor environments that require coordination with municipalities, water boards, architects, consultants, and local communities. Literature identifies key aspects influencing collaboration: organisational alignment, legal frameworks, financial arrangements, and relational trust. Effective partnerships require well framed and clear roles, transparent communication and shared goals. However, public-private or private-private partnerships often face barriers such as unequal power dynamics and unclear responsibilities. The relational aspect, trust and commitment, is often a decisive factor for success in these collaborations.

SQ3: What is the role of a real estate developer in the context of urban development projects?

Developers act as orchestrators of the development process. They take on multiple roles: initiator, coordinator, risk manager, financier, and market strategist. Their influence stretches from land acquisition to sales, across all project phases. Their role in climate adaptation is ambiguous, they are not always required to act, but they can be pivotal. Developers' decisions determine whether adaptive measures are considered early in the design or overlooked in favour of cost or speed. Their capacity to drive innovation and sustainability is influenced by internal motivations, project context, and external incentives or obligations.

SQ4: What are development companies' corporate positions on climate change adaptation?

Case studies have shown that the corporate vision on climate change varies. In the second case (Erasmusveld) the company handles climate change in their corporate theme's. They indicated that they have had some variation on these themes for over 15 years. They have now been named climate adaptive development. Having in-house expertise advising on individual projects shows that they take it very seriously.

In the first case of the Glasfabriek in Schiedam, themes were also implemented on the corporate level. Climate is put together with nature, which is good. But it can also be seen as hiding it under a similar theme to diminish the topic. Development company 1 shows a more experimental motivation on implementing climate change with a climate advisor that works individual cases and tries to learn from finished developments. Both cases confirmed that adaptation is not yet structurally embedded for all developments, rather depending on

individual projects and the circumstances of these developments. This makes it difficult for overall implementation.

SQ5: How do real estate developers integrate climate change adaptation in real estate projects?
Integration of climate adaptation takes place primarily in the early stages of design. In the case of Erasmusveld the ambition was to create the most 'sustainable' design of the Netherlands. But only a couple of years later the project isn't a front runner anymore. Adaptation was implemented through a combination of spatial design (green adaptation and technical solutions (grey adaptation).

In the other case, the developer demonstrates more ownership by co-developing sustainability ambitions and working with external advisors to embed adaptation principles into the master plan. Looking for creative solutions on water management, such as converting a silo to a water tower. Still, both developers indicate that financial feasibility, regulatory support, and the maturity of adaptation tools strongly influence how much is implemented. Adaptation often remains a "nice-to-have" rather than a "must-have".

SQ6: How do real estate developers experience collaboration with external parties in implementing climate adaptations in urban development projects?
Real estate developers increasingly recognize that effective climate adaptation cannot be achieved in isolation. Collaboration with public authorities, water boards, consultants, and designers is essential. Developers with an innovation-oriented profile or long-term strategic interests tend to invest more actively in building trust-based partnerships, often involving advisors early in the process to co-create sustainability goals. However, even these proactive developers face significant barriers, such as fragmented legal frameworks, tendering constraints, and a lack of shared definitions or tools for adaptation.

More conventional or commercially-driven developers, who operate under tight financial and planning constraints, tend to rely on established public-private frameworks. These developers often experience collaboration as more procedural than strategic, expressing concerns about shifting responsibilities from public to private actors without accompanying financial compensation or clear legal arrangements. These insights indicate that the developer's profile, internal ambition, and the institutional context significantly shape the nature and quality of collaboration around climate adaptation.

SQ7: How do corporate, development, and collaboration strategies contribute to the integration of climate adaptation in urban area developments?
The integration of climate adaptation in urban development is not only the result of a single action or policy, but the outcome of multi-leveled strategic choices. made across the corporate, development and collaboration level. The findings from the cases and feedback from the experts showed how these strategic layers support climate adaptation.

The developed strategy model provides a structured, phased, and practical framework to guide climate-adaptive real estate development. It includes:

- **Corporate strategy**: Embed climate goals internally through KPIs, policies, and procurement frameworks.
- **Development strategy**: Implement adaptation actions per phase, from concept to post-delivery, and apply tools like climate stress tests early on.
  Collaboration strategy: Establish joint governance structures, clarify legal responsibilities, and build trust through continuity and open dialogue.

These strategies are supported by four overarching themes: organisational, legal, financial, and relational. The model promotes an iterative “implement & improve” approach to foster learning and adaptability. It is designed to function as both a management tool and a conversation starter between developers, municipalities, and advisors.

“What strategies can real estate developers use to implement climate change adaptations in urban development projects?”
Using different strategies in urban development projects, developers can make a significant impact on the climate. As written before, there is a multi-leveled approach to implement climate change adaptations. These strategies are interconnected and reinforce one another. It enables developers to address both internal and external challenges that come with developing climate adaptation. It all starts at the top, on the corporate level.

At this level the developer must begin by defining climate adaptation throughout the organisation. This can be done by integrating CA in the company's mission, themes and strategic priorities. Building internal knowledge and awareness among staff can improve the implementation on a project level. Internal experts are crucial in making this as seamless as possible. The cases of Erasmusveld and Glasfabriek illustrated that when adaptation is early embedded within strategic ambitions it helps with the integration in future projects.

The development strategy is central to translating these corporate ambitions into physical adaptation. Developers must ensure that adaptation is embedded early in the development process. From the conceptual and design phase it is important that CCA is taken into account, here the influence of implementation is the strongest. Developers should seek to incorporate water management, through smart and innovative solutions. This can be done through technical and spatial design. Both Erasmusveld and Glasfabriek demonstrated the importance of early integration, as it allows adaptation to be shaped alongside other spatial and financial considerations rather than added later as a constraint.

In terms of collaboration, developers play a pivotal role in building and maintaining strong partnerships. Successful integration of climate adaptation relies on early engagement with municipalities, water boards, and other stakeholders. Developing shared ambition and ensuring clarity around roles, responsibilities, and risk allocation should be done in relation to other stakeholders. Formal agreements, such as development frameworks or covenants, can help avoid fragmentation. Trust, transparency, and regular coordination are essential to maintaining alignment throughout the development process. This is demonstrated by both cases in the joint ventures and partnerships they both had with either a public or a private party.

In conclusion, developers must move from a purely technical view of adaptation and adopt a strategic view that spans across the entire development process. By combining corporate vision, project-level execution, and strong collaboration, developers can navigate complexity and lead the way in climate-adaptive urban area development.

