Public Private Partnerships in area development: the challenge of sufficient housing construction and changing policy related to housing and climate adaptation.

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Abstract

This thesis addresses a pressing societal issue known as the housing crisis. Affordable housing is no longer accessible for everyone. Moreover, while various developers argue that regulations and shifting policies create uncertainty in their business models, climate adaptation guidelines are becoming increasingly influential in new developments. To what extent do these issues converge or conflict in striving to ensure both adequate housing and climate-adaptive development? This thesis employs semi-structured in-depth interviews with market participants and local governments to identify and better understand bottlenecks in the planning processes. The result is an expert-validated framework highlighting the structure and issues within these processes. Bottlenecks were identified both within and outside the framework. Addressing the challenges of climate-adaptive development and sufficient housing requires integrated collaboration between various stakeholders (market and government) in this complex sector. Aligning ambitions and objectives among parties with typically differing motivations are fundamental to successful collaborations in climate-adaptive housing development.

Key words: Public private partnerships, climate adaptation, planning, complexity, policy design, institutional design, area development.

"Master theses are preliminary materials to stimulate discussion and critical comment. The analysis and conclusions set forth are those of the author and do not indicate concurrence by the supervisor or research staff."

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Preface

Throughout this research, frequent news articles have emerged regarding climate adaptation, climate-adaptive development, and the housing crisis in the Netherlands. This underscores the societal relevance of these topics and demonstrates that they are evolving issues. As the problems continue to develop, so too do the solutions. While this research captures a snapshot of the situation, it is crucial to recognize that developments in the field have not ceased during the writing of this thesis. This study aims to highlight relevant points and discuss potential solutions.

However, this thesis cannot fully do justice to the knowledge and information shared by the respondents, all of whom have shown significant societal engagement and are actively working to address the issues discussed herein. They employ a wide array of concrete applications to tackle both the housing shortage and the challenges of climate-adaptive development.

The respondents' attitudes are very promising, indicating a vast reservoir of knowledge available to address these problems. Given the static nature of this research, it must be acknowledged that some suggestions or solutions may already be applicated in practice. The participants demonstrated proactive efforts in disseminating and implementing solutions.

I would like to express my gratitude to everyone who contributed to this research for their valuable insights, which have further sparked my interest in this field.

1. Introduction

1.1. Societal problem

The housing crisis in the Netherlands, marked by a shortage of 390,000 houses in 2023, creates various societal implications. (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2021). According to Myers, Bowman & Southwood (2021) housing shortages in western countries contribute to higher wealth inequalities, lower birth rates, lower workers productivity and climate change. There is a risk of further social issues arising due to phenomena caused by climate change. For instance, homeowners often do not recognize risks related to flooding and foundations (Valk, v.d. T., 2024 & Huisbeek, v.d., 2024). This dual problem, consisting of housing shortages and the realization of a climate-adaptive built environment, needs to be addressed through collaboration between the government and the market (Bregman, 2023; O'Brien, Lord & Dembski, 2020). The outlook for building sufficient houses is not promising due to the limited number of building permits issued and developments often facing resistance (Monster, 2024 & NOS, 2024). Next to that creating a flood-safe Netherlands is very costly (Du Saar, 2024).

Considering the construction sector has a significant share in global CO2 emissions, it contributes to climate issues due to the extensive use of fossil fuels (IEA, 2019). Climate impacts are getting a firmer grip on worldwide urbanized deltas (Laeni et al., 2021). Hence, a paradox unfolds in the construction sector: On one hand, they bear a significant responsibility for climate change; on the other hand, they also represent the solution for climate-adaptive development and the housing crisis.

As policy guidelines regarding climate adaptive development are developing and evolving, this poses additional challenges for the construction sector. Real estate development is generally a lengthy and costly endeavor. Doodeman (2024) states that real estate development is a sector that requires stability.

New legislation in the Netherlands concerning the private rental sector has already led to the stagnation of several projects in preparation. Further changes in laws and regulations could be counterproductive, especially considering the increased interest rates and construction costs in recent years (Monster, 2024). It is evident that climate-adaptive housing construction poses a challenge where both the market and the government play crucial roles. Therefore, this thesis investigates Public-Private Partnerships (PPPs) between developers and local governments and the practical interplay between them in facing the challenge of climate adaptive development.

1.2. State of knowledge

Gerrits, Rauws & de Roo (2012) argue that climate adaptation has become increasingly important in spatial planning. According to them, trends visible in climate-adaptive developments include: integration into other policy fields, decentralization, attempts at simplification, emphasis on green infrastructure, and a focus on enhanced collaboration and coordination. Khan & Roberts (2013) confirm this and indicate that climate-adaptive policies have also evolved internationally. Scott & Becken (2010) state that through the Paris Agreement, efforts have been made to establish an international framework for climate adaptation. As a result, international climate adaptive policies are increasingly integrating with development planning in poor countries (Khan & Roberts, 2013). They also argue that impoverished areas often cannot adequately respond to climate risks and that social, cultural, and political issues often underlie vulnerability to climate-related challenges. Teicher (2018) suggests that in the real estate sector, parties are increasingly taking proactive actions in various strategies related to flood risks.

Research by Laeni, van den Brink, Trell, and Arts (2021) regarding the transfer of the Dutch water management system to other countries highlights the importance of developing and implementing adaptation strategies. They argue that the Netherlands effectively exports their strategy, applying it to different regions. In doing so, the Netherlands presents itself as a global partner in water management. However, there are implications in transferring policy from one region to another. Berrang-Ford et al. (2014) state that institutional capacity and good governance are prerequisites for climate-adaptive development for instance. Additionally Ten Brinke, Kruijf, Volker & Prins (2022) published a study about the mainstreaming of climate adaptation into urban development projects. This provides insights from literature on mainstreaming, sustainable building drivers and policy instruments for climate adaptation. They argue that most of the area developments seldom include adaptation measures. This raises the question why the mainstreaming has not led to adaptation in practice. Additionally to the research of ten Brinke et al. (2022) this thesis tries to answer this by not only focusing on rules and regulations regarding climate adaptive housing development, but also on the cooperation among government and private parties in practice.

1.3. Research problem statement

The problem investigated in this thesis is primarily a societal issue. There is a visible paradox in the significant challenge of new construction in the Netherlands to create sufficient housing.

The construction sector is the designated sector to solve this problem but also one that significantly contributes to emissions leading to climate change. As a result of climate change, climate-adaptive construction is necessary, which is embedded in policies and guidelines set by governments. These relatively new guidelines or policies lead to restrictions or complications in planning processes. The collaboration between developers and governments is fundamental to area development. This issue leads to the research question:

How can the interplay between government and market parties stimulate a process that secures both climate adaptation and sufficient housing construction?

Qualitative research is the most suitable for this study, as it seeks information that is illustrative and aims to uncover deeper layers within the research area (Queirós, Faria and Almeida 2017). To gain insight into the collaboration between the market and government, semi-structured in-depth interviews are conducted with representatives from market parties and local governments. As there is little literature available on the interaction between climate adaptive development and challenges related to housing crises, an exploratory manner of research is needed. Studies in the same vein, such as those by Laeni et al. (2021) and ten Brinke et al. (2022), also opt for a qualitative approach because much remains to be discovered. While there are already studies conducting quantitative research on climate policy (Berrang-Ford, 2014), the literature suggests that we are currently in the midst of developing climate adaptation policies. To uncover the relationship between housing shortages and climate-adaptive development in planning processes, the chosen research method is suitable for developing a theoretical understanding of the challenges in area development resulting from climate adaptation policy.

To obtain this theoretical understanding, a framework concerning planning processes is created and validated with respondents from the real estate development sector. This allows for the identification of bottlenecks in such processes and the establishment of a relationship with climate adaptation. As a result, a clear theoretical overview emerges, which can assist policymakers and other stakeholders in understanding the relationship between climate adaptation and housing development. This, in turn, can facilitate better decision-making in the future.

2. Theoretical framework and Dutch policy context

In this chapter, a literature review is conducted to establish a connection between existing theory and the Dutch context. The topics covered include climate adaptation, policy and institutional

design, and PPPs. Various components are further connected within the Dutch context through boxes throughout the chapter.

2.1. Climate adaptation

The phenomenon of climate change calls for a rethinking of society concerning energy-intensive economic growth, the availability of sufficient quality food and water resources, the permanence of coastlines, the predictability of storms, the safety of communities, and other aspects that are currently taken as conventional (O'Brien et al., 2014). The necessity to be climate-adaptive lies in vulnerability to climate risks.

Box 1 Dutch climate vulnerability

After the North Sea flood disaster of 1953, the Dutch established a "Delta commission" and five years later they came with a plan that resulted in a "Delta law" (Erfgoedhuis Zuid-Holland, no date). This resulted in formal legislation related to the protection of the Netherlands against climate events. The Netherlands have a history of National Policy documents related to Water Management and climate adaptation (Kwadijk et al., 2010). The consequences of climate change are becoming increasingly visible (Olshansky, 2018). This reinforces interest in the Dutch approach.

Part of this vulnerability is caused by social, political and cultural roots (Khan & Roberts, 2013; O'Brien et al., 2014). Vulnerability to climate change is therefore influenced by factors as access to resources, income level, education, social capital and other local or national factors (Khan & Roberts, 2013). Development of a country and poverty reduction are important aspects in climate adaptation. These ideas are reinforced by the findings of a study by Berrang-Ford et al. (2014) in which they reviewed 117 countries regarding their climate adaptation policies. They found that in countries where governance is poor and climate vulnerability is high, adaptation planning and funding should focus on the development of good governance. Good governance is determined through the corruption perceptions index in the study of Berrang-Ford et al. (2014). The Netherlands is placed on the eighth position in the Corruption Perception Index in 2023, suggesting that the Netherlands provide a favorable environment for the development of climate adaptation policies (2023 Corruption Perception index). The Netherlands is also among the best countries in Europe regarding the quality of government, ranking fifth and scoring well above average (Charron, Lapuente & Bauhr, 2024).

The importance of climate adaptive construction for vulnerable areas (often a result of climate adaptive policy) is underscored by Mitchell & Tanner (2006). They state that climate adaptive construction is about risk reduction. Climate adaptive construction could help preventing problems related to: health, water and sanitation, agriculture and food security and natural disasters (Mitchell & Tanner, 2006).

Rañeses et al. (2021) mention the lack of clarity in roles in climate-adaptive housing development. Additionally, climate adaptation tends to occur only after climate events have happened, meaning that policies and measures are primarily reactive (Olshansky, 2018 & Agarwal et al., 2012). This aligns with the findings of Assche et al. (2012), who indicate that failures are necessary to reproduce an institutional design.

There are additional challenges to consider. Preston, Westaway & Yuen (2011) point out that adaptation plans are often underdeveloped. Weaknesses in climate adaptation planning include insufficient consideration of non-climatic factors and the neglect of adaptive capacity**.** This suggests a lack of integration and a gap between the implementation of climate adaptation measures and the formulation of climate adaptation policies. While Preston, Westaway, and Yuen (2011) state that non-climate-related factors are insufficiently considered, Van Buuren et al. (2014) indicate that challenges arise in linking climate adaptation with other policy areas. While such linking can help to acquire necessary resources, an integrated approach to addressing issues may also lead to unwanted resistance when non-climate-related values for a project conflict with climate adaptive objectives. Additionally, climate adaptation processes often take considerable time and can frequently encounter failures. While those responsible may view this as a learning process, the outside world perceives it as inefficiency, which can generate opposition. Complexity may lead to situations in which intervention in one aspect of climate adaptation can lead to positive outcomes on one hand, and negative outcomes on the other (Van Buuren et al., 2014).

