

Radboud Universiteit



Mapping Stakeholder Dynamics in Brownfield Redevelopment

A Case Study of Arnhem-Nijmegen region, Netherlands



Colophon

Project:

Master's thesis

Author:

Marc Nekkers

Supervisor:

Dr. C. Vitale

Second reader:

Dr. S.A. Veenman

Master Program:

Master Spatial Planning

Planning, Land and Real Estate Development

University:

Radboud University, Nijmegen School of Management

Keywords:

brownfield redevelopment, adaptive reuse, collaborative governance, synergy, trust-building, resource allocation, collaboration advantages & challenges, stakeholder interests.

Word count: 19.799 (excluding preface & references)

Date:

8-5-2025

Abstract

This research investigates stakeholder collaboration processes in brownfield redevelopment within the Arnhem-Nijmegen region of the Netherlands, to address the significant housing deficit and the growing scarcity of suitable industrial land. By employing a case study methodology, it explores the factors influencing stakeholder collaboration and examines its impact on (un)successful brownfield redevelopment. This research aims to understand different forms of collaboration, assess stakeholder interactions across various stages of the redevelopment process, and evaluate the contribution of collaboration to (un)successful outcomes. Societally, it addresses the pressing need for housing and efficient utilization of brownfield sites, while academically, it contributes to the understanding of collaborative approaches in sustainable urban development. Insights from this research may offer valuable recommendations for policymakers, developers, and stakeholders involved in brownfield redevelopment initiatives, aiming to improve stakeholder collaboration and future brownfield redevelopment efforts.

Index

Colophon	2
Abstract	3
Index	4
1. Introduction	6
1.1 Research objective	7
1.2 Societal relevance	8
1.3 Academic relevance	10
2. Theoretical Framework	12
2.1 Sustainable development	12
2.2 Adaptive reuse	14
2.3 Brownfield redevelopment	16
2.3.1 Challenges and opportunities	17
2.4 Collaborative governance	19
2.4.1 Advantages & challenges in collaborative governance	20
2.4.2 Stakeholder definition & identification	22
2.5 Operationalization	25
2.5.1 Conceptual model	25
2.5.1 Operationalisation of key concepts	26
3. Methodology	30
3.1 Research philosophy	30
3.2 Research strategy	31
3.2.1 Research design	31
3.2.2 Case study approach	31
3.2.3 Data collection	32
3.3 Data analysis	35
3.4 Validity, generalizability & reliability	36
3.5 Ethical considerations	36
4. Results	37
4.1 Introduction to the case study	37
4.2 Trust-building	38
4.3 Synergy	39
4.4 Resource allocation	41
4.5 Leadership	43
4.6 Collaborative advantages	44
4.7 Collaborative challenges	45
4.8 Stakeholder interests	46
4.9 Contextual factors	48
4.10 Successful collaboration	49
5. Discussion	51
5.1 Stakeholder willingness and long-term collaboration	51
5.2 The role of leadership in overcoming barriers	52
5.3 The complexity of resource allocation	52

5.4 Institutional and political uncertainty	53
5.5 Balancing public and private interests	53
5.6 What makes brownfield redevelopment unique?	54
6. Conclusions	56
6.1 Sub-question 1	56
6.2 Sub-question 2	56
6.3 Sub-question 3	57
6.4 Sub-question 4	57
6.5 Sub-question 5	58
6.6 Answering the main research question	58
7. Reflection & Recommendations	59
7.1 Reflection	59
7.1.1 Methodological reflection	59
7.1.2 Theoretical Reflection	60
7.2 Recommendations	60
7.2.1 Further research	60
7.2.2 Policy recommendations	61
8. Literature	63
9. Appendices	73
9.1 Interview guide	73
9.2 Coding scheme	75

1. Introduction

The Netherlands faces a significant housing deficit, with a shortfall of 279,000 dwellings in 2021, and the demand continues to rise (ABF Research, 2021). While some experts question the exact scale of the housing demand, the need for brownfield redevelopment in urban areas remains undeniable (Stornebrink, 2021). According to Bezemer et al. (2022), addressing inner-city brownfield sites is essential, not only for meeting housing demand quantitatively but also for improving quality by preserving cultural heritage and reducing urban sprawl (Azam, 2023). Brownfield redevelopment is a relatively recent chapter in urban planning and environmental management. The concept of regeneration and redevelopment of underused, and often contaminated and vacant industrial lands, or so-called 'brownfields' (Alker et al., 2000) is one of the greatest challenges for urban planners, developers and local governments in urban areas at the moment (Frantál et al., 2015). The challenge lies in safely and effectively redeveloping underused and sometimes polluted land, requiring substantial investment and close stakeholder collaboration.