08 Recommendations

chapter 8 will go through the recommendations for practice and for future research

8. Recommendations

For practice

Embed climate adaptation structurally in corporate strategy
Developers should move beyond project based climate ambitions and instead imbed climate adaptation into their corporate documents such as KPIs, procurement policies and programmes of requirements. Making it standard that there are assigned responsibilities such as internal climate advisors, that assure a constant implementation across all projects.

Involve experts early and iteratively
Many barriers for these problems arise because stakeholders are involved too late. Municipalities don't always deliver climate adaptive variables in the beginning of development and advisors and technical experts are involved too late. Bringing in advisors at the early stages of the project could increase the chances of meaningful adaptation.

Improve legal clarity through standardization
A recurring barrier is the legal fragmentation across Dutch municipalities. Developers and other stakeholders should lobby for national standardization of climate norms. Engage in policy dialogue with ministries. National authorities should consider introducing a standardised yet flexible climate adaptation framework, legally anchored and complemented by implementation support for local governments. This would promote regulatory consistency while maintaining the ability to tailor measures to local environmental and social contexts. Such an approach can enhance trust, reduce transaction costs, and make adaptive development more scalable and realistic.

Formalize and maintain post-delivery systems
Climate measurements such as wadi-systems, green roofs, or retention basins require maintenance. From the interviews and expert panel, it seems that post-delivery effectiveness is not measured and it is unclear who has to look after these measurements. developers, municipalities and VvEs should co-develop long-term maintenance agreements and define feedback loops (5-10-15-30 year periods for example) for these measurements.

Engaging long-term stakeholders
To improve realism and feasibility, investors and, if applicable, housing associations should be actively involved in these agreements. Long-term asset owners benefit from reduced operational risks and improved performance, giving them a stake in climate resilience. Institutional investors increasingly consider ESG performance, and social housing providers often already manage post-delivery processes. Their inclusion increases accountability and aligns long-term interests.

Built coalitions on shared sustainability values
Trust and shared ambition are key drivers for successful collaboration. Therefore, developers should work towards forming coalitions with partners that have proven to be like-minded. Assessing value alignment in partner selection, moving on from lowest-cost procurement.

Future research

Explore role of investors and lenders
Investors and lenders also have obligations towards ESG goals. Institutional investors and banks play a crucial role in financing development projects. They have to meet certain ESG criteria from their investments. Research is needed into how these actors influence urban developments.

Evaluation of climate measurements
Both the cases of this research are still evolving projects. one being delivered but not yet all the way settled in and the other in early stages of development. A study could be performed on the effectiveness of implemented adaptation measures over time, such as the water systems and green infrastructure.

Resident engagement in climate adaptation
Adaptation is not only a technical or institutional process, but it also involves behaviour and usage. Future research could explore how residents, VvEs and community groups cope with adaptive measurements. How is it affected in the long-term?

International comparisons
This research is only focussed on the Dutch context, international comparison could offer valuable insights into how other countries manage adaptation in urban developments. In what countries these climate risks vary or where policies differ significantly.

09
Reflection

In the Final chapter, the reflection is done for the whole process.

9. Reflection

From the beginning of my masters, my interests have constantly been the real estate developer. How they have to deal with urban complexity, climate responsibility and their role in working together with private and public stakeholders. Stakeholder management in combination with the urgency of climate change, drove me to explore how developers operate within the urban area to implement climate-adaptive strategies.

The research question that I have answered: “how do real estate developers integrate climate-adaptive strategies into their urban development projects to ensure resilience against future risks?”. This question combined two themes: the increasing responsibility of developers in shaping climate adaptive cities and the system-based challenge of translating climate goals into a company's strategies. Climate change is not only a global problem but also a local one and developers, whether they like it or not, are central players in implementing it in projects.

Reflection on the research and design approach
The research approach for this project was based on a combination of theoretical and empirical methods. Creating a multi-leveled framework consisting of corporate, development and collaboration strategies. The basis was laid with an extensive literature review, which formed the conceptual framework and described the context surrounding this research. It also structured the scope of the project. This was followed by the case study analysis of the two urban area developments located in Schiedam (Galsfabriek) and Erasmusveld (The Hague). Through document analysis and semi-structured interviews. This all combined formed the final product of the thesis: A strategy framework for developers implementing climate change adaptation in urban area developments. This was tested through an expert panel. This approach proved to be largely working as intended. The layered strategy model has a high possibility of being an effective lens for analysing and improving both the internal and external dynamics of developers implementing CCA.

However, one challenge was at the beginning, I thought that I needed to use a mixed method research methodology which made it more difficult because I wanted to incorporate too much into the research. After a while it was decided to go forward with a qualitative methodology. Another difficult thing was deciding on the conceptual framework that was going to be used for carrying out this research. between the strategy approach by Daamen (2010) and Heurkens’ (2012) framework. Eventually I chose the latter, because I felt that it was more understandable in this context.

Reflection on the methods and their effectiveness
The qualitative research methodology was well-suited for this research. The use of semi-structured interviews proved to be effective to get the right information of the interviewees. The flexibility of this method allowed for a deeper understanding and helped to get the drivers and barriers that are often not seen in official documents. The case study analysis also worked effectively. It helped to see the contrast and comparison of the two developers with different organisational size, project context, and collaboration structures. While every project is different, it helped with generalising key insights.

What proved to be less effective was the initial timeline for the interviews and the data processing. Planning interviews with an already finished case proved to be difficult, because most people moved on from their previous jobs, or had busy schedules. On the other hand, the case that was still in process of development was easier to approach, if the personal

schedule of the interviewees didn't play a part. The time to process data, transcription and coding, took more time than expected. In hindsight, allocating more time for this process would have improved efficiency.

Reflection on Feedback and integration

The Feedback from my mentors during midterms and regular meeting moments were instrumental in shaping this research. Although, sometimes it was difficult to see and hear other opinions and implement the feedback. Some stubbornness and laziness to change the parts that were commented on, meant that the research took longer. In hindsight these were things that should have been taken more seriously.

This doesn't mean that I did not listen. The feedback did help me choose a framework, how to code the data and shape the strategy framework. The experts of the panel also helped with some layered feedback, coming from both public and private backgrounds. Urging the strategy framework to implement a feedback moment for projects in later stages after complement.

Reflection on learning process

My own personal schedule and reactiveness also played a part in this research. My board year in the first year caused the research to be almost on hold for a large part. Thereafter, starting it up again proved to be more difficult than anticipated. Eventually falling back on track again. My reactiveness also was a problem, not having a company helping me with the research made it more difficult to find cases and plan interviews. It took a while before contact was made for the cases and even after I wouldn't always be as proactive as I would like to be. Eventually everything fell into the right place. The expert panel was organised enough time before it had to be held, with exception of unplanned scheduling on the participants part.