They therefore advocate organizing it as a transparent and integrated process, what clearly links to the Dutch context discussed in box 2. Resistance and a critical attitude may lead to positive outcomes because, as O'Brien et al. (2014) pointed out, climate adaptation is a social process, and individuals, households, communities, and institutions are needed to collectively assess the driving forces behind climate risks and adapt the community accordingly.

Box 2: Dutch Delta Management

The Netherlands have strategically framed Dutch delta management as 'global water solutions' that consist of three major aspects: 'delta technology', 'delta governance' and 'Adaptive Delta Management' (Laeni, van den Brink, Trell & Arts, 2021). Especially the latter two are of interest for this research. Delta governance, meaning integrated thinking and collaborative governance, has been highlighted as important solution for coping with vulnerabilities in delta areas. It is related to multilevel governance, legal enforcement and financial resources for flood protection and adapting to long-term climate and water-related risks. The Adaptive Delta Management, is the approach that highlights scenario planning with environmental and socioeconomic considerations. An interesting outcome of the Adaptive Delta Management is the "Spatial decision-making framework for climate-adaptive built environment" discussed in box 3 (Ruimtelijk afwegingskader klimaatadaptieve gebouwde omgeving, 2024).

A strategy regarding climate-adaptive development is mentioned by Kwadijk et al. (2010). They mention the Adaptation Tipping Points (ATP) approach, which identifies limits that may be exceeded due to climate change. Focusing on ATPs helps decision-makers understand the urgency of effects and the need for adaptation strategies. However, it is conditional that there is good governance for institutional capacity, and thus successful climate adaptation strategies (Berrang-Ford et al., 2014). A Dutch example of the ATP approach is provided in Box 4.

To achieve good governance O'Brien et al. (2014) plead for a transformation of development itself to deal with climate change impacts. In the Netherlands, there is an ongoing development in which climate-adaptive development is approached in this manner, as explained in Box 3. O'Brien et al. (2014) suggest six recommendations to do so:

1. Prioritize building contextual knowledge among development actors;
2. Create spaces for engagement and negotiation between diverse interests and actors;
3. Empower the most vulnerable into planning and decision-making processes;
4. Extend the time frame for activities;
5. Include more social and process-oriented indicators in monitoring and evaluation;

6. Challenge assumptions and introduce learning and reflexivity into adaptation processes

Box 3: National Framework for green climate-adaptive built environment

Three Dutch ministries published the National Framework for a green climate-adaptive built environment in 2023 (Appendix 1). This framework provides guidelines for climate-adaptive construction, including performance requirements and objectives regarding biodiversity and nature inclusivity drought; subsidence; heat; consequence limitation of flooding and water-related nuisances. The aim is to prepare the Netherlands for the consequences of climate change, thereby providing guidance to governmental bodies, housing corporations, and construction companies (Landelijke maatlat, 2024).

According to O'Brien et al (2014), not only the consequences of climate change should be addressed, but societal context in which climate change occurs should be confronted.. Social, economic, and political relationships often underpin sources of climate vulnerabilities. The recommendations of O'Brien et al. (2014) are primarily procedural in nature, more practical applications of climate adaptation strategies are provided by Khan & Roberts (2013) and can be observed for Dutch context in box 4 and 5.

Table 1 Climate adaptation strategies based on Khan & Roberts (2013)

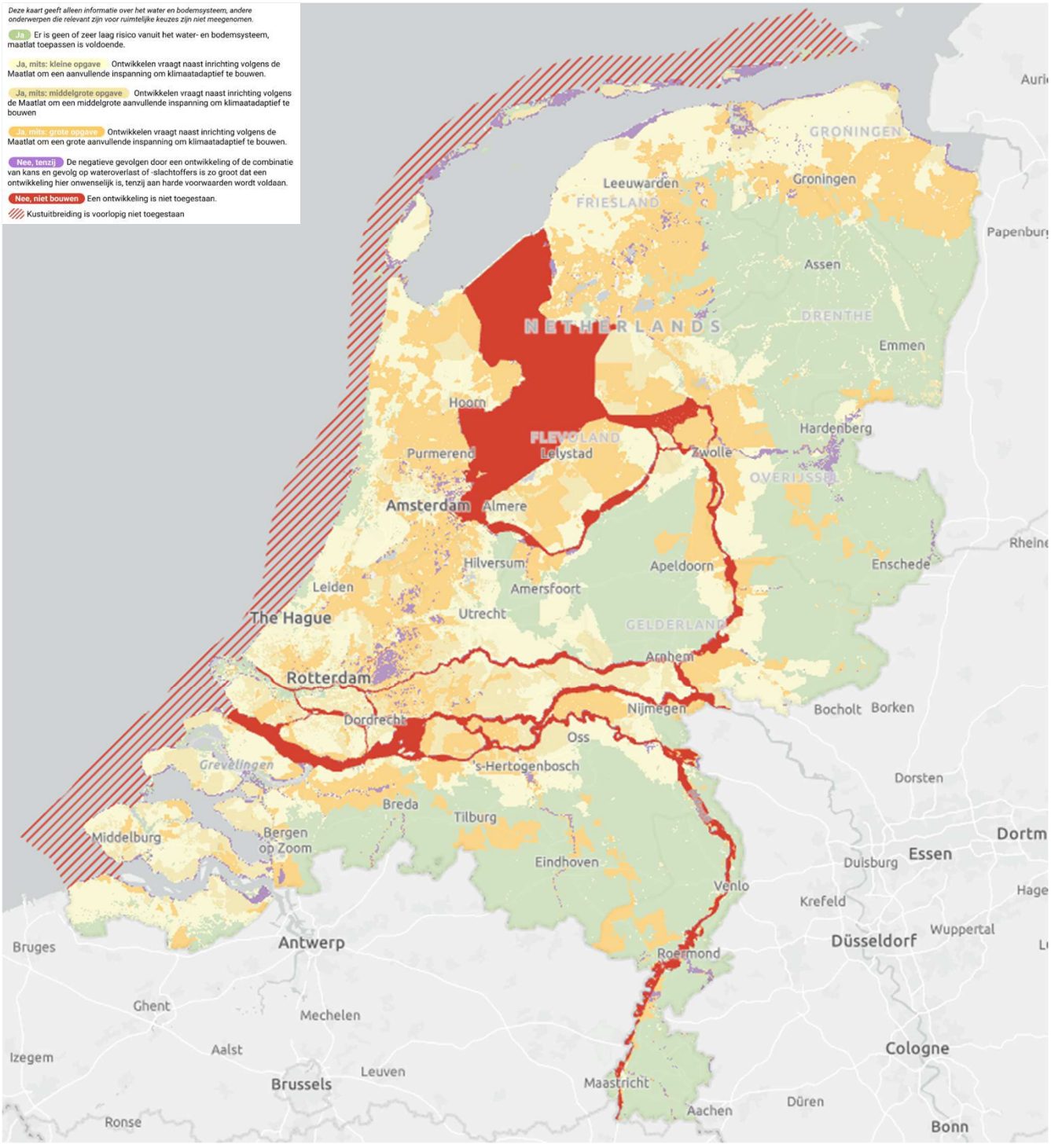
	Adaptation strategies	Description	Examples of Adaptive Actions
1	Preventing losses	Take action to reduce the exposure to climate impacts	Building sea barriers
2	Tolerating losses	Accept losses where it is not possible or cost-effective to avoid them	Accept reduced crop yields
3	Spreading or sharing losses	Distribute the burden of impacts over a larger region or population beyond those directly affected by the climate event	Insurance of assets
4	Changing use or activity	Switch of activity or resource use to one better suited to the changed climate	New business opportunities (tourism, agriculture, insurance)
5	Changing location	Migrate to an area which is more suitable under the changed climate	Assets moved away from areas at risk of flooding
6	Restoration	Restore assets to their original condition following damage or modification due to climate	Rebuilding or replacement of damaged assets

In this section, light has been shed on the theory concerning climate-adaptive development. Various examples from the Dutch context have been cited. According to Laeni et al. (2021), attempts are being made to apply the Dutch approach in the Mekong Delta in Vietnam. However, this is not always possible on a one-to-one basis due to economic and cultural differences that, given Vietnam's less advanced development, weigh more heavily than in the Netherlands. Additionally, in the Netherlands, there is an institutional organization that ensures the gathering and expansion of knowledge on this matter, unlike Vietnam. The principle of collaborative governance is strongly embedded in the Dutch institutional design but cannot be

universally adopted (Laeni et al., 2021). The next section further delves into policy and institutional design.

Box 4: spatial decision-making framework for climate-resilient built environment

This document assists municipalities, water boards, and provinces in choosing new development locations. Water safety, flooding, land subsidence, and the availability of drinking water are taken into account. The colors on the map represent guidelines on whether or not to build, along with advice on whether additional climate adaptation measures should be taken.



Box 5: The Climate-Adaptive Construction Guideline 2.0

This guideline developed by the Province of South Holland, Amsterdam Metropolitan Region, Province of Utrecht, and Province of Gelderland. It indicates that legal agreements regarding climate adaptation can be made in the land-purchase and construction contracts by the developer, builder, and buyer of the building (Leidraad Klimaatadaptief bouwen 2.0, 2022).

Subject	Description	Phase	Number in guideline
Area plan or advice for water, greenery and climate	Incorporating space requirements for water, greenery, and climate into alignment with the urban development plan, including costs and added value for area quality.	Feasibility: definition / vision and program	2.6
The Water Assessment	Water safety and compensation are part of the assessment by the Waterboard. The water section is part of the environmental plan, and the development design is evaluated accordingly.	Feasibility: design / Land exploitation	2.9
Performance testing	The layout plan and urban development plan can be analyzed through a climate stress test to optimize the design.	Feasibility: design / plan development	2.11
Environmental permit	This involves seeking permission for activities. A permit from the Water Board is required for adding paving and excavating water. This is the final stage for assessing whether the conditions for climate-adaptive construction have been met.	Feasibility: preparation / land exploitation	2.15

2.2. Policy and institutional design

Understanding institutional transformation is important as planning takes place in specific institutional contexts (Alexander, 2005). A great deal of planning involves institutional transformation. Amended legislation or regulations, policy implementation and reorganizing plans, addresses planners with a task of institutional design (Alexander, 2005). According to Savini et al. (2015), the challenge lies in the paradoxical nature of planning: a structural tension between organization and spontaneity. Planners are facing dilemmas in three dimensions of policy action; firstly they face an intervention dilemma whenever they need to choose when and where to intervene in areas. Secondly they face a regulation dilemma, as ground is needed for spontaneous development, while legal certainty is needed to avoid undesirable outputs and define desirable usages of land. Thirdly they face an investment dilemma as there is a tension between supply and demand led logics. It often takes a few years to get return on big investments. They conclude to say that spatial planning exists as a practice of organizing locational, legal and economic resources over space and time (Savini et al., 2015). Box 6 provides insights on the Dutch planning history, introducing its complexity.