Brownfield sites, previously used for industrial or commercial purposes, are receiving increased attention from policymakers, planners, and developers because open land for new development is becoming harder to find, more costly, and more protected, especially in populated areas like the Netherlands (Frantál et al., 2015). Research also indicates a growing interest in brownfield redevelopment (Tölle et al., 2009; Frantál et al., 2015). However, these projects often encounter unforeseen challenges, including regulatory barriers, financial constraints, and stakeholder conflicts (Alexandrescu et al., 2014; Frantál et al., 2015; Ganser & Williams, 2007; Payne, 2013). There are regulatory challenges such as strict EU environmental cleanup standards and complex permitting processes, which can delay projects and increase costs (Alexandrescu et al., 2014). Also coordination difficulties could come up from the need to align the interests and actions of multiple stakeholders, including local governments, developers, and community groups. Additionally, variations in laws, economic conditions, and administrative procedures complicate brownfield redevelopment (Frantál et al., 2015). The process of decision-making and policy formulation in brownfield redevelopment is therefore very important and is also seen as a complex and dynamic process involving several issues and multiple stakeholders across the various stages of the redevelopment (Bianchi et al., 2021).

An important strategy for sustainable brownfield redevelopment is adaptive reuse (Canevaro et al., 2019). This approach prioritizes the conservation of existing structures, reducing material waste, minimizing embodied energy loss, and preserving site identity. Closely related to adaptive reuse is the mixed-use strategy, which promotes the integration of residential, commercial, and recreational functions within redeveloped urban spaces. This strategy is a land use planning concept that focuses on creating an urban

core area with ‘live-work-play’ facilities and amenities in often already existing structures, which can also be applied to former brownfield sites (Wardner, 2014).

Through these adaptive reuse and mixed-use strategies, industrial areas can be redeveloped, transforming them into more sustainable and efficient industrial sites or even in livable neighborhoods for residents (Glumac et al., 2015; Rijksoverheid, 2023). By repurposing these spaces for residential, commercial, or new industrial use, stakeholders can improve the cleanliness, safety, and attractiveness of the city, which may ultimately generate economic benefits at the local level. (Glumac et al., 2015). On the other hand, redeveloping brownfield locations can become a costly process, making brownfield redevelopment economically not always feasible and desirable (Ahmad et al., 2020). Ultimately, the stakeholders which are involved in brownfield redevelopment often include: the government (local, provincial, and national), project developers, citizens, housing associations, conservation groups, and landowners (Green, 2018).

1.1 Research objective

This research aims to advance both academic discourse and practical understanding of stakeholder collaboration in brownfield redevelopment. It investigates how stakeholder interactions influence brownfield redevelopment outcomes by identifying the key factors that either facilitate or hinder collaboration. After mapping stakeholder collaboration, this research examines its consequences to assess whether collaboration was successful. This research adopts Silverthorne’s (2006, p. 41) definition of success in brownfield redevelopment: ‘Any redevelopment of a brownfield site must be an improvement and therefore a success, given the inherent problems and costs of unimproved brownfield sites.’. In this research, success is determined by stakeholder perceptions of whether the collaboration was effective or not.

Investigating this research aim is challenging due to the diverse interests and experiences of stakeholders. Their perspectives vary across brownfield redevelopment cases, complicating efforts to generalize collaboration patterns. Additionally, the lengthy and highly regulated Dutch planning process makes it difficult to assess collaboration efforts in brownfield redevelopment (Van der Krabben & Buitelaar, 2011). Extended timelines can shift stakeholder priorities and involvement, affecting collaboration dynamics (Hammond et al., 2021).

Due to the involvement of multiple stakeholders, long redevelopment timelines, and contextual dependencies, a case study approach is the most suitable method for this research. This research adopts a case study methodology to examine factors influencing stakeholder collaboration within the

Arnhem-Nijmegen region. This region was selected because of its active urban redevelopment agenda, illustrated by initiatives such as the *Woondeal 2.0* (Rijsoverheid, 2023), the presence of several complex brownfield sites such as the Waalhaven area in Nijmegen and Rijnpark in Arnhem, and the involvement of a diverse range of stakeholders in spatial planning, making it a relevant context for this research. Successful transformations, such as the Rijkswaterstaat tower and the former ING building in Arnhem, also demonstrate the potential of brownfield redevelopment to address regional housing shortages and boosting the local economy (Vos, 2018; Wijnacker, 2011). By examining collaboration processes in brownfield redevelopment, this qualitative research explores stakeholder interactions and their impact on redevelopment outcomes.