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Appendix

Appendix 1: Interview protocol

Before interview

- ☐ Contact interviewee via email or phone
- ☐ send invitation via teams
- ☐ send consent form
- ☐ send interview questions
- ☐ turn on recording and teams recording and dictaphone on phone

During interview

- ☐ thanking for participation
- ☐ go through consent
- ☐ check for image and sound recording
- ☐ switch on teams recording and dictaphone on phone
- ☐ Brief introduction about the topic

After interview

- ☐ Thank again for participating in study
- ☐ ask if he/she has any questions
- ☐ share thesis if desired with interviewee

INTERVIEW 1: CORPORATE LEVEL

A. Focus and Purpose

- Understand how climate adaptation and sustainability fit into the broader **corporate strategy** and **organizational structure**.
- Identify how financial decisions regarding climate adaptation are made at a corporate level.
- Explore the legal frameworks or obligations the firm faces broadly (not just for one project).
- Examine how the company fosters relationships internally and externally to manage adaptation goals.

B. Relevant Documents to Request

1. **Annual Reports / Sustainability Reports**
   For insights into strategic priorities, sustainability commitments, and financial performance.
2. **Corporate Organizational Charts**
   To see reporting lines and departmental responsibilities (especially regarding sustainability or climate adaptation).
3. **Internal Policy Documents** (e.g., ESG or CSR policies)
   Shows formal commitments or standards the developer has set.

4. **Risk Management / Compliance Documents**
   Highlights how they anticipate and address climate change risks.
5. **Corporate Governance/Legal Frameworks**
   Board-level documents that outline fiduciary duties, compliance, or risk frameworks relevant to climate adaptation.

C. Interview Questions

Organizational

1. **Corporate Structure and Strategy**
   "How is your organization structured in relation to sustainability or climate adaptation? Where do these responsibilities reside?"
   "What motivated your organization to adopt climate adaptation as part of its broader strategy?"
2. **Roles and Responsibilities**
   "Which departments or roles are directly involved in decision-making on climate adaptation measures?"

Financial

3. **Budgeting and Investment Priorities**
   "How do you allocate budget for climate adaptation initiatives? Is there a specific fund or does it compete with other investments?"
   "How do you evaluate the financial return or risk mitigation benefits of adaptive measures at the corporate level?"
4. **Revenue and Risk Management**
   "Do you see climate adaptation as a potential source of competitive advantage or revenue? Or is it primarily a risk mitigation tool?"

Legal

5. **Regulatory Environment**
   "Which regulations or industry standards have the largest impact on your corporate strategies regarding adaptation?"
   "What are the most significant legal/compliance challenges you face in implementing sustainable or adaptive measures?"

Relational

6. **Stakeholder Engagement**
   "How do you engage with government bodies, financial institutions, or other partners at the corporate level to advance climate adaptation goals?"
   "Which external parties or networks (e.g., industry associations) are most influential in shaping your sustainability strategy?"

7. **Internal Collaboration**
   "How do different teams within the company collaborate on climate-related decisions, from research to execution?"

INTERVIEW 2: DEVELOPMENT / PROJECT LEVEL

A. Focus and Purpose

- Zoom in on **one specific project** or development the company is undertaking (or has completed).
- Understand the **organizational**, **financial**, **legal**, and **relational** elements tied directly to that project.
- Identify practical measures, costs, and governance structures involved in implementing climate adaptation at the project scale.

B. Relevant Documents to Request

1. **Project Feasibility Studies / Business Cases**
   Shows initial cost-benefit analyses, risk assessments, and project goals.
2. **Project Development Plans / Master Plans**
   Detailed plans indicating how climate adaptation is integrated (e.g., water management).
3. **Building Permits / Planning Applications**
   Offers insight into any regulatory mandates or special conditions for adaptive measures.
4. **Project Financial Projections and Budgets**
   Itemized budgets highlighting spending on adaptive solutions, if available.
5. **Contract Documents with Contractors / Consultants**
   Shows any specialized responsibilities or clauses tied to adaptation measures.

C. Potential Interview Questions

Organizational

1. **Project Team Structure**
   "Who is on the core project team, and how were they selected? Did you involve specific sustainability or adaptation specialists?"
2. **Decision-Making Processes**
   "How are decisions made regarding changes to design, materials, or systems for climate adaptation?"

Financial

3. **Project Financing**
   "How did you secure financing for this project? Were there incentives, grants, or subsidies for climate-adaptive features?"
4. **Cost-Benefit Analysis**
   "What cost implications did climate adaptation measures have on the project budget? Were these costs justified by anticipated benefits?"
5. **Risk Allocation**
   "Did climate adaptation factors influence how you distributed financial risks between partners, contractors, or insurers?"

Legal

6. **Permits and Regulations**
   "Did you face any specific permitting hurdles or legal obligations around resilience measures (e.g., flood defenses, green roofs)?"
7. **Contractual Obligations**
   "Were there any contractual terms specifically related to climate adaptation (e.g., performance metrics, penalties, or warranties)?"

Relational

8. **Collaboration with Local Authorities and Stakeholders**
   "How did you interact with municipalities or water boards to ensure compliance with local adaptation policies?"
9. **Community Engagement**
   "Were local residents, neighborhood groups, or NGOs involved in the project? Did their input affect adaptation decisions?"
10. **Partnerships and Supply Chain**
    "Did you form new partnerships to address adaptation requirements? How did those relationships operate day-to-day?"

INTERVIEW 3: COLLABORATION LEVEL

A. Focus and Purpose

- Assess how the developer collaborates with public, private, and civic actors to achieve climate adaptation goals.
- Clarify the organizational, financial, legal, and relational frameworks specifically for joint ventures, PPPs, or consortiums.
- Understand conflict resolution, power dynamics, and the synergy of different interests.

B. Relevant Documents to Request

1. Partnership Agreements (JV, PPP, or Consortium Contracts)
   Clarifies roles, financial obligations, and risk-sharing mechanisms.
2. Letters of Intent
   Details how the collaboration was initiated and structured.
3. Governance / Steering Committee Charters
   Outlines decision-making bodies, frequency of meetings, voting rights, etc.
4. Meeting Minutes or Stakeholder Workshops Summaries
   Offers insight into ongoing collaboration dynamics, challenges, and solutions.