Box 6 Dutch planning history

Dutch planning history can be divided into three periods: the welfare state, neoliberalism, and the present day, marked by the Omgevingswet. Historically, spatial planning in the Netherlands was highly managed with a major role for the public sector (Teijmant, 1988). Municipalities acted as developers, benefiting finances and development methods (Louw, 2008). Over time, the government's role became more facilitative, with decentralized implementation (Louw, 2003; Gerrits, Rauws & de Roo, 2012). Municipalities still establish zoning plans, providing legal certainty and thorough spatial planning (Savini et al., 2015; Djankov et al., 2003; Koomen et al., 2008). The shift from national to local government tasks was criticized (Gerrits et al., 2012). The Omgevingswet, integrated into Dutch law in 2024, aims to simplify planning and consolidate spatial planning laws (Bregman, Karens, Bonthuis-Broekman, 2023; Kenniscentrum Infomil, 2024).

Del Rio & Howlett (2013) further discuss the complexity of policy design in a reaction on the Tinbergen Rule. The Tinbergen Rule is a linear programming principle that a government should use multiple policy instruments if they want to impact multiple policy targets (Tinbergen, 1954). Del Rio & Howlett (2013) add complexity with their statement that issues regarding horizontal government layers can often be influenced by coordinating goals, instruments, or design elements implemented within a particular level of government, while conflicts in vertical policy are more difficult to resolve through coordination due to different goals applying to different levels of government.

Another manifestation of the complexity of planning processes is caused by financialization and globalization in the real estate sector (Byrne, 2020). In the past, this has attracted institutional investors, but recent changes in legislation regarding the rental sector are discouraging investors (Doodeman, 2024). Changes in policy thus lead to supply problems, but research by Schill (2005) and Green & Malpezzi (2003) indicates that this also affects rental prices. This is also seen in Dutch context, as explained in box 7.

Box 7 Dutch housing context

After the Global Financial Crisis (GFC) in 2008 neo-liberalisation got a firmer grip on the housing market. The crisis triggered financial problems for housing development projects which meant permanent cancellation or severe delay (Boelhouwer, 2017; Savini, 2017).

To address issues in the social rental sector where housing associations had an advantage over other developers, the Housing Act was introduced in 2015 (Priemus & Gruis, 2011; Van Gent & Hochstenbach, 2020). This law resulted in less new construction and a reduction in the housing stock due to new taxes and landlord levies. Over time, the social rental sector has primarily focused on the poorest in the Netherlands, excluding midde-income earners (Boelhouwer, 2020).

At the same time, policy reforms have also led to an increase in house prices. The exclusion of the middle class from both the purchase and social rental sectors has created more demand in the private rental sector (Hochstenbach, 2022). The current system in the Netherlands drives social inequality and spatial segregation (Hochstenbach & Ronald, 2020). A gap has emerged between insiders in the housing market and outsiders, leading to a divide between citizens and the government (Boelhouwer, 2020).

Additionally, it is important to mention that an institutional design is not only related to government institutions, but also to the real estate sector as a whole. Porter (2008) provides a model that helps analyzing an industry's underlying structure related to competition and profitability. Porter indicates that various factors can influence the profitability of a sector in the medium and long term. The underlying structure is determined by five competitive forces, which vary by sector. The following factors are determining for profitability and competition in a certain sector according to Porter (2008):

1. Threat of new entrants;
2. Bargaining power of buyers;
3. Threat of substitute products or services;
4. Bargaining power of suppliers;
5. Rivalry among existing competitors.

The theory of Porter (2008) is important to understand as area developments and the creation of housing stock are stagnating. To understand the shortage of developments, we must not only look at the market-government playing field but also at market-market. Several competitive elements from Porter's theory are undermined by the structure of the real estate sector. The construction sector is a complex sector due to its diversity of stakeholders and subsectors. Next to that, the real estate sector is one in which there is heterogeneity among assets, creating principal-agent problems (Liu, Nowak & Smith, 2020). There are difficulties in investing in real estate because of the lack of information or benchmarking, different measurement methods, revaluation frequencies, temporal lag bias and other missing information to create a complete overview (Geltner & Ling, 2006).

Assche et al. (2012) suggest that the Dutch planning system consists of various organizations that cause both successes and failures. Failures linked to events in the system are necessary to reproduce their own institutional design. Assuming that the ongoing housing crisis is a failure, based on Assche et al. (2012), this creates an opportunity to reproduce the institutional design. However, the findings of Schill (2005) and Green & Malpezzi (2003) actually point to higher costs due to policy changes in the housing market. Intervening in institutional design to ensure lower costs and increased housing supply, resulting in higher costs due to policy changes, fits perfectly within the paradoxical nature of the regulation dilemma as mentioned by Savini et al. (2015).

The next section elaborates further on the theory behind the playing field of market and government.

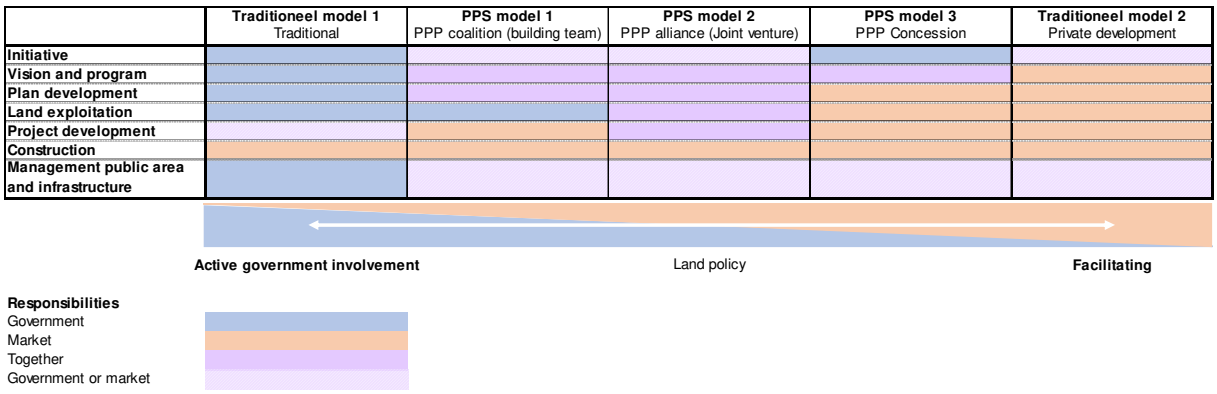
2.3. Private and public partnerships

Various studies on planning and PPPs point to complexity theory as a perspective on how reality unfolds (Verhees, 2013 & Leendertse, 2015). Complexity theory posits that systems cannot be managed by a single actor but that stakeholders are part of a system and that the system evolves (Leendertse, 2015). Area development is a process that cannot be managed by a single actor but is a system that evolves. Heurkens (2009) indicates that urban development in the Netherlands is increasingly characterized by development processes dominated by the private sector. An overview on the means of cooperation in Dutch context is given in box 8.

Box 8 public private partnerships in area development

There are roughly five land development models (Bregman, 2023). The choice of a model is particularly dependent on who owns the property in an area. Based on Bregman et al. (2023) and the Land policy model from Deloitte (2024), an adapted version of the model has been created, depicting the various collaboration models with process phases and responsible parties:

Table 2 Collaboration models in area development



This concerns the collaboration between the market and the government and who bears responsibility at each stage of the development process. Table 2 presents the collaboration models in area development. From left to right, the influence of the government in the collaboration decreases. Thus, the left side includes a model with significant government responsibility, where only construction is outsourced. On the right side, a model in which the market takes on virtually all tasks can be observed. The far-left and far-right variants are traditional models. Everything in between has arisen as models based on collaboration between the market and the government in PPPs.

Within any form of collaboration, it is ultimately the government's task to issue the building permit. However, if a developer designs a private development within the zoning plan and other applicable laws and regulations, the government generally cannot prevent its realization. If the lands are already in the hands of a developer, there is no longer competition in the development because the landowner essentially has a monopoly on the development. Thus, the competitive element, as mentioned in Porter (2008), essentially disappears. (replace you see by a passive: for instance: can be observed)

PPPs are identified as a solution to safeguard the public interest, due to suboptimalities arising from pure market mechanisms, network governance, or exclusive government steering (Sanders, 2014). Additionally, there is no pure market mechanism in area development due to missing information and heterogeneity within products. It is logical that large investments and projects are matters that need to be addressed through collaboration between the market and government. However, studies also point out the disadvantages of PPPs, as these collaborations are associated with over-reliance on private investments, making projects vulnerable to

financial risks and placing too much emphasis on creating economic opportunities rather than promoting social cohesion in disadvantaged areas (Leung & Hui, 2005).

As a solution Halbert, Henneberry & Mouzakis (2014) recommend that policymakers and urban planners may need to consider ways to encourage investment in non-core markets and promote more sustainable long-term investment strategies that could benefit both investors and local communities. The agreements that governments can make are closely related to ownership and plan capacity, as discussed in Box 9.

Box 9 Contractual agreements in PPPs.

When entering into a contractual partnership with market parties, municipalities can make private law agreements with these parties. This is the most commonly used approach in area development. In such cases, municipalities have more influence and can agree on additional matters, such as climate adaptation ambitions. Demanding additional conditions when the land is already fully owned by a developer is not feasible (Bregman et al., 2023). Negotiations can occur, and a clear vision from the municipality can be influential, but the negotiating position is very weak.

Van Der Krabben (2022) states that the initiation phases, in which negotiations are held, often seem to take a considerable amount of time. In particular, the zoning plan procedure appears to be time-consuming. Research by Geuting & De Leve (2018) reveals that this process takes an average of more than four years. Another notable finding from their research is that plan capacity does not level new construction. Possible explanations they mention include: locations not aligning with demand, bottlenecks in plans (soil contamination, objections, etc.), and strategic considerations.

Brinkerhoff & Brinkerhoff (2011) state that partnership between market and government has to be guided by good governance practices, this aligns with the conditions for climate-adaptive development as mentioned by Berrang-Ford et al. (2014). They state that good governance principle include inclusion, equity, transparency, accountability and ethical behaviors in partnerships between state and market. The functioning of PPPs is dependent on commitment and trust (Brinkerhoff & Brinkerhoff, 2011). They also state that those values are at risk in developing countries.

It appears that the functioning of PPPs and the success of climate-adaptive development require the same conditions of good governance, as studies by Brinkerhoff & Brinkerhoff (2011), Berrang-Ford et al. (2014), Khan & Roberts (2013), and O'Brien et al. (2014) demonstrate common values in this area.

In summary, PPPs are necessary to engage in area developments due to the scale and complexity of projects, as well as the capacity and resources of market parties or government individually. However, collaboration between government and market also entails risks if there is little trust or if the governance of PPPs is not well organized. Good governance is a prerequisite for the functioning of PPPs and the successful implementation of climate-adaptive policies. There is a soft side to good governance as well, as functioning depends on commitment and trust (Brinkerhoff & Brinkerhoff, 2021). Accountability is sometimes complicated by political cycles, as explained in Box 10.