To investigate stakeholder collaboration in brownfield redevelopment within the Arnhem-Nijmegen region, the following research questions will be explored.

Main question:

‘What are the factors that support or hinder the successful collaboration between stakeholders in brownfield redevelopment within the Arnhem-Nijmegen region?’

Sub-questions:

- What are the different forms of stakeholder collaborations and how is it defined in general?
- What are the factors that support or hinder the successful collaboration between stakeholders according to academic literature?
- How does stakeholder collaboration vary across different stages of the brownfield redevelopment process (e.g., planning, implementation, monitoring)?
- To what extent does stakeholder collaboration influence the success of brownfield redevelopment?
- What lessons can be derived to improve future collaborations within the region?

1.2 Societal relevance

One of the key motivations for this research is the significant housing deficit in the Netherlands. Within the Groene Metropoolregio, the metropolitan region surrounding Arnhem and Nijmegen, the lack of available housing is particularly alarming. According to research by Companen (2023) and the Government of the Netherlands (Rijksoverheid, 2023), 42,000 new houses must be built by 2040 to meet the demand. The Netherlands Environmental Assessment Agency (PBL, 2021) identifies demographic changes as the primary driver of this housing shortage, as increasing population growth fuels demand for homes. This situation has been worsened by the failure of crisis measures, which did not lower housing prices as expected. Additionally, the construction sector, which lost significant capacity during the financial crisis, continues to struggle to recover. These combined factors create a complex challenge that makes it difficult to effectively address the housing shortage (PBL, 2021). The municipalities of Arnhem and Nijmegen also acknowledge the suboptimal utilization of existing real estate, including brownfield locations (Rijksoverheid, 2023). In the Netherlands, approximately 7% of industrial buildings remain unused, a percentage similar to that of brownfield locations within the Arnhem-Nijmegen region (CBS, 2022).

As previously mentioned, open land for housing development is becoming scarcer, more expensive, and increasingly protected, particularly in densely populated areas (Frantál et al., 2015). Reusing and redeveloping brownfield sites effectively is therefore crucial in addressing the housing shortage, as it makes additional land available for residential construction (Glumac et al., 2015). According to CBS, PBL, RIVM, and WUR (2024), more than half of the annual housing stock expansion since 2012 has occurred within the boundaries of the 2000 existing built-up area. In the most recent period from 2018 to 2020, this share was 58%, demonstrating that urban redevelopment has played a significant role in expanding the housing stock in recent years.

Beyond housing development, brownfield sites also offer opportunities for sustainable and circular industrial redevelopment. According to PBL (2009), there is a shortage of suitable areas for new sustainable industrial development. Addressing this scarcity requires a shift from expansion to the restructuring of existing industrial areas to support future economic activities, making brownfield redevelopment an essential part of this transition (PBL, 2009).

According to the Dutch Bureau for Statistics (Centraal Bureau voor de Statistiek, CBS, 2025), a total of 8,675 housing units were realized through the transformation of brownfield sites in the Netherlands in 2024. This marks a slight decrease compared to 2023, when 8,755 transformation homes were delivered, and a more notable decline from the 12,000 units achieved in 2019. Despite this downward trend, the

potential for inner-city redevelopment remains substantial. Approximately 3 million square feet of former brownfield sites are still vacant (CBS, 2025), representing a significant reserve of underutilized urban land that could be repurposed to address the growing housing and industrial demand.

Successful collaboration between municipalities and other stakeholders is needed for the adaptive reuse of industrial estates. This collaboration contributes to the national goal of achieving 15,000 transformation homes annually in the most sustainable manner (Rijksoverheid, 2023). However, this approach is not always successful due to ineffective collaboration among stakeholders involved in brownfield redevelopment (Rittel & Webber, 1973; Schilder et al., 2021). This research, therefore, aims to further examine stakeholder collaboration in brownfield redevelopment, ultimately benefiting the redevelopment process in the Arnhem-Nijmegen region.

1.3 Academic relevance

Scholars have extensively investigated the role of collaboration in brownfield redevelopment, highlighting its effectiveness in addressing various socio-environmental challenges, including urban regeneration, pollution mitigation, and sustainable land use (Alker, Joy, & Roberts, 2000; De Sousa, 2006; Frantál et al., 2015). Collaboration is recognized as the most important strategy in overcoming the complexities associated with brownfield sites, such as contamination, legal hurdles, and economic constraints (Adams et al., 2010; Dixon et al., 2007). Additionally, several studies emphasize the importance of collaborative efforts between the public and private sectors in achieving successful brownfield redevelopment and advancing sustainable development goals (Edelstein & Warner, 2004; Van der Krabben & Jacobs, 2013).