C. Potential Interview Questions

Organizational

1. Collaboration Structures
   "What formal collaboration model did you adopt (PPP, joint venture, or other)? Why did you choose this model?"

2. Governance
   "How are governance responsibilities allocated among partners? Who has the final say in major strategic decisions?"

Financial

3. Funding and Risk-Sharing
   "How do the partners split financial investments and potential returns or losses? Are there contingency funds specifically for adaptive measures?"
4. Incentives
   "Do public entities or other partners offer financial incentives (e.g., subsidies, tax benefits) to encourage climate adaptation?"

Legal

5. Contracts and Dispute Resolution
   "Which legal clauses ensure that climate-related commitments are upheld by all parties? How are conflicts handled?"
6. Regulatory Alignments
   "How do you ensure compliance across different layers of regulation if multiple municipalities or agencies are involved?"

Relational

7. Trust and Communication
   "What mechanisms (regular meetings, digital platforms) are in place to ensure transparency and consistent communication among partners?"
8. Power Dynamics
   "Has there been any tension between partners regarding priorities, timelines, or financial contributions? How was it resolved?"
9. Long-Term Collaboration
   "Do you see this partnership continuing beyond the current project? Why or why not?"

Appendix 2: Consent form

Geachte heer/mevrouw,

U wordt uitgenodigd om deel te nemen aan een onderzoek genaamd implementing climate change adaptations by real estate developers using relational aspects in urban development projects. Dit onderzoek wordt uitgevoerd door Merijn Jansen van de TU Delft.

Het doel van dit onderzoek is het onderzoeken van de relationele aspecten van het ontwikkelen van vastgoed binnen de stedelijke omgeving en zal ongeveer 45-60 minuten in beslag nemen. De data zal gebruikt worden voor het onderbouwen van mijn afstudeeronderzoek. U wordt gevraagd om vragen te beantwoorden die gerelateerd zijn aan klimaatadaptatie binnen de gebouwde omgeving. Wat zijn problemen, uitdagingen en kansen die er zijn.

Zoals bij elke online activiteit is het risico van een data breuk aanwezig. Wij doen ons best om uw antwoorden vertrouwelijk te houden. We minimaliseren de risico's door de data anoniem te verzamelen, niet uw naam te gebruiken in het onderzoek (tenzij u daar geen problemen mee hebt). Er wordt geen persoonlijke data verzameld, alle data wordt veilig bewaard.

Uw deelname aan dit onderzoek is volledig vrijwillig, en u kunt zich elk moment terugtrekken zonder reden op te geven. U bent vrij om vragen niet te beantwoorden.

Wij beloven dat wij zorgvuldig met uw gegevens omgaan, en dat de gegevens op een beveiligde Europese server worden bewaard met een password voor extra beveiliging. Het document waarin wij bijhouden onder welke code uw gegevens worden verwerkt, zullen we ook met een extra password beveiligen en op een andere plek bewaren. Dit sleuteldocument zullen we 5 jaar na de laatste wetenschappelijke publicatie over dit onderzoek vernietigen.

Als u vragen heeft over dit onderzoek, kunt u contact met mij opnemen: Merijn Jansen
(

Als u mee wilt doen aan dit onderzoek, wilt u dan de bijgaande verklaring invullen en ondertekenen?

Met vriendelijke groet,

Merijn Jansen

	ja	*nee*
(1) Ik verklaar dat ik de informatiebrief d.d. 20 May 2025 heb gelezen of deze brief is aan mij voorgelezen. Ik heb deze informatie begrepen. Daarnaast heb ik de mogelijkheid gekregen om hier vragen over te stellen en deze vragen zijn naar tevredenheid beantwoord.	□	□
(2) Ik verklaar hierbij dat ik vrijwillig meedoe aan dit onderzoek. Ik begrijp dat ik mag weigeren om vragen te beantwoorden en dat ik mijn medewerking aan dit onderzoek op elk moment kan stoppen zonder opgave van reden. Ik begrijp dat het meedoen aan dit onderzoek betekent dat mijn antwoorden worden bewaard.	□	□
(3) Ik begrijp dat het geluidsmateriaal (of de bewerking daarvan) en de overige verzamelde gegevens uitsluitend voor analyse en wetenschappelijke presentatie en publicaties zal worden gebruikt.	□	□
(4) Ik begrijp dat de opgeslagen gegevens onder een code worden bewaard en anoniem worden verwerkt.	□	□
(5) ik geef hierbij apart toestemming dat de geanonimiseerde gegevens in de toekomst ook door andere onderzoekers mogen worden gebruikt.	□	□

Ik heb dit formulier gelezen of het formulier is mij voorgelezen en ik stem in met deelname aan het onderzoek.

Plaats: Datum:

_ (Volledige naam, in blokletters)

_ (Handtekening geïnterviewde)

'Wij hebben toelichting gegeven op het onderzoek. Wij verklaren ons bereid nog opkomende vragen over het onderzoek naar vermogen te beantwoorden.'

Naam onderzoeker(s)

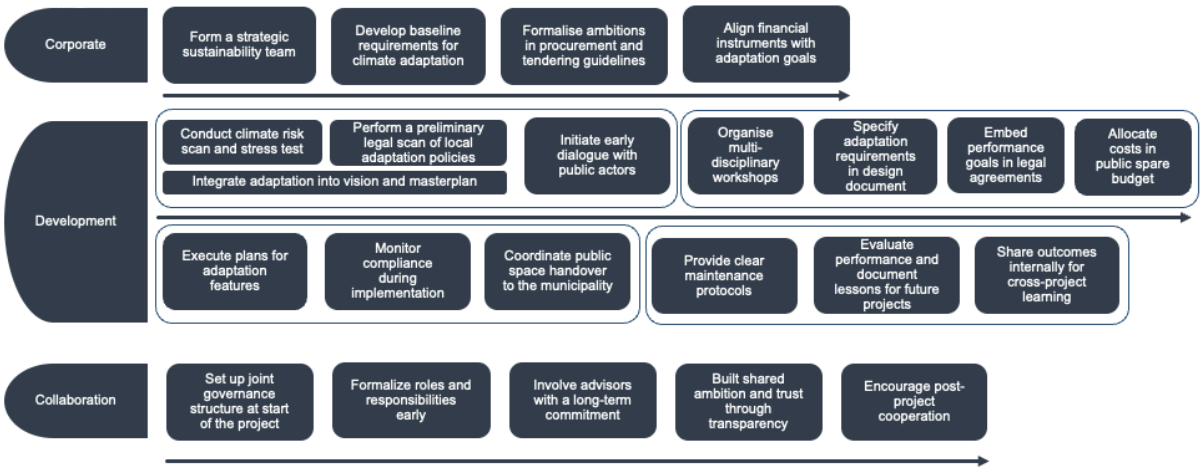
Merijn Jansen

Appendix 3: Barriers from literature

Appendix 4: Strategy framework

Strategy framework (own work)