Box 10 Political cycles in planning

A final noteworthy point to mention, in relation to the duration of planning processes, is the fact that municipal councils are re-elected every four years. Since a municipal council also has budgetary authority, it is the body that ultimately makes decisions about municipal developments. Consequently, important decisions are sometimes postponed until after elections, which can impact planning processes (Rosema & Boedeltje, 2011; Schaap et al., 2019).

2.4. A planning framework

From this chapter, it becomes clear that the Netherlands is an interesting study area due to effective organization within the government as well as between the market and government. The Dutch context provides favorable conditions for climate-adaptive development, and guidelines on these topics are currently under development. However, much of the theory discussed in this chapter revolves around policy development. An important question arising from this is how the planning context operates in practice in the Netherlands.

Through a planning framework with a more practical approach, this thesis aims to elucidate the functioning of the Dutch planning context. As a tool for this purpose, the framework in Table 3 has been developed. This framework was validated during interviews with respondents and later refined in 4.1. This framework can be considered an institutional design. As Assche et al. (2012) indicate, flaws in the system also provide opportunities to revise an institutional design. Therefore, the remainder of this thesis focuses on the operation of this system in practice. Thus, this framework serves as the starting point of the empirical part of this research, the methods of which are described in the following chapter.

Table 3 The planning process prior to interviews

Process	Initiative phase	Feasbility phase			Realisation phase	Exploitation phase
		Definition	Design	Preparation		
Duration	Project dependent	Project dependent	Project dependent	Project dependent	Project dependent	Project dependent
Goal	Where and how to build?	Cost measures for site preparation and residential readiness	Ensuring requirements in design	Plan evaluation and contract information	Construction and completion	Commissioning including public areas
Main process plan product	Urbanization strategy and land policy	Development strategy for the area: - Program - Functions - Spatial - Financial	Preliminary building design	Definitive building design	Realization buildings	Completion buildings
		Land- and real estate exploitation	Zoning plan or environmental plan for the area	Contract and preparation for site and residential readiness	Site preparation	Temporary management of public areas
		Environmental impact report	Public space design plan (preliminary and final)	Environmental permit	Residential readiness	Transfer of public area management
		Urban development plan		Purchase and construction contract		
		PPP: tender or development agreement				
Planning framework / assessment framework	Structural vision	Area vision		Environmental legislation Zoning plan or environmental plan Building regulations Visual quality plan		

Time

Responsibility government
Responsibility market
Responsibility of both

3. Methodology and data

This thesis aims to discover relationships and gather knowledge that has not yet been produced. The knowledge obtained from this research is not only scientifically relevant but also policy-relevant. According to Boeije (2009), a qualitative research method is known to be beneficial for the people being interviewed and also useful for the field in which they work. Additionally, qualitative research is known for generating more detailed and in depth information (Thonipara, Runst, Ochsner, Bizer, 2019). Qualitative methodologies intend to understand complex realities and the meaning of actions in a given context (Queirós, Faria and Almeida 2017). Qualitative methods consider that there are deeper relationships, processes and understandings of phenomena that cannot be reduced to the operationalization of variables. This is due to a great diversity of meanings, motives, values, beliefs, aspirations and attitudes as stated by Maxwell (2013). Because the research examines the relationship between market parties and governments, a quantitative method would be too abstract.

Maxwell (2013) describes various dimensions of qualitative research that are applicable in this thesis. The dimensions he mentions and that apply to this thesis include: a focus on understanding the context of the problem, a closer proximity of the researcher to the problem compared to quantitative research, a generally longer duration of the study, an internal point of view for the researcher, less structure in theory and hypotheses, more flexibility in analysis, and a more exploratory approach to analysis. The aforementioned dimensions have both advantages and disadvantages. By selecting certain research methods, efforts have been made to mitigate the disadvantages. To provide more structure to the thesis, a framework-based approach has been chosen to develop knowledge. This offers more guidance and allows reasoning from a planning perspective.

3.1. Developing a framework

The framework of the planning process, established through both market and academical literature, is used in the interviews as input and is validated during the interviews. According to Partelow (2023), a framework can function as a "knowledge bridge." Furthermore, Partelow identifies four mediating processes that emerge through the development of a framework:

Table 4 Mediating processes of framework development based on Partelow (2023).

	Mediating process	Purpose	Process and practice
1	Empirical generalization	Development	Empirical comparison, meta-analysis or review. Inferring observations as representative of broader phenomena

2	Theoretical fitting	Development	Explaining observations with existing theory or hypotheses.
3	Application	Use	Gathering diverse empirical observations. Taking what is known generally, as a guide for what is important to observe.
4	Hypothesizing	Use	Hypothesizing new relationships. Taking what is known generally, as a guide for suggesting new relationships to be tested.

All processes mentioned in Table 4 apply to the developed framework. The framework is used as guideline to structure data collection and to display bottlenecks in the planning process. Understanding the bottlenecks in the planning process is crucial for gaining an overview of where processes are stalling. Identified bottlenecks are displayed within the framework, allowing for a more targeted examination of the issues and potential solutions.

Savini et al. (2015) indicate that spatial planning consists of a constant tension between spontaneity and organization, therefore it is an dynamic playing field. Thus, capturing the planning process in a framework is a task primarily intended to approach the process systematically by identifying, describing, and interpreting the key patterns within and between cases within a specific field of work (Goldsmith, 2021).

3.2. Interviews

During the interviews, respondents are given the opportunity to contribute significantly and guide the discussion. Therefore, semi-structured interviews have been chosen, with themes and topics broadly underlying the interviews. The respondents represent a wide range of the working field, and what they say should be seen in their context, consistent with the findings of Queirós, Faria, and Almeida (2017). Additionally, this approach encourages respondents to share information they believe is relevant. The respondents are considered experts in this sector, so even divergent information can provide valuable insights for the research (Trochim, Donnelly, & Arora, 2016). All respondents have their own relation to area development. Their involvement is diverse in nature, providing a broad understanding of the field based on the interviews. For the selection of respondents from governmental bodies, it was important that they had knowledge of area development and/or policymaking regarding climate adaptation. Additionally, only local governments were interviewed where climate adaptation is a significant issue due to the location of the area below sea level or near a river. Consequently, all local governments are dealing with climate risks. The market parties are diverse, with all three developers focusing on different market segments, considering that the housing shortage is an issue affecting all parts of the housing market. The real estate consultant acts as a link between governments and market parties, with extensive theoretical knowledge of the sector. They were

interviewed anonymously and are thus presented below by their function[1] and anonymized name:

- Respondent 1 (R1): Conceptual developer in health care sector;
- Respondent 2 (R2): Developing contractor;
- Respondent 3 (R3): Urban real estate developer;
- Respondent 4 (R4): Municipality policy officer;
    - Municipality facing challenges in proximity to rivers.
- Respondent 5 (R5): Municipality planning economist;
    - Municipality facing challenges due to land subsidence and high groundwater level.
- Respondent 6 (R6): Real estate consultant;
- Respondent 7 (R7): Municipality planning economist and lawyer;
    - Municipality facing challenges due to land subsidence and high groundwater level.
- Respondent 8 (R8): Developer social housing association.

Despite the fact that conducting anonymous interviews with respondents offers less transparency, there are several reasons to ensure the anonymity of respondents (Ellersgaard, Ditlevsen & Larsen, 2022). Respondents may be reluctant in some cases because they fear misinterpretation when interviews are not anonymous. Additionally, respondents may speak more freely about certain topics in a field where it is likely that respondents might know each other (Ellersgaard et al., 2022).

A combination of deductive and inductive approaches is used to guide the themes emerging from the interviews. Some themes were already known from literature, while others are supplemented by new findings from the interviews (Biggs et al., 2021). The interview guide in the appendices should be considered as a starting point for the semi-structured conversations. Many of the topics mentioned in the interview guide served to gain a better understanding of the context. Additionally, the interview guide aimed to gather a wide range of information, from which a selection of useful data was made in the further empirical research. Therefore not all topics mentioned in the guide have been included in this thesis. The goal of the interviews was

1 A limitation of this study is that investors were not interviewed. While the collaboration between the market and the government is examined, investors play a significant role in area development that should be considered in further research.

to gather information about the respondents' relationship to area development and their experiences in that field. Attention was then given to the challenges respondents face in the planning process, linking these to climate adaptation. Ultimately, this led to insights into the relationship between climate adaptation and area development, the associated challenges, and respondents often proposed solutions to address these issues. The subject of the study is significantly influenced by societal matters and is closely connected to practical applications. Therefore, it could be relevant to actively involve the interviewees in the research and its results.

3.3. Data collection and processing

There are several notable choices made in the methodology that deserve explanation. The interviews were conducted in Dutch, as the native language of all respondents was Dutch. This approach allowed for a deeper exploration of the subject matter. This also applies to much of the consulted literature. Therefore, efforts were made to find a suitable translation, although it may convey a slightly different meaning in some cases. Microsoft Teams was used for transcription and recording. Four interviews were conducted online, and four were conducted in person. The transcription feature worked better for online interviews, so the accuracy of interpretation was carefully reviewed for the other interviews. The interviews were semi-structured, meaning that the discussed topics varied among respondents. Additionally, coding was performed using Atlas.ti, which guided the identification of themes used for interpreting the interviews to approach the results analytically.

The coding process commenced with open coding, facilitating the emergence of key themes that subsequently guided the analysis and interpretation of results. Open coding is applied in scientific research at the beginning of a qualitative data analysis. Later, this leads to the development of theories based on the codes (Khandkar, 2009). By starting with open coding, no elements are overlooked, which ultimately allows the researcher to create relevant codes for the study. Additionally, it ensures that the researcher maintains a broad perspective before becoming selective and focusing on a specific problem. This approach leads to the development of a rich theory that feels comprehensive and complete (Holton, 2007).

All respondents have given permission to ask additional questions if necessary. Given that there is sometimes a contradiction in thoughts between private and public, it could be interesting to share research findings with each other. However, this poses ethical challenges for the

researcher's influence and relation with and between respondents.[2] Thus, in addition to obtaining prior consent from respondents to record the interviews, it was indicated that the process would be conducted anonymously. Relevant findings that emerge and are of interest to other respondents, are only shared if the respondent agrees to share information with the interested party.

2 The researcher in this study maintains close proximity to the respondents, resembling engaged research as described by Van de Ven (2007). The research method is practice-oriented, aligned with practical applications, and conducted interactively with practitioners. If time had permitted, even further interaction with respondents would have been valuable to gain a deeper understanding of the bottlenecks in the planning process. Flyvbjerg (2001) further elaborates on Van de Ven's idea, asserting that social researchers should focus on practice within a social system. They should aim to gather perspectives through interaction and dialogue with stakeholders and other interested parties (Flyvbjerg, 2001). In reality, this research did not delve as deeply into the subject matter, but the influence of the researcher remains a point of attention. Additionally, Boeije (2009) identifies other limitations that could apply to this study, such as limited generalizability, challenging quantifiability, and restricted capacity for a longer research scope. The interpretation of data is subjective, as is the selection of which parts of the data to use. Generalizability may be limited since the responses and respondents are influenced by the context in which they work (Boeije, 2009).