Collaboration in brownfield redevelopment has been examined in various contexts, including urban (Lange & McNeil, 2004; Nijkamp et al., 2002; Thornton et al., 2007) and rural settings (Litt & Burke, 2002; Meyer, 2003; Rizzo et al., 2015). Several studies have also investigated the roles of different stakeholders, such as government agencies, private developers, and local communities, in the redevelopment process. For instance, Adams and Hastings (2001) examine the dynamics of public-private partnerships (PPP), while Thornton et al. (2007) analyze the influence of community involvement on redevelopment outcomes.

Researchers have applied various theoretical frameworks to understand the mechanisms of collaboration in brownfield redevelopment. Collaborative planning theory has been used to identify barriers and drivers (Healey, 1997), while stakeholder theory explores the interactions between different actors (Freeman,

1984; Mitchell et al., 1997). In addition, institutional theories have been used to examine the regulatory and organizational factors influencing collaboration (North, 1990; Scott, 2001). Other theoretical approaches include game theory, which analyzes strategic interactions among stakeholders (Weber & Khademian, 2008), and network theory, which provides insights into the structure and effectiveness of collaborative networks (Provan & Kenis, 2008).

Implementation theory is also commonly used to understand policy outcomes (Fenton et al., 2015; Hill, 1997; Hogwood & Gunn, 1984). However, limited research has focused on the specific implementation of collaborative policies in the context of brownfield redevelopment, despite its importance in ensuring that these strategies are effectively executed and achieve intended outcomes (Ryan, 2015). Fenton et al. (2015) and Karlsson (2008) emphasize the role of municipalities in achieving successful brownfield redevelopment, as they often act as key facilitators and coordinators among various stakeholders. This aspect has also been explored by Isaksson & Hagbert (2020) and Saad et al. (2021). However, there is a need for further research on the implementation of collaborative strategies in municipally owned brownfields, particularly to gain insights into how local governments can improve stakeholder engagement and effectively address regulatory challenges (Wihlborg et al., 2019).

This research is scientifically relevant for several reasons. It examines how collaboration theories can be specified and applied within the context of brownfield redevelopment in the Arnhem-Nijmegen region. In addition, this research also provides new insights into the role of stakeholders in facilitating collaborative efforts in brownfield redevelopment. Finally, this research contributes to addressing the existing knowledge gap in this field. Although brownfield redevelopment processes have been widely studied, the role of collaboration and power dynamics in these processes remains underexplored (Innes & Booher, 1999; Mehdipour et al., 2024). By integrating these elements, this research adds value to the existing debate on collaborative approaches in brownfield redevelopment while exploring new possibilities for implementing effective collaboration strategies.

2. Theoretical Framework

This second chapter explores the theoretical foundation of brownfield redevelopment and stakeholder collaboration. It begins by discussing sustainable development and adaptive reuse, and their roles within brownfield redevelopment. Next, the concept of brownfield redevelopment is further examined, especially by outlining its challenges and opportunities. After getting a clearer picture of this concept, collaborative governance is then introduced as an important mechanism in stakeholder collaboration. This is followed by a theoretical analysis of stakeholder identification and interests. In the last part of this chapter, the conceptual model is presented and operationalized, detailing how stakeholder willingness to collaborate could influence the success of brownfield redevelopment.

2.1 Sustainable development

According to the United Nations, sustainable development has been defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Jarvie, 2016). Redeveloping brownfields is the perfect means to regenerate an area for better use while maintaining environmentally friendly planning and construction and thereby contributing to sustainable development (Ahmad et al., 2020). Next to the definition of sustainable development by the UN, seventeen goals were also created that should help realize sustainable development all over the world, which can be seen in Figure 1. Brownfield redevelopment aligns primarily with Sustainable Development Goal (SDG) 11, which focuses on sustainable cities and communities, and with SDG 9, which targets industry, innovation, and infrastructure (Ahmad et al., 2020).