Strategy framework timeline, on each of the three strategies (own work)



Corporate strategy (own work)

Corporate	**Long-term embedding of climate adaptation into the core business**
Org.	Create a climate adaptation team (or designate experts in-house); embed goals in the company's KPI system and strategic roadmap (e.g. in annual OGCM-type reports). Promote shared learning across projects.
Leg.	Anticipate regulatory shifts by standardising internal criteria based on national/international frameworks (e.g. NAS, EU taxonomy). Advocate for national uniformity.
Fin.	Link climate ambitions to ESG finance metrics. Develop internal financial thresholds for adaptation investments (e.g. min. % of public realm budget).
Rel.	Build and maintain a preferred partner network with aligned ambitions. Use early-stage alignment tools (e.g. sustainability charters). Foster internal collaboration across teams.

Development strategy (own work)

Development	**Concrete actions throughout the urban development process**

	Initiation	Design	Realisation	Post delivery
Org.	Perform climate stress test and baseline scan	Apply adaptive design principles and iterative loops	Align contractor specs with adaptation targets	Plan for monitoring and feedback collection
Leg.	Map local regulations and permit constraints	Integrate adaptation measures into permit design	Ensure delivery is legally compliant (e.g. LIOR)	Establish long-term VvE and public space agreements
Fin.	Draft financial scenarios with and without adaptation	Budget for green/blue infra in the public realm	Monitor cost deviations; validate added value	Include O&M adaptation costs in VvE fees
Rel.	Involve key stakeholders early (e.g. municipality, water board)	Co-design with experts, architects, and local community	Maintain joint steering groups, regular site reviews	Involve residents in feedback and stewardship mechanisms

Collaboration strategy (own work)

Collaboration	**Structures for working with others over time**
Org.	Set up joint boards or consortia where public/private actors co-decide on adaptation measures. Ensure continuity in roles beyond project life cycles.
Leg.	Use clear development agreements (e.g. anterior contracts) with performance clauses. Include maintenance and monitoring provisions.
Fin.	Align business case expectations with partners. Explore shared investment models (e.g. land value capture, public-private co-financing).
Rel.	Invest in trust and continuity by building long-term partnerships with advisors and local authorities. Create governance tools for conflict mediation and ambition setting.

Appendix 5: Expert interview protocol

Introductie

Goedemiddag, Hartelijk bedankt dat jullie mee willen werken aan dit expertpanel. Voordat ik verder ga, vraag ik jullie toestemming om deze meeting op te nemen. Mijn naam is Merijn Jansen en ik ben momenteel bezig met het afronden van mijn master management in the built environment aan de TU Delft.

Mijn onderzoek gaat over de implementatie van klimaatadaptatie door ontwikkelaars in gebiedsontwikkelingen. Het doel van mijn thesis is het ontwikkelen van een strategie/concept wat ervoor kan zorgen dat ontwikkelaars klimaatadaptatie actief gaan behandelen in ontwikkelingen.

Het panel zal niet meer dan een uur duren. Binnen deze tijd zal ik de experts een aantal statements voorleggen die zijn opgesteld aan de hand van de case studies en literatuuronderzoek.

Statements

Organisational

"Zonder interne expertise op het gebied van klimaatadaptatie lopen ontwikkelaars het risico om reactief te blijven in plaats van proactief te innoveren."

"Het opnemen van klimaatstresstesten als vast onderdeel van het ontwikkelproces kan risico's verminderen en kansen beter zichtbaar maken."

Legal / Regulatory

"De huidige 'wildgroei' aan gemeentelijke puntensystemen belemmert de schaalbare en efficiënte toepassing van klimaatadaptieve maatregelen."

"Gemeenten zouden bij elk project een klimaat- of duurzaamheidsadviseur moeten aanstellen om structurele doelen te waarborgen."

Financial / Economic

"Zonder koppeling tussen klimaatmaatregelen en directe financiële voordelen blijft adaptatie een extra kostenpost voor ontwikkelaars."

"Rentekortingen of lagere verzekeringspremies voor klimaatbestendige woningen zouden een katalysator kunnen zijn voor bredere toepassing."

Relational / Collaborative

"Vertrouwen tussen ontwikkelaars en publieke partijen is een voorwaarde voor gedeeld eigenaarschap over lange termijn klimaatdoelen."

“Het ontbreken van lange termijn coalities na oplevering ondermijnt het beheer en de werking van klimaatadaptieve ingrepen.”

Opportunities

In hoeverre zou klimaatadaptatie een standaard onderdeel moeten zijn van kwaliteitsborging (QA) of KPI-systemen binnen ontwikkelbedrijven?

Strategie model

Wat is uw eerste indruk van het strategiemodel?
Is het strategiemodel duidelijk te lezen?
Zou dit strategie model in de praktijk te gebruiken zijn? hoezo wel, of niet?

Afsluiting

Ik wil jullie hartelijk bedanken voor het deelnemen aan dit panel. Alle statements zijn behandeld en het strategiemodel is besproken. Alle antwoorden worden uiteraard geanonimiseerd, mochten er nog vragen zijn na afloop dan ben ik per mail beschikbaar om deze te beantwoorden. Ik zal mijn onderzoek na afloop met jullie delen, als dat gewenst is.

Appendix 6: Expert interview results

Expert panel person 1

Organisational

Stelling:

"Zonder interne expertise op het gebied van klimaatadaptatie lopen ontwikkelaars het risico om reactief te blijven in plaats van proactief te innoveren."

Antwoord: Eens

Toelichting: De expert benadrukt dat interne expertise cruciaal is om ambitieniveaus te formuleren en proactief te blijven. Bij developer 2 wordt actief vooruitgelopen op wetgeving, en worden er bovenwettelijke ambities opgesteld. Het ontwikkelen van instrumenten zoals de klimaatstresstest en interne begeleiding van collega's bevestigen dat deze expertise noodzakelijk is.

Stelling:

"Het opnemen van klimaatstresstesten als vast onderdeel van het ontwikkelproces kan risico's verminderen en kansen beter zichtbaar maken."