4. Results

In this chapter, the results from the interviews with the respondents are discussed. The chapter is structured as follows: the first section focuses on adjusting the framework based on the respondents' suggestions and interpretations of the collected data. In an attempt to capture the planning process in a framework, Table 5 The planning process been developed. This visualization was validated by the interviewees and altered after suggestions and discussions.

The second section addresses the current collaboration between parties and how this is perceived. Initially, the focus was on the collaboration between the market and government, but during the interviews, it became apparent that the interaction between different layers of government is not always straightforward and therefore warrants further analysis.

The third section involves the analysis of identified bottlenecks in planning processes. These bottlenecks are categorized thematically and provided with explanations. In the same section, bottlenecks are mapped onto the planning framework to identify where in the planning process the issues occur. A distinction is made between bottlenecks related to climate adaptation and other issues.

The chapter concludes with improvement proposals for the planning process to suggest how, according to respondents, both climate-adaptive development and sufficient housing development might be stimulated. In doing so, strategies to overcome bottlenecks concerning climate adaptation are discussed, as well as tackling other bottlenecks. This ultimately leads to answering the main research question.

Table 5 The planning process

Process	Initiative phase	Feasbility phase			Realisation phase	Exploitation phase
		Definition	Design	Preparation		
Duration	Project dependent	Project dependent	Project dependent	Project dependent	Project dependent	Project dependent
Goal	Where and how to build?	Cost measures for site preparation and residential readiness	Ensuring requirements in design	Plan evaluation and contract information	Construction and completion	Commissioning including public areas
Main process plan product	Urbanization strategy and land policy	Development strategy for the area: - Program - Functions - Spatial - Financial	Preliminary building design	Definitive building design	Realization buildings	Completion buildings
		Land- and real estate exploitation	Zoning plan or environmental plan for the area	Contract and preparation for site and residential readiness	Site preparation	Temporary management of public areas
		Environmental impact report	Public space design plan (preliminary and final)	Environmental permit	Residential readiness	Transfer of public area management
		Urban development plan		Purchase and construction contract		
		PPP: tender or development agreement				
Planning framework / assessment framework	Structural vision	Area vision		Environmental legislation Zoning plan or environmental plan Building regulations Visual quality plan		

Responsibility government
Responsibility market
Responsibility of both

Time

4.1. Modifications to the planning framework

The framework in Table 5 The planning processwas shared with respondents prior to the interview. They were asked to provide suggestions to improve the framework or to indicate if components were incorrect. The process steps were recognizable to all respondents, but it was noted that the proposed responsibilities depend on the specific project. R3 mentioned that projects at their organization start based on their own initiative or plan, a competition organized by a government entity, or an existing zoning plan. R6 confirmed this and suggested that it would be beneficial to include the collaboration models mentioned in Table 2. This also included adding another category of responsibilities: government or market. This significant change has resulted in a framework where collaboration models and the planning process are depicted in a single figure.

Respondents indicated that providing accurate timelines for developments is challenging. R3 mentioned purchasing land in 2008 and only now, 16 years later, delivering 130 homes. Similarly, R2 purchased an area in 2009 and is currently developing it. R7 noted that land purchases are recorded in the cadastre from before the euro. R6 highlighted that appeals to the Council of State and the handling of zoning procedures can take up to two years. When a zoning plan is established, the process may accelerate; once the municipality cooperated, it took 5-6 years to complete the development. Given the wide variation in timelines per project, it was decided to remove this part from the framework.

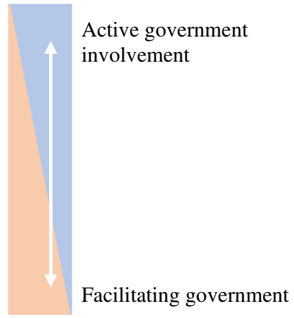
As indicated by R7, some land purchases are recorded from before the euro era, suggesting there is essentially a phase before the initiation phase. Since land ownership is a guiding factor in the collaboration model and subsequent development agreements, an extra phase has been added before the initiation phase. This phase is called the speculative phase.

Since the plan production main process primarily indicated which products were delivered by the government, and this did not emerge as specifically interesting information from the interviews, it was decided to replace it with contracts. This provides an overview of the key contracts concluded. Additionally, the formal climate-adaptive methods mentioned in Table 6 have been incorporated into the framework.

In table 6 the changes compared to the initial framework are highlighted in red. Overall, the entire section on land exploitation models has been added, a speculation phase has been introduced to the initiation phase, and formal adaptation methods have been incorporated into the framework. A final change is that the category 'main process plan product' has been changed to 'contracts'. Lastly in order to explain responsibilities, the category ‘Government or market’ is included.

Table 6 Adjusted planning process

		Initiative		Feasibility			Realization		
		Speculation	Initiative	Vision and program	Plan development	Land exploitation	Project development	Construction	Management public area and infrastructure
Land exploitation models	Traditional								
	PPP coalition (building team)								
	PPP alliance (joint-venture)								
	PPP Concession								
	Private development								
Planning process	Goal	Acquiring land positions	Determine how and where to build.	Determining the costs for land preparation and habitation Establishing objectives, requirements and selection criteria	Ensuring requirements in design and creating a feasible plan.	Plan evaluation and contract information.	Site preparation and construction preparation	Construction and completion	Commissioning including public areas
	Assessment framework		Structural vision	Area vision		Environmental legislation Zoning plan or environmental plan Building regulations Visual quality plan			
	Contracts			PPP: tender or development agreement		Purchase and construction contract & environmental permit			Exploitation contracts
	Formal climate adaptation method			Area plan or advice for water, greenery and climate	Performance testing	The Water Assessment & Environmental permit			



Responsibilities
Government
Market
Together
Government or market

Time

4.2. Interplay between government and market

As highlighted in the literature, good governance is a prerequisite for the successful operation of PPPs and climate-adaptive development. Berrang-Ford et al. (2014) relate this to the Corruption Perception Index (2023), where the Netherlands performs relatively well, ranking eighth. Brinkerhoff & Brinkerhoff (2011) emphasize inclusivity, equality, transparency, accountability, and ethical behavior, noting that commitment and trust are crucial for the functioning of PPPs.

Regarding cooperation between the government and market parties, it can be observed that there is generally a positive perception of policies. Stakeholders understand the existence of policies and their role in providing guidelines for development. However, there are also regulations imposed at the national level that have adversely affected area development, as noted by both market parties and local governments, particularly concerning rental regulations.

In some cases, local governments translate national guidelines to their own context and consult with regional market parties before implementation, aiming to avoid overburdening the market. Notably, policymakers (R4) are cautious about this, whereas R5 and R7, more involved in development planning, are more critical of policies set by the national government. Their daily work involves negotiations with market parties where commercial interests are weighed, resulting in a less "friendly" attitude. This perspective aligns with the role distribution described by R5:

"The market has the technical knowledge and necessity to develop, concepts should come from there as they have done it more often. The municipality is the client, they know what is needed in society and they know the city, so pressure should come from that direction."

This is also echoed by constructing developer R2, differing from other developers who are more engaged in vision development. Developer R1 and developer R3 express a preference for collaboration with governments in land and building exploitation, which has yielded positive results. Developer R8 also mentions the importance of an involved government, facilitating joint problem-solving.

Both market parties and governments express a sense of insufficient knowledge within the other organization, which is observed through unrealistic requests from municipalities and innovative solutions not adopted by market parties.

Finally, a form of "us versus them" mentality is evident from the interviews. Nevertheless, parties acknowledge the benefits of challenging each other and recognize a shared goal. While improvements are possible, generally, cooperation is perceived positively, albeit influenced by context and individuals. The findings demonstrate that there is no reason to doubt whether the collaboration between parties meets the criteria as outlined by Brinkerhoff & Brinkerhoff (2011), although in some cases, a critical attitude toward trust in the central government can be observed from both the market and local authorities. There is consensus that parties ultimately aim for the same goal, with further details on potential improvements outlined in Table 8 provides an explanation of the bottlenecks outlined in the framework. The colors in the table correspond to the colors of the bottlenecks in the planning overview:

Table 8 Bottlenecks from table 7 explained

Nr	Bottleneck	Respondents	Category
1	Programs and area visions are imposed by either the municipality or developer without user support, leading to resistance.	R1, R2, R7	Policy and regulations
2	The permit application is assessed solely by the municipality without collaboration, resulting in rejection due to non-compliance, often stemming from limited interaction between the market and government.	R1, R2, R3, R8	Planning and execution
3	There are various stages for objections to plans, such as appealing against a zoning plan, which can sometimes take up to two years.	R1, R2, R3, R5, R6	Policy and regulations and social aspects
4	Some market participants advocate for governmental norms to be established, but excessive regulation through for instance a structural vision could lead to stagnation.	R1, R2, R4, R5, R7, R8	Policy and regulations
5	Difficulty in finding contractors leads to failure in signing construction contracts. This is often related to economic cycles.	R3, R5, R7, R8	Organizational aspects and finance & economic factors
6	Execution errors occur because each execution phase reinvents the wheel. This could be related to construction itself and processes like planning and tendering.	R5, R8	Planning and execution

7	Differences in collaboration partners' visions.	R1, R2, R3, R5, R7, R8	Organizational aspects
8	Lack of clear guidelines and frameworks from the municipality.	R2	Policy and regulations
9	Last-minute adjustments before permit issuance due to insufficient collaboration in earlier stages result in suboptimal plans.	R1, R2, R3, R5, R7, R8	Organizational aspects and planning and execution
10	Delays sometimes occur during the signing of a collaboration agreement, prolonging the process.	R6	Planning and execution
11	Land positions were acquired long ago, leading to clashes between municipal ambitions and landowners' objectives, potentially delaying land development.	R2, R3, R7	Finance and economic factors
12	Contractors find building for housing associations unprofitable due to low margins.	R5, R8	Finance and economic factors
13	Design elements requiring costly maintenance and management contribute to higher expenses, particularly in light of climate adaptive features, which typically complicate and increase the cost of managing public spaces.	R1, R3, R5, R7, R8	Sustainability and climate adaptation and organizational aspects
14	A province halts the construction of a new residential area due to concerns regarding the area's suitability and its climate-adaptive resilience. This relates to the vertical government layer challenges stated by Del Rio & Howlett (2013)	R3, R6, R8	Sustainability and climate adaptation and policy and regulations
15	Designing a climate-adaptive area requires expertise and consideration of factors such as heat stress, building shading, and orientation. Inadequate planning may necessitate revisions later on.	R1, R3, R4, R5, R7, R8	Sustainability and climate adaptation and organizational aspects
16	Climate adaptation should be considered in urban planning, but sometimes lacks specialized knowledge, causing issues in later stages.	All	Sustainability and climate adaptation and policy and regulations
17	Municipal land sales fail to account for price fluctuations caused by climate adaptive requirements, the energy transition, and additional costs for site preparation. While municipalities seek	R1, R2, R3, R5, R8	Sustainability and climate adaptation, organizational

	to shift tasks to the market, they maintain consistent land prices.		aspects and finance and economic factors

The provided list demonstrates that despite stakeholders' positive attitudes towards collaboration between the market and government, a multitude of bottlenecks exists within a planning process. This extends beyond what is outlined in the framework and is also related to the themes discussed earlier in this section. It is often the case that bottlenecks exist in a planning process due to external circumstances. However, there is also a significant number of bottlenecks that are internal to the planning process and can be resolved therein. The following section will discuss the measures that can be taken to streamline collaborations between the market and government, thus alleviating bottlenecks.

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4.3. Bottlenecks and inefficiencies

This section discusses the bottlenecks identified in the planning process during the interviews. The bottlenecks can be broadly categorized into those internal to the planning system and those that are external. These bottlenecks are further classified by theme. Additionally, the internal bottlenecks are represented in the framework. In this framework, the blue points indicate bottlenecks related to climate adaptation, while the red points represent "regular" bottlenecks.

Based on the interviews, a list of 102 bottlenecks has emerged. These are divided into seven categories, which are discussed in this section with subcategories or an additional description.

Policy and regulations

- Changes in policy and regulations: for example, changes in rental legislation leading to investor withdrawal ultimately leading to less developments.
- Government policy and ambitions: local government ambitions regarding the use of certain materials are not feasible. This may lead to less competitors or failed business cases.
- Legal aspects and permits: municipalities only serve an assessing function and do not collaborate, leading to lengthy objection procedures. Essentially, any time a contract is signed or a permit is required, a potential bottleneck in the process arises.
- Political administrative periods, can sometimes lead to postponed decisions from local governments, causing delays.

Finance and economic factors

- Financing and investment capacity: the withdrawal of investors leads to an infeasible scenario. Often several stakeholders bring resources for area development and when one of them is withdrawing, the whole development is affected. Investors are often driven by financial considerations and base their decisions on revenue (Byrne, 2020). This causes them to withdraw earlier than stakeholders with regional or local involvement.
- Construction costs and land prices. Developers indicate that financial feasibility is jeopardized due to increased tasks in area development but no additional compensation from governments.
- Rising interest rates and other economic conditions, for instance higher construction costs.

Organizational aspects

- Staff turnover and continuity: Occasionally, knowledge may be lost throughout the duration of a project due the turnover of personnel involved, this could lead to reconsiderations in informal agreements made in the past.

- Capacity and knowledge: Both the market and the government acknowledge that there is sometimes a shortage on the other party's side.
- Collaboration and coordination: not all stakeholders are involved and often parties have different ambitions or visions. This could lead to objections and, consequently, delays in procedures.
- Ownership poses challenges according to respondents. When developers own lands, they can wait for the right moment to develop and are not challenged by competition, as mentioned by Porter (2008). Acquiring lands in the past results in relatively little competition during development.

Planning and execution

- Implementation capability and processes: impractical designs to maintain are designed. This may lead to reconsideration of the design and is related to organizational aspects, as there appears to be a lack of coordination between different departments within governments.
- Bureaucracy and administrative burdens: Overregulation by governments, solely conducting assessments without offering guidance for improvements. Accountability as noted by Brinkerhoff & Brinkerhoff (2011) as aspect of good governance is thereby neglected.
- Design and management aspects: Certain design elements are prohibited from being implemented in public spaces due to safety concerns. Additionally, plans are often narrowly focused on individual plots, whereas certain issues cannot be adequately addressed solely within those boundaries.

External factors

- Unforeseen circumstances like the war in Ukraine or the COVID crisis can lead to changing prices and therefore stagnation or delays in developments.

Sustainability and climate adaptation

- Climate adaptation and sustainability measures. Although sustainability and climate adaptation are mentioned as bottlenecks, they are often related to their financial implications. Additionally, the presence of a certain protected species can sometimes lead to delays in the planning process.
- A lack of knowledge regarding climate adaptation sometimes leads to unrealistic objectives. This aligns with one of the prerequisites identified by O'Brien et al. (2014) for building contextual knowledge in climate-adaptive development.

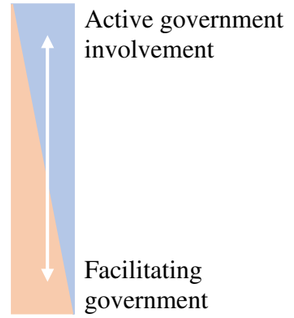
Social aspects

- Community involvement and support. This theme relates to organizational aspects and stakeholder involvement but is more focused on society than internal organization.

The specific bottlenecks identified in the planning process are detailed in Table 7 Adjusted planning process including bottlenecksTable 8 Bottlenecks from table 7 explained these bottlenecks are explained with references to one of the aforementioned categories.

Table 7 Adjusted planning process including bottlenecks

		Initiative		Feasibility			Realization		
		Speculation	**Initiative**	**Vision and program**	**Plan development**	**Land exploitation**	**Project development**	**Construction**	**Management public area and infrastructure**
Land exploitation models	**Traditional**								
	PPP coalition (building team)								
	PPP alliance (joint-venture)								
	PPP Concession								
	Private development								
Planning process	**Goal**	Acquiring land positions	Determine how and where to build.	Determining the costs for land preparation and habitation Establishing objectives, requirements and selection criteria	Ensuring requirements in design and creating a feasible plan.	Plan evaluation and contract information.	Site preparation and construction preparation	Construction and completion	Commissioning including public areas
	Assessment framework		Structural vision	Area vision	Zoning plan	Environmental legislation Zoning plan or environmental plan Building regulations Visual quality plan			
	Contracts			PPP: tender or development agreement		Purchase and construction contract & environmental permit			Exploitation contracts
	Formal climate adaptation method			Area plan or advice for water, greenery and climate	Performance testing	The Water Assessment & Environmental permit			



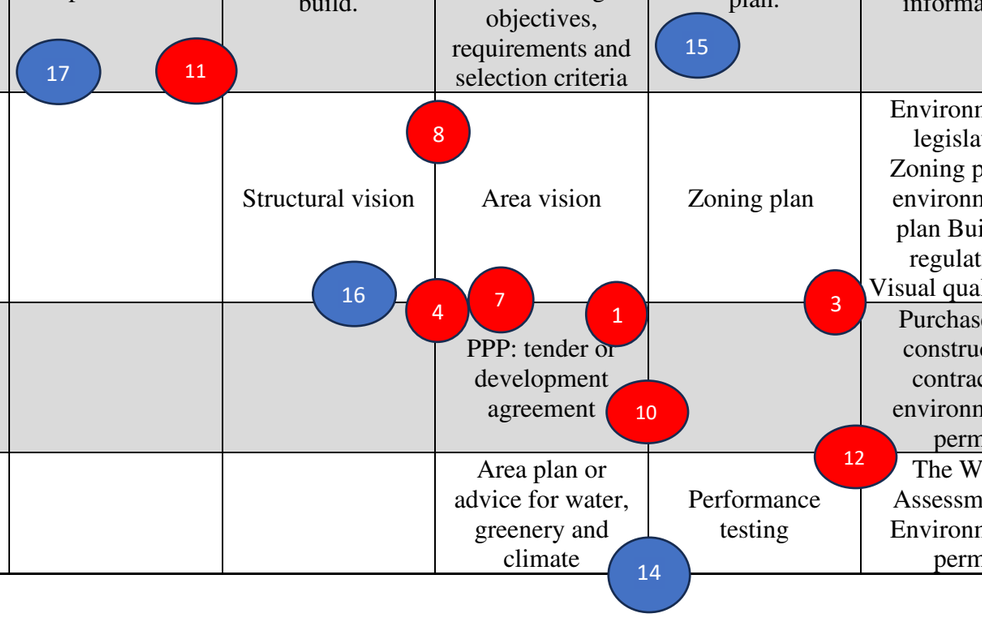


Table 8provides bottlenecks related to the planning process. The red points are bottlenecks and the blue points are bottlenecks related to climate adaptation. Table 8 provides an explanation of the bottlenecks outlined in the framework. The colors in the table correspond to the colors of the bottlenecks in the planning overview:

Table 8 Bottlenecks from table 7 explained

Nr	Bottleneck	Respondents	Category
1	Programs and area visions are imposed by either the municipality or developer without user support, leading to resistance.	R1, R2, R7	Policy and regulations
2	The permit application is assessed solely by the municipality without collaboration, resulting in rejection due to non-compliance, often stemming from limited interaction between the market and government.	R1, R2, R3, R8	Planning and execution
3	There are various stages for objections to plans, such as appealing against a zoning plan, which can sometimes take up to two years.	R1, R2, R3, R5, R6	Policy and regulations and social aspects
4	Some market participants advocate for governmental norms to be established, but excessive regulation through for instance a structural vision could lead to stagnation.	R1, R2, R4, R5, R7, R8	Policy and regulations
5	Difficulty in finding contractors leads to failure in signing construction contracts. This is often related to economic cycles.	R3, R5, R7, R8	Organizational aspects and finance & economic factors
6	Execution errors occur because each execution phase reinvents the wheel. This could be related to construction itself and processes like planning and tendering.	R5, R8	Planning and execution
7	Differences in collaboration partners' visions.	R1, R2, R3, R5, R7, R8	Organizational aspects
8	Lack of clear guidelines and frameworks from the municipality.	R2	Policy and regulations

9	Last-minute adjustments before permit issuance due to insufficient collaboration in earlier stages result in suboptimal plans.	R1, R2, R3, R5, R7, R8	Organizational aspects and planning and execution
10	Delays sometimes occur during the signing of a collaboration agreement, prolonging the process.	R6	Planning and execution
11	Land positions were acquired long ago, leading to clashes between municipal ambitions and landowners' objectives, potentially delaying land development.	R2, R3, R7	Finance and economic factors
12	Contractors find building for housing associations unprofitable due to low margins.	R5, R8	Finance and economic factors
13	Design elements requiring costly maintenance and management contribute to higher expenses, particularly in light of climate adaptive features, which typically complicate and increase the cost of managing public spaces.	R1, R3, R5, R7, R8	Sustainability and climate adaptation and organizational aspects
14	A province halts the construction of a new residential area due to concerns regarding the area's suitability and its climate-adaptive resilience. This relates to the vertical government layer challenges stated by Del Rio & Howlett (2013)	R3, R6, R8	Sustainability and climate adaptation and policy and regulations
15	Designing a climate-adaptive area requires expertise and consideration of factors such as heat stress, building shading, and orientation. Inadequate planning may necessitate revisions later on.	R1, R3, R4, R5, R7, R8	Sustainability and climate adaptation and organizational aspects
16	Climate adaptation should be considered in urban planning, but sometimes lacks specialized knowledge, causing issues in later stages.	All	Sustainability and climate adaptation and policy and regulations
17	Municipal land sales fail to account for price fluctuations caused by climate adaptive requirements, the energy transition, and additional costs for site preparation. While municipalities seek to shift tasks to the market, they maintain consistent land prices.	R1, R2, R3, R5, R8	Sustainability and climate adaptation, organizational aspects and finance and economic factors

The provided list demonstrates that despite stakeholders' positive attitudes towards collaboration between the market and government, a multitude of bottlenecks exists within a planning process. This extends beyond what is outlined in the framework and is also related to the themes discussed earlier in this section. It is often the case that bottlenecks exist in a planning process due to external circumstances. However, there is also a significant number of bottlenecks that are internal to the planning process and can be resolved therein. The following section will discuss the measures that can be taken to streamline collaborations between the market and government, thus alleviating bottlenecks.