Antwoord: Eens

Toelichting: De stresstest wordt als waardevol instrument gezien om vroegtijdig ontwerpkeuzes te sturen. Hoewel deze nu vaak toetsend wordt gebruikt, is de wens om deze juist ontwerpend in te zetten aanwezig. De stresstest wordt gezien als een proces vergelijkbaar met de watertoets, en vormt de basis voor gesprekken met ontwerpers en gemeenten.

Legal / Regulatory

Stelling:

"De huidige 'wildgroei' aan gemeentelijke puntensystemen belemmert de schaalbare en efficiënte toepassing van klimaatadaptieve maatregelen."

Antwoord: Eens

Toelichting: De expert bekritiseert de versnipperde regelgeving op lokaal niveau. Puntensystemen verschillen sterk per gemeente, wat landelijke opschaling belemmert. De voorkeur gaat uit naar eenduidige landelijke normen zoals de landelijke maatlat. Lokale aanvullingen worden als inefficiënt en soms niet doelmatig beschouwd.

Stelling:

“Gemeenten zouden bij elk project een klimaat- of duurzaamheidsadviseur moeten aanstellen om structurele doelen te waarborgen.”

Antwoord: Eens, met kanttekeningen

Toelichting: Een intern adviseur bij gemeenten wordt als wenselijk gezien, mits deze pragmatisch is en rekening houdt met doelmatigheid. Externe adviseurs bij kleine gemeenten kunnen soms te strak vasthouden aan rigide eisen, zoals waterberging op perceelniveau, wat de samenwerking en effectiviteit ondermijnt.

Financial / Economic

Stelling:

“Zonder koppeling tussen klimaatmaatregelen en directe financiële voordelen blijft adaptatie een extra kostenpost voor ontwikkelaars.”

Antwoord: Eens

Toelichting: Klimaatadaptatie leidt zeker tot extra kosten, met name bij binnenstedelijke verdichting of eisen op privaat terrein. Hoewel openbaar gebied meer mogelijkheden biedt voor kostenefficiënte oplossingen, zijn er gevallen waarin technische maatregelen (zoals kratjes) duur en moeilijk te onderhouden zijn. Hierdoor ontstaat een spanningsveld tussen betaalbaarheid en ambitie.

Stelling:

“Rentekortingen of lagere verzekeringspremies voor klimaatbestendige woningen zouden een katalysator kunnen zijn voor bredere toepassing.”

Antwoord: Eens

Toelichting: De expert noemt dit een logische stimulans. Hoewel ontwikkelaar 2 nog geen verschillen in rentetarieven ervaart, zou dit in de toekomst een waardevolle prikkel kunnen zijn. Een maatschappelijk kader bij banken en verzekeraars wordt als essentieel gezien voor deze verandering.

Relational / Collaborative

Stelling:

“Vertrouwen tussen ontwikkelaars en publieke partijen is een voorwaarde voor gedeeld eigenaarschap over lange termijn klimaatdoelen.”

Antwoord: Eens

Toelichting: Vertrouwen is essentieel, vooral omdat gemeenten en ontwikkelaars vaak andere belangen hebben. Goede samenwerking, gebaseerd op wederzijds begrip en heldere

communicatie, maakt het mogelijk om keuzes in bijvoorbeeld het openbaar gebied gezamenlijk vorm te geven. In kleinere gemeenten ontbreekt dit vertrouwen soms nog.

Stelling:

"Het ontbreken van lange termijn coalities na oplevering ondermijnt het beheer en de werking van klimaatadaptieve ingrepen."

Antwoord: Eens

Toelichting: De overdracht aan gemeenten kan leiden tot verlies van kennis over de toegepaste maatregelen. Langetermijnbetrokkenheid van de ontwikkelaar of collectieve bewonersinitiatieven (zoals VvE's) zouden dit kunnen verbeteren, maar dit is zelden structureel geregeld. De expert ziet kansen in sociale duurzaamheid en eigenaarschap van bewoners, maar erkent ook dat dit niet voor elk project haalbaar is.

Opportunities

Vraag:

In hoeverre zou klimaatadaptatie een standaard onderdeel moeten zijn van kwaliteitsborging (QA) of KPI-systemen binnen ontwikkelbedrijven?

Antwoord:

Klimaatadaptatie zou volgens de expert een **integraal onderdeel moeten vormen van de bedrijfsstrategie** van ontwikkelbedrijven. Voor toekomstbestendige, duurzame leefomgevingen is een visie op klimaatadaptatie essentieel. De expert geeft aan dat eerder ontwikkelde wijken (toen klimaatadaptatie minder prominent was) nog redelijk goed presteren, maar dat met gerichte aandacht veel winst te behalen is.

Toelichting:

- Er wordt bij ontwikkelaar 2 gewerkt met ondergrenzen en ambities op het gebied van duurzaamheid en klimaatadaptatie.
- Deze ambities zijn vertaald naar programma's van eisen, zodat collega's duidelijk weten wat ontwikkelaar 2 verwacht en hoe dat zich verhoudt tot wetgeving.
- Er is tevens aandacht voor het ontwikkelen van tools en checklists die ervoor zorgen dat klimaatmaatregelen geborgd worden binnen verschillende fases van het ontwikkelproces.
- Klimaatadaptatie wordt in toenemende mate gekoppeld aan sociale duurzaamheid, gezondheid, en leefkwaliteit. Thema's die in de toekomst waarschijnlijk alleen maar belangrijker worden.
  Samenvatting:

Klimaatadaptatie moet een vast onderdeel zijn van KPI-systemen en kwaliteitsborging, en niet iets vrijblijvends. Het draagt bij aan bredere doelen zoals leefkwaliteit, biodiversiteit en gezondheid, en moet daarom structureel worden geïntegreerd in ontwikkelpraktijken.

Strategiemodel

Vraag:

Wat is uw eerste indruk van het strategiemodel?

Antwoord:

De expert vindt het model **compleet en helder**. Er wordt positief gereageerd op de opbouw en de cyclische structuur met continue evaluatie en feedback. De expert bevestigt dat dit aansluit bij hoe ontwikkelaars klimaatadaptatie in de praktijk proberen te implementeren, namelijk iteratief en in verschillende fasen.

Vraag:

Is het strategiemodel duidelijk te lezen?

Antwoord:

Ja, het model is duidelijk opgebouwd. Vooral de vier thema's (organisational, legal, financial, relational) worden herkend als relevante invalshoeken. De stapeling in fases van ontwikkeling en toepassing in de praktijk wordt logisch bevonden.

Toelichting:

- De fasering komt overeen met hoe ontwikkelaars in de praktijk te werk gaan: ophalen van opgaven, formuleren van uitgangspunten, uitvoeren van stresstesten, vertalen naar ontwerp, en afsluitend evalueren.
- De wens om bij te sturen op basis van prestatie en evaluatie wordt onderschreven.

Vraag:

Zou dit strategie model in de praktijk te gebruiken zijn? Hoezo wel, of niet?

Antwoord:

Ja, mits het goed wordt ingebed in bestaande werkprocessen en eigenaarschap wordt belegd. De expert geeft aan dat het model goed bruikbaar is, maar dat het succes staat of valt met toewijzing van verantwoordelijkheden en interne betrokkenheid.

Aandachtspunten:

- Niet alle collega's hebben dezelfde affiniteit met klimaatadaptatie; daarom zijn ambassadeurs binnen het bedrijf (zoals duurzaamheidsmanagers) nodig om de strategie levend te houden.
- Het model zou geholpen zijn met duidelijke programma's van eisen, KPI's en koppelingen met financierings- en ESG-doelstellingen.

- Externe communicatie (bijv. richting bewoners of gemeenten) is ook een belangrijk onderdeel van borging.

Samenvatting:

Het strategiemodel is **praktisch toepasbaar**, mits het gekoppeld wordt aan concrete processen, duidelijke eisen, en betrokkenheid van interne aanjagers. Het biedt structuur in een complex ontwikkeltraject en sluit aan bij de bredere duurzaamheidsambities van ontwikkelaars.

Expert 2

Organisational

Stelling 1

“Zonder interne expertise op het gebied van klimaatadaptatie lopen ontwikkelaars het risico om reactief te blijven in plaats van proactief te innoveren.”

Antwoord: Eens (met nuance)

Toelichting: De expert vindt een eigen “klimaat- en wateradviseur” in elk projectteam noodzakelijk om vroegtijdig ontwerp- en risico besluiten te nemen. Tegelijk erkent hij dat geen enkel bedrijf het kennisniveau van een waterschap kan evenaren; interne specialisten móeten daarom structureel samenwerken met externe partijen zoals Waternet.

Stelling 2

“Het opnemen van klimaatstresstesten als vast onderdeel van het ontwikkelproces kan risico’s verminderen en kansen beter zichtbaar maken.”

Antwoord: Eens – mits resultaten worden opgevolgd

Toelichting: Een stresstest is waardevol om ‘what-if-scenario’s’ te doorrekenen (bijv. trafo’s boven maaiveld, buffering onder gebouwen). Het instrument moet echter leiden tot concrete ontwerp- en beheer aanpassingen; zonder duidelijke opvolging blijft het papier.

Legal/Regulatory

Stelling 3

“De huidige ‘wildgroei’ aan gemeentelijke puntensystemen belemmert de schaalbare en efficiënte toepassing van klimaatadaptieve maatregelen.”

Antwoord: Neutraal

Toelichting: Hij erkent dat lokale regels soms verschillen, maar betoogt dat tegenstrijdigheden uiteindelijk bestuurlijk worden opgelost. Efficiëntie hangt volgens hem minder af van puntensystemen dan van goede coördinatie en besluitvorming.

Stelling 4

“Gemeenten zouden bij elk project een klimaat- of duurzaamheidsadviseur moeten aanstellen om structurele doelen te waarborgen.”

Antwoord: Eens

Toelichting: In Amsterdam is een integraal duurzaamheidsadviseur standaard lid van elk projectteam – gelijkwaardig aan verkeer of stedenbouw. Specialistische kennis blijft nodig, al kan de rol in de toekomst deels opgaan in regulier project- en ontwerptalent.

Financial/Economic

Stelling 5

“Zonder koppeling tussen klimaatmaatregelen en directe financiële voordelen blijft adaptatie een extra kostenpost voor ontwikkelaars.”

Antwoord: Oneens

Toelichting: Adaptatie is geen ‘extraatje’ maar een basis verantwoordelijkheid én risicoreductie. Investeringen renderen via hogere ESG-scores, langere levensduur en een lager risicoprofiel. Ontwerpkeuzes (zoals slim waterbeheer) hoeven bovendien niet duurder te zijn.

Stelling 6

“Rentekortingen of lagere verzekeringspremies voor klimaatbestendige woningen zouden een katalysator kunnen zijn voor bredere toepassing.”

Antwoord: Onbeslist

Toelichting: Financiële prikkels kunnen helpen, maar liggen bij banken en verzekeraars. Hij ziet de beweging richting ESG-financiering, maar noemt nog geen concrete praktijkvoorbeelden.

Relational/Collaborative

Stelling 7

“Vertrouwen tussen ontwikkelaars en publieke partijen is een voorwaarde voor gedeeld eigenaarschap over lange termijn klimaatdoelen.”

Antwoord: Eens (met nadruk op commitment)

Toelichting: Niet ‘vertrouwen op blauwe ogen’, maar expliciet commitment en transparante afspraken zijn cruciaal. Partijen moeten vroeg duidelijk zijn over hun mogelijkheden en beperkingen en samen verantwoordelijkheid nemen.

Stelling 8

“Het ontbreken van lange termijn coalities na oplevering ondermijnt het beheer en de werking van klimaatadaptieve ingrepen.”

Antwoord: Eens

Toelichting: Langdurig gedeeld beheer (bijvoorbeeld via corporaties, beleggers of actieve VvE’s) vergroot de kans dat water- en groen systemen blijven functioneren. De expert pleit voor schaal- en tijd bewuste afspraken (5-15-30-45 jaar) en voor blijvend eigenaarschap van ontwikkelaars in de nazorgfase.

Opportunities

Vraag

In hoeverre zou klimaatadaptatie een standaard onderdeel moeten zijn van kwaliteitsborging (QA) of KPI-systemen binnen ontwikkelbedrijven?

Antwoord:

Klimaatadaptatie moet integraal onderdeel worden van KPI’s en ESG-rapportages. Bedrijven die dit niet borgen, verliezen op termijn financiering en marktpositie. Adaptatie levert maatschappelijke waarde en risicobeperking op en hoort dus in de kernstrategie.

Toelichting:

- Adaptatiemaatregelen verlagen lange-termijn risico's en vergroten de levensduur van vastgoed.
- ESG-criteria van financiële instellingen dwingen ontwikkelaars om klimaatprestatie meetbaar te maken.
- Interne “ambassadeurs” zijn nodig om doelen levend te houden en te koppelen aan ontwerp- en beheerkeuzes.