4.4. Possible mechanisms to secure climate adaptative sufficient housing development

This thesis investigates the collaboration between the market and government concerning climate-adaptive development and the sufficient provision of housing. According to theory, the Netherlands offers a favorable development climate to address both challenges (Berrang-Ford et al. 2014; Charron, Lapuente & Bauhr, 2024.; Brinkerhoff & Brinkerhoff, 2011). This is also confirmed by the findings in 4.2.

Almost all respondents had suggestions for improvements, that sometimes are already applied in practice. The challenge therefore also lies in the adoption of these good practices. Additionally, it must be realized that development processes are context and stakeholder dependent, and policy adoption depends on the institutional context of the local development context, as Laeni et al. (2021) observed in Vietnam. Area development could be considered as an institutional design in a local context. A notable aspect of this research was the solution-oriented approach of the respondents, which is evident from the mechanisms discussed in the following part as answer to the main question.

Addressing key bottlenecks related to PPPs:

- Various developers have indicated that they are unable to make their business cases financially viable. This is due to several circumstances, including higher construction costs and increased interest rates, which are external economic factors. Additionally, they have to take over more tasks from municipalities in developing public areas. There are also requirements for the construction of social housing, which generates significantly less revenue. To mitigate this problem, R5 has indicated that they are building a financial reserve as a municipality to bridge the gap between market value and social housing value of land. They are currently selling the land at market-rate and managing the difference between social housing land value and market land value to eventually use this as a subsidy for developing social housing when the economy is more favorable.
- A frequently mentioned issue is the collaboration between the market and the government throughout the process. Almost all respondents identified this as a problem. There are various underlying causes, such as changing personnel, poor communication, or a complex organizational structure. One proposed solution is an integrated approach from the very beginning. This requires attention to the complexity of integrated

development. A transparent and inclusive process reduces resistance within the organization and among local residents, decreasing the likelihood of costly procedures later in the development. This view is supported by R1, R3, R5, R6, R7, and R8. For the respondents not mentioned, this aspect was not as explicitly addressed. According to R1, R3, R5, and R8, this collaboration should take the form of a contract in which the risks and profits related to land and building exploitation are shared. This way, the demands and wishes of all stakeholders are balanced, and there is a financial incentive to formulate shared ambitions.

- It is suggested by developers that municipalities should take a more active role in formulating guidelines and ambitions and participate in development discussions. Contextual knowledge partially resides with municipalities, and this should be actively represented. Although this point is highly project-dependent, R5 (a municipality) has also indicated that they would like to take a more active role in development issues by engaging early and regularly in discussions. They also advocate for organizing more capacity for this purpose. R4 (a municipality) clearly demonstrates how to organize and coordinate policy locally with the market. Therefore, these approaches can be seen as "good practices" from the government.
- Predictable actions by governments are essential to keep the developers market moving. Uncertainties created by changing policies have significant implications for housing supply. This is a point of attention relevant to collaboration, climate adaptation, and the creation of sufficient housing. Both local governments and developers have indicated that they struggle with policies mandated by the national government.

Addressing key bottlenecks related to climate adaptation:

- Climate-adaptive measures are sometimes considered costly investments. Although none of the respondents indicated that climate adaptation itself is a problem, they did mention that developments are becoming more expensive, with more costs shifting towards the developers. According to various respondents (R5, R7, and R8), climate-adaptive development is a sustainable and possibly even cheaper investment in the long term due to the potential for reduced future damage costs and higher quality. Ensuring long-term stakeholder engagement after development can thus lead to a more socially engaged vision rather than a focus on quick profits.
- Real estate development is often perceived as a conservative sector as several respondents have indicated this. Individual interests or reluctance sometimes influence

developments. Ambitious individuals on both the market and government sides are needed to accelerate climate-adaptive development. Sharing knowledge without financial motive is also part of this. Quick wins, such as allowing weeds to grow, are already mentioned by R5 and easy to adopt. Sharing knowledge to achieve a common goal however may require a cultural change, as suggested by Khan & Roberts (2013).

- Changing or unclear policies lead to additional costs (Schill, 2005; Green & Malpezzi, 2003). Therefore, there is a demand for clarity regarding climate adaptation guidelines. Although these guidelines exist, various respondents (R2, R3) from the private sector are formulating their own policies and are not fully aware of government guidelines. It is unclear whether this lack of knowledge pertains to the respondent individually, their company, or if there is general ambiguity surrounding the guidelines. Policy must be clearly communicated because interpretation depends on the recipient.

Addressing key bottlenecks related to sufficient housing development:

- The housing shortage is partly caused by market stagnation. Single-family homes are sometime for instance occupied by less than a family, limiting mobility in the housing market (R5 & R8). This mobility needs to be increased. Given economic challenges, it is complicated to make single-family homes affordable in new construction, therefore the focus should also be on turnover in the existing stock.
- Real estate development lags behind other sectors in terms of innovation. Housing remains expensive due to limited standardization. R8 suggests that increased standardization could accelerate the process, improve quality, and lead to more supply in the long term. Concrete solutions such as factory-built homes and streamlined processes involving development experts are mentioned.

In general, both the market and the government are involved in developing an approach to solve the issue. The proposed solutions are frequently related to fostering closer collaboration between parties to establish common goals. Clear communication, transparent attitudes and goals, including in financial matters, predictable government policies, innovation, standardization and significant attention to the complexity of the field are necessary in the collaboration between the market and the government to ensure an adequate production of climate-adaptive new areas. The relationship between the findings in this chapter and the existing literature is addressed in the next chapter.

5. Discussion

In the previous chapter, various bottlenecks in the planning process were identified, and those related to climate adaptation were also clarified. Subsequently, possible solutions were mentioned that answer the main question:

How can the interplay between government and market parties stimulate a process that secures both climate adaptation and sufficient housing construction?

Important mechanisms to secure climate adaptive development include an integrated approach, increased collaboration, better communication, predictable government policies, innovation, standardization, and a fair distribution of finances. While some of these solutions may seem predictable, effective implementation remains a challenge. Despite the fact that the Netherlands is seen as a country that performs well in terms of good governance, respondents indicate that there is room for improvement (Berrang-Ford et al., 2014; Charron, Lapuente & Bauhr, 2024). However, the results of this thesis do not align with the findings of Ten Brinke et al. (2022), who indicate that climate-adaptive policy does not lead to climate-adaptive applications in practice. In this section, further implications on the results and literature are discussed, with attention for the contribution and generalizability of this study.

First, it is worth noting that the Netherlands is a prosperous country with good governance. In countries lacking good governance, there is less trust between the government and the market, and thus, the findings in Chapter 4.2 would be different. Since good governance is a prerequisite for successful collaboration in PPPs and climate adaptation, the Netherlands offers a favorable planning context. Respondents' proposals for joint development in finance and risk between governments and market parties indicate mutual trust, needed for PPPs to function well (Brinkerhoff & Brinkerhoff, 2011). There is a critical attitude towards each other's organizations, but the parties also understand their interdependence and shared ultimate goals. For example, R3 suggests that some municipalities are becoming more proactive in land policy and indicates that this should not happen solely with the goal of generating revenue, but rather to stimulate more developments and is actively talking with the municipality about this.

Additionally it is noteworthy that respondents in the Netherlands see a clear role distribution between market and government, although Rañeses et al. (2021) indicated that clear role distribution is a great challenge in realizing climate-adaptive housing. Although there is sometimes ambiguity regarding the demarcation of costs and responsibilities, market parties state that they need to build, and the government outlines the spatial frameworks, unless they

engage in joint development. Development models delineate responsibilities, and policies regarding climate adaptation are evolving. Although this development accelerates when climate change becomes visible, it can be argued that Dutch climate-adaptive development is not only reactive, as noted by Olshansky (2018) and Agarwal et al. (2012). However, it is important to realize that the Netherlands has frequently dealt with climate issues in the past.

An integrated approach has been identified by several respondents as a solution to the problems, as mentioned in section 4.4. From the literature, Van Buuren et al. (2014) indicated that linking tasks to other policy areas or stakeholders can lead to undesirable opposition when non-climate-related values conflict with climate adaptive objectives. An interesting outcome is that virtually all respondents stated that an integrated approach actually leads to more decisiveness and support.

Another noteworthy point is the criticism on historical housing policy, that is sometimes cited by respondents and literature as the cause of the current housing shortage (Boelhouwer, 2020; Savini, 2017). There is a societal call for policy change to solve the problems. However, it is also noted that changing policies generally lead to higher costs (Green & Malpezzi, 2003). The Omgevingswet is intended to simplify a complex policy structure, aiming to make planning processes less complicated. It is not yet clear whether this changing policy is more expensive or will lead to more expensive houses. The recommendation, based on the interviews, is to formulate new policies clearly to prevent uncertainty for developers, as previously occurred in the rental sector (Doodeman, 2024).

Capacity is an issue according to some respondents that was not mentioned in the theoretical framework. There is a shortage in manpower and knowledge and it is suggested that part of this problem can be solved through standardization and innovation. R8, in particular, is engaged in innovative projects such as factory-built homes where the technical permit is already issued prior to placement, leading to a shorter permitting and construction process. Additionally, according to R8, factory-built houses offer advantages in the number of deployable workers, as a construction worker needs to be physically stronger than someone assembling housing components in a factory. Furthermore, this method could improve working conditions for construction workers.

Several respondents (conceptual developers and governments) have indicated that prolonged engagement can yield positive outcomes. This aligns with the ideas of Halbert,

Henneberry, & Mouzakis (2014), who suggested that long-term strategies could benefit both investors and local communities.

Large-scale investments in climate adaptation are not new for the Netherlands, as the Dutch infrastructure sector has a long history of climate-adaptive development (Kwadijk et al., 2010). The "Afsluitdijk" and "Deltawerken" are excellent examples of integrated developments that have taken place in the Netherlands in the past. Although these projects differ from area developments for housing, as they are major projects almost solely funded by the government, they serve the same purpose as climate-adaptive housing developments: namely, protecting the built environment in the Netherlands. Therefore, it may be interesting in the financing and development of new climate-adaptive areas to look at such projects to see which components can be applied to new climate-adaptive housing developments.

This research contributes to the scientific field as little is known about the practical challenges in planning processes addressing climate adaptive areas. This research provides broad insights from practice, representing both market parties and government perspectives. A context has been developed that shows how the government and the market relate to each other in practice. The positive outcomes derived from this interplay give more substance to the context of good governance, which is identified as a prerequisite for successful collaboration and the practice of climate-adaptive development (Brinkerhoff & Brinkerhoff, 2011). Because of the current nature of the research, the challenges will develop in the coming years.