Strategiemodel

Eerste indruk

Het model is compleet en begrijpelijk: de vier thema’s en de cyclische ‘implement & improve’-lus sluiten aan bij de praktijk.

Leesbaarheid

Opbouw is helder, maar hij adviseert expliciet ruimte te maken voor wetgeving, schaal (project, gebied, regio) en tijd horizons (5-15-30 jaar) in elke fase.

Praktische toepasbaarheid

Bruikbaar, mits verantwoordelijkheden en eigenaarschap per fase worden vastgelegd en het model wordt gekoppeld aan ESG-doelen, financiering en risicomanagement. Interne ambassadeurs moeten de voortgang bewaken; zonder duidelijke verankering verzandt het in goede bedoelingen.

Samenvatting

Expert 2 onderschrijft het belang van geïntegreerde klimaatadaptatie, maar benadrukt:

- Interne én externe expertise zijn nodig;
- Regelgeving is niet de hoofd belemmering, goede coördinatie wel;
  adaptatie is risicobeperking en waardecreatie, geen loutere kostenpost;
- Lange termijn commitment en gedeeld beheer bepalen het uiteindelijke succes;
  Strategiemodellen werken alleen met concrete KPI's, duidelijke verantwoordelijken en koppeling aan ESG-eisen.

Expert 3

Organisational

Stelling 1

"Grote ontwikkelaars en beleggers hebben een eigen ESG-/duurzaamheidsteam nodig om klimaatadaptatie structureel te verankeren."

Antwoord: Eens

Toelichting: De expert ziet dat grote partijen al interne strategieën vastleggen (bijv. Paris-Proof, CO_2-arm beton, houtbouw). Die interne expertise is nodig om vroeg in de SO-fase heldere uitgangspunten te formuleren en tijdens het ontwerp te bewaken – óók wanneer later concessies nodig blijken.

Stelling 2

"Vroege quick-scans (flora & fauna) en klimaatstresstesten horen standaard bij grote projecten."

Antwoord: Eens, maar projectafhankelijk

Toelichting: Bij grootschalige gebiedsontwikkeling worden stresstesten nu al in de SO-fase uitgevoerd om infiltratiesystemen, daktuinen en waterbuffering door te rekenen. Kleine, eenvoudiger projecten doen dit nog nauwelijks; daar ligt volgens de expert een verbeterpunt.

Legal/Regulatory

Stelling 3

“Versnipperde gemeentelijke eisen (60 l/m² hier, 70 l/m² daar) maken een uniforme klimaataanpak moeilijk.”

Antwoord: Eens

Toelichting: Grote steden kwantificeren waterberging streng, kleinere gemeenten lopen achter. Dat verschil schept onduidelijkheid en vertraagt projecten.

Stelling 4

“Gemeenten moeten hun klimaateisen afwegen tegen betaalbaarheid en sociale programma’s.”

Antwoord: Eens

Toelichting: Gemeenten stellen vaak én hoge klimaatnormen én omvangrijke programma-eisen (30 % sociaal, 40 % middensegment). Hierdoor raken business-cases klem en worden klimaatinvesteringen uitgesteld of versoberd.

Financial/Economic

Stelling 5

“Zonder aantoonbare financiële opbrengst blijft klimaatadaptatie een moeilijke extra post.”

Antwoord: Eens

Toelichting: Regenwateropvang, infiltratiekratten en extra groen verhogen de stichtingskosten, terwijl opbrengsten (met name bij verkoopprojecten) begrensd blijven. Beleggers met langetermijnrendement zijn bereid verder te gaan; ‘hit-and-run’ ontwikkelaars minder.

Relational/Collaborative

Stelling 6

“Langdurig eigenaarschap van beleggers vergroot de bereidheid om in klimaatadaptatie te investeren.”

Antwoord: Eens

Toelichting: Beleggers houden hun vastgoed 20+ jaar en hebben dus direct belang bij lagere operationele kosten, temperatuur comfort en robuuste watersystemen. Partijen die na oplevering verkopen missen die prikkel.

Stelling 7

“Goede coördinatie tussen gemeentelijke afdelingen is cruciaal; ‘ivoren torens’ vertragen projecten.”

Antwoord: Eens

Toelichting: Afdelingen stellen afzonderlijke eisen zonder integraal kosten-nut-beeld. Een hoger 'over-all' overlegniveau is nodig om realistische keuzes te maken.

Opportunities

Vraag

Hoe kan klimaatadaptatie verankerd worden in kwaliteitsborging?

Antwoord:

Integreer 'meten is weten'. Implementeren is niet genoeg; ontwikkelaars moeten sensoren, data-platforms en monitoring budget inbouwen om te zien of buffers, daktuinen en infiltratie echt werken. Zonder performance-data leer je niets en herhaal je mogelijk ineffectieve oplossingen.

Toelichting:

- Monitoring vergt extra investering (sensoren, apps) en meerdere jaren datacollectie.
- Resultaten moeten via feedbackloops terug naar de ontwerp- en onderhoudsteams.
- Gemeenten zouden monitoring kunnen eisen in anterieure overeenkomsten.

Strategiemodel

Eerste indruk

Het model dekt de relevante aspecten (organisational, legal, financial, relational) en de iteratieve cyclus is logisch.

Leesbaarheid

Duidelijk; de expert herkent de fasering (SO → VO → DO → Realisatie).

Adviezen / aandachtspunten

- Voeg expliciet "Performance & Monitoring" toe aan de cyclus om feedback te borgen.
- Maak tijdschalen concreet (5- / 15- / 30-jaar) om te bepalen wanneer herziening nodig is.
- Onderstreep dat meetgegevens een voorwaarde zijn voor 'Improve' in het centrum van het model.

Praktische toepasbaarheid

Goed bruikbaar, mits projecten budget reserveren voor monitoring en gemeenten realistische, integraal afgewogen eisen stellen.

Samenvatting

Expert 3 bevestigt de relevantie van het voorgestelde strategie concept, maar benadrukt twee hoofdpunten:

1. **Meten = Weten** – zonder sensoren en dataverzameling is de 'Improve'-fase van het model onuitvoerbaar.

2. **Realistische integrale eisen** – gemeenten moeten klimaat-, programma- en betaalbaarheid doelen afwegen; anders blijft adaptatie de sluitpost.

Langdurig eigenaarschap, interne ESG-teams en vroegtijdige stresstesten zijn volgens hem de sleutel om klimaatadaptatie daadwerkelijk, én betaalbaar, te realiseren.