Policy regarding climate adaptation will gain clarity in the coming years. Additionally, more research will need to be conducted on the implications of implementing the Omgevingswet in the field. Both the market and government are challenging each other to achieve optimal solutions, as indicated in the literature (O'Brien, 2014) and by various respondents. Therefore, it could be interesting to repeat this research in a few years to see how things have progressed. Additionally, new real estate developments, such as the realization of very small new social rental homes, are emerging. Such developments could influence the livability of an area in the long term, making case studies on residential experience in the future an intriguing area of research. Innovation in construction could also impact the sector in the future, potentially leading to cheaper housing and faster processes, thereby necessitating adjustments in the planning process. Finally, quantitative research could be conducted on rejected building permits. The reasons for rejecting building permits could provide insights into the impact of climate-adaptive policies on sufficient housing development.

6. Conclusion

This thesis has investigated the collaboration between market parties and governments concerning the challenge of building sufficient housing in a climate-adaptive manner. This resulted in an unique, expert validated planning framework. While it was assumed that climate adaptiveness would be a bottleneck for the development of sufficient housing, the findings suggest that many stakeholders see it as an opportunity. Area developments have become more complex, necessitating an appropriate approach. This thesis provides insights in possible mechanisms to secure climate adaptive area development through PPPs. The planning framework including bottlenecks can be used in practice to clarify roles and responsibilities for both municipalities and developers. It provides insights on bottlenecks and solutions or mechanisms to address those bottlenecks. Therefore it can be used to identify potential bottlenecks in an early stage of a project. It could be used as framework for the assessment of projects as well. Further development of the framework offers the potential to create a foundational document in which all necessary products for a given phase can be assigned to either the municipality or the developer, depending on the collaboration model. This can contribute to a transparant and clear project organization where expectations are documented in writing.

Furthermore, the interviews offer a deep and broad perspective, and the outcomes of this thesis can serve as starting point for further research or as input for policy design. Throughout the writing of this thesis, the topics addressed have appeared in the news multiple times, emphasizing their urgency. There is a need for an integrated approach to tackle the challenges and ensure safe housing remains accessible to everyone. Such an integrated approach can ensure that formal assessment moments of climate-adaptive requirements no longer lead to project stagnation. Collaboration between stakeholders could lead to early determination that plans will not meet the specified requirements, allowing timely intervention without incurring significant additional costs. An integrated approach can also lead to greater transparency in ambitions and goals, enabling governments to understand financial challenges developers face and developers to comprehend the societal challenges governments are dealing with. Ultimately, this should lead to a collective effort aimed at achieving a sustainable, climate-adaptive housing market that meets the demand for homes across all segments of the population in the Netherlands.

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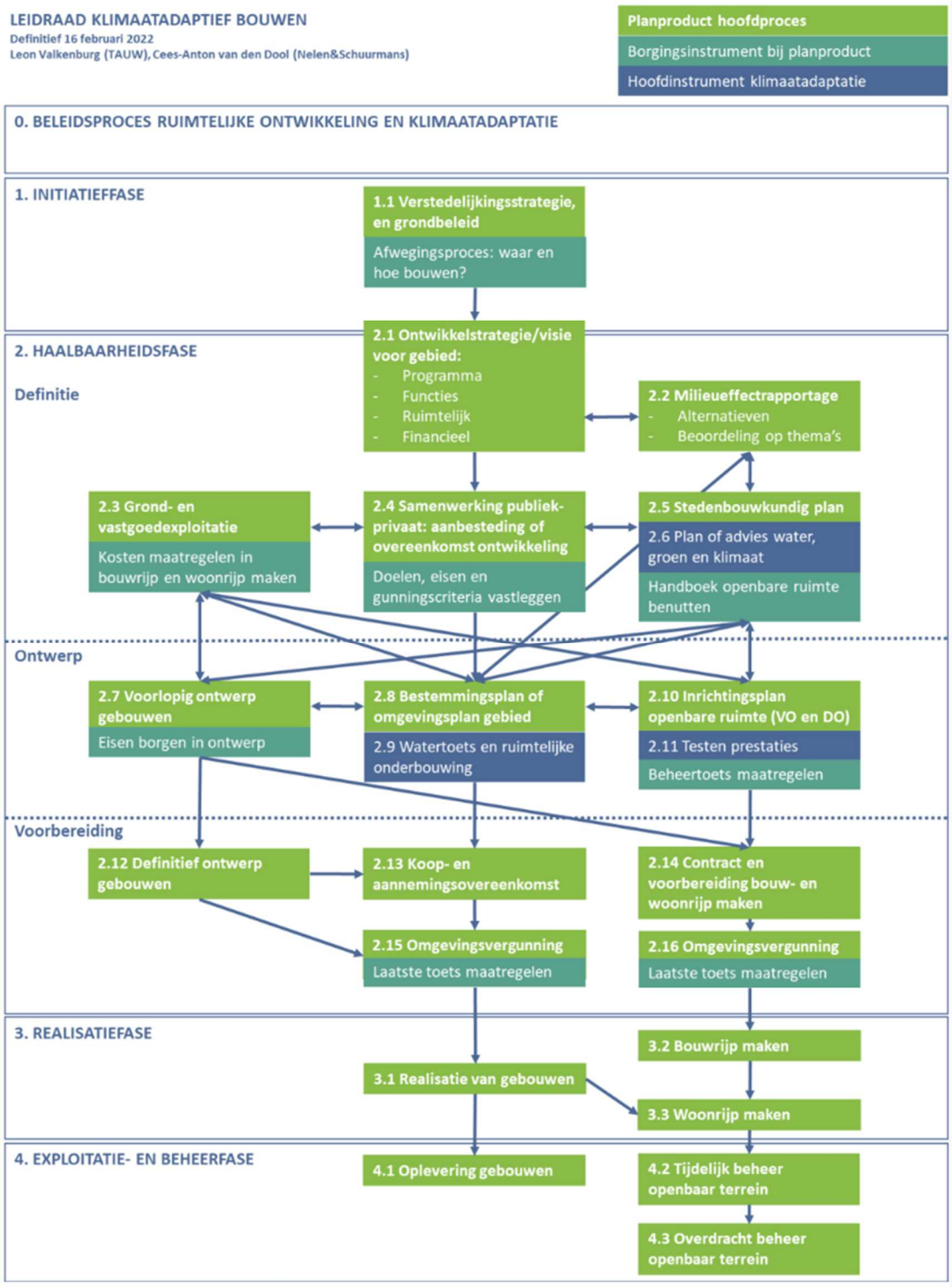
Appendices

Appendix 1: Green climate adaptive built environment

Appendix 2: Guideline climate adaptive construction 2.0



Appendix 3: interview guides

Ontwikkelaar	Gemeente
Introductievragen	**Introductievragen**
In welke hoedanigheid bent u bij gebiedsontwikkeling betrokken? (wat drijft jou eventueel?)	In welke hoedanigheid bent u bij gebiedsontwikkeling betrokken? (wat drijft jou eventueel?)
Op welke markt focussen jullie en wie zijn jullie klanten?	Op welke manier wordt gebiedsontwikkeling in uw gemeente georganiseerd?
Aangaande gebiedsontwikkeling	**Aangaande gebiedsontwikkeling**
Vooraf bespreken framework met vragen:	Vooraf bespreken framework met vragen:
Is dit overzicht in lijn met hoe het proces van gebiedsontwikkeling in elkaar zit volgens u? En wat kan er nog anders?	Is dit overzicht in lijn met hoe het proces van gebiedsontwikkeling in elkaar zit volgens u? En wat kan er nog anders?
Welke doorlooptijd schat u in per fase?	Welke doorlooptijd schat u in per fase?
Welke verantwoordelijkheden heeft uw organisatie in gebiedsontwikkeling?	Welke verantwoordelijkheden heeft uw organisatie in gebiedsontwikkeling?
Op welke plekken in het raamwerk is er interactie met de overheid?	Op welke plekken in het raamwerk is er interactie tussen markt en overheid?
Wat is de terugverdientijd van een project? (dit heeft verband met hoelang een partij in "de wedstrijd" zit, omdat klimaatadaptieve maatregelen investeringen zijn voor een lange termijn)	
Waar hangt het opstarten van een project vanaf?	Waar hangt het opstarten van een project vanaf?
Hoe ervaart u beleid omtrent gebiedsontwikkeling?	Hoe komt beleid omtrent gebiedsontwikkeling tot stand?
In welke mate heeft dit beleid invloed op jullie keuze om een project te gaan doen?	In welke mate heeft dit beleid invloed op het aantal projecten in jullie gemeente?
Kunt u knelpunten aanwijzen waar volgens u in het proces ontwikkelingen vaak vastlopen?	Kunt u knelpunten aanwijzen waar volgens u in het proces ontwikkelingen vaak vastlopen?
Aangaande klimaatadaptatie	**Aangaande klimaatadaptatie**
Wat verstaat u onder klimaat adaptatie?	Wat verstaat u onder klimaat adaptatie?
Welke relatie ziet u in de praktijk tussen klimaatadaptatie en gebiedsontwikkeling?	Welke relatie ziet u in de praktijk tussen klimaatadaptatie en gebiedsontwikkeling?
Wat zijn jullie doelstellingen omtrent klimaatadaptieve ontwikkeling?	Wat zijn jullie doelstellingen omtrent klimaatadaptieve ontwikkeling?
Hoe verhouden deze doelstellingen zich tot de richtlijnen van overheden?	Hoe verhouden deze richtlijnen zich tot de doelstellingen van marktpartijen?
Waar in het raamwerk kom je richtlijnen omtrent klimaatadaptatie tegen	Waar in het raamwerk kom je richtlijnen omtrent klimaatadaptatie tegen
Hoe reageren jullie op nieuwe richtlijnen vanuit de overheid?	Hoe wordt er op nieuwe richtlijnen aangaande klimaatadaptatie gereageerd?
Bent u bekend met de Landelijke klimaatlat klimaatadaptief gebouwde omgeving? - welke gevolgen verwacht u daarvan in uw werk te ervaren?	*Bent u bekend met de Landelijke klimaatlat klimaatadaptief gebouwde omgeving? - welke gevolgen verwacht u daarvan in uw werk te ervaren?*
Voorzien jullie knelpunten die ontstaan door richtlijnen omtrent klimaatadaptatie in jullie projecten?	Voorzien jullie knelpunten die ontstaan door richtlijnen omtrent klimaatadaptatie in jullie projecten?
Zijn er zaken die ik niet gevraagd heb maar toch interessant zijn te benoemen?	Zijn er zaken die ik niet gevraagd heb maar toch interessant zijn te benoemen?
Hebben jullie nog vragen aan mij?	Hebben jullie nog vragen aan mij?
Kan ik jullie nog bereiken voor eventuele vragen achteraf?	Kan ik jullie nog bereiken voor eventuele vragen achteraf?

Appendix 4: Codes and data

To conduct the research, 8 interviews of approximately 1 hour each were coded. Initially, the interviews were analyzed through coding, resulting in 48 code groups. From these, a selection was made of the most significant code groups for further analysis, which led to identifying challenges categorized by themes. In total, 590 quotations were gathered in Atlas.ti. The key finalized code groups analyzed include:

- Trigger for potential challenges
- Best practices in area development
- Bureaucracy
- Complexity
- Legal safeguards
- Challenge
- Financial structure
- Collaborating parties
- Stakeholders/organization
- Challenges
- Responsibilities
- Relationship between market and government

Although there are several other groups that could be identified, the above formed the basis for data analysis. To maintain respondent anonymity, fully detailed transcripts were not included.