Figure 1 (Rijksoverheid, 2024)

The terms 'sustainability' and 'sustainable development' are often improperly used interchangeably, however (Ruggerio, 2021). These concepts have different meanings within the environmental discourse. Sustainable development, as conceptualized in the *Brundtland Report* (Jarvie, 2016), focuses as defined earlier, on enabling current economic and social growth without compromising future generations' ability to do the same. This is often critiqued for its optimistic take on continuous growth on a finite planet (Ruggerio, 2021). On the other hand, sustainability is portrayed as a broader, more holistic concept that emphasizes ecological balance, social equity, and cultural diversity, aiming to maintain life support systems on Earth more comprehensively and ethically (Ruggerio, 2021). In this context, sustainability is understood as a broader concept than sustainable development, making it applicable across all Sustainable Development Goals and not just SDG 9 and SDG 17.

The EU also largely invests in sustainable urban development through various policies and financial frameworks. This includes funding from sources like the European Regional Development Fund/Cohesion Fund, which assists in the regeneration of industrial and military brownfields (Weiland et al., 2021). These policies are aligned with the sustainable development goals and the *2030 Agenda* according to Morar et al. (2021). The *2030 Agenda* serves as a global reference point for the transition to a more sustainable world by 2030 (Weiland et al., 2021).

A positive aspect of brownfield redevelopment is that it turns unused areas into vibrant spaces, attracting businesses and creating jobs, which could boost the local economy (Glumac et al., 2015). By redeveloping these sites, new commercial opportunities are created, leading to increased local investment and higher property values (Manfredi & Costi, 2023). This process supports Sustainable Development Goal (SDG) 11: Sustainable Cities and Communities by making urban areas safer, sustainable and economically resilient. Brownfield redevelopment also reduces the environmental impact of urban sprawl by making use of existing urban areas that are already underutilized or contaminated, rather than expanding into untouched greenfield sites (Manfredi & Costi, 2023; Tendero & Bazart, 2024). This also helps limit soil sealing, which is crucial for maintaining soil health and thereby contributes to even more sustainable development (Morar et al., 2021).

Other than qualitative improvements, redeveloping brownfields can also help in a quantitative way by providing a larger number of new and sustainable houses (Boelhouwer, 2020). By converting unused industrial or commercial land into residential areas, cities can increase the number of available houses without taking up natural or farmland, leading to a better housing market situation (Boelhouwer, 2020). Brownfield redevelopment can therefore help in, not only realizing different sustainable development goals, but also in solving the ongoing housing crisis in a sustainable way (Manfredi & Costi, 2023).

Promoting sustainable (re)development also comes with certain downsides according to Mangnus (2021). Sustainable development and climate adaptation become increasingly more important when building new houses within the Netherlands and the rest of the European Union which at first glance seems purely positive. However, the building requirements which are tied to sustainable development often lead to new restrictions that negatively affect the housing market. An example is that in the Netherlands, new buildings must comply with stringent energy performance standards known as the Nearly Zero-Energy Building (NZEB) requirements which are determined by the European Union (D'Agostino & Mazzarella, 2019). Other building standards necessitate the integration of high-quality insulation, energy-efficient windows, and systems like solar panels or heat pumps (Mangnus, 2021). Instead of accelerating the realization of houses, these various restrictions can lead to the cancellation or postponement of building plans (Mangnus, 2021).

2.2 Adaptive reuse

Adaptive reuse is a strategy that aims to transform old and possibly abandoned sites like brownfields, into useful vibrant spaces while using its pre-existing structures (Azam, 2023). This approach not only preserves historical structures and the stories they hold, but also integrates them into modern needs, making sure that the cultural legacy continues. From an economical point of view it stimulates local economies by increasing property values, creating jobs, and attracting new businesses (Azam, 2023). By reusing existing structures, which in the end is at the core of adaptive reuse, the need for new construction materials is also reduced (Canevaro et al., 2019).

The relevance of adaptive reuse in the context of urban renewal, especially in regions affected by industrial decline, is significant (Mohamed et al., 2017). As industries relocate or shut down, they leave behind vacant properties that become eyesores or liabilities. According to Cowell (2014) and the Preservation Green Lab (2013), adaptive reuse serves as a pragmatic solution to these challenges by transforming potential urban decay into valuable community resources. Public policies therefore increasingly advocate for adaptive reuse as a means to rehabilitate these structures for new uses, ranging from commercial and residential to industrial purposes (Cowell, 2014; Preservation Green Lab, 2013). Adaptive reuse is also linked with the principles of sustainable development, specifically the three pillars as identified by Tobias and Vavaroutsos (2009): environmental protection, economic growth, and social equity, which can be seen in the following figure.



Figure 2 (Tobias and Vavaroutsos, 2009)

These pillars correspond to reducing construction waste and greenhouse gas emissions, stimulating local economies through job creation and property value increases, and preserving community ties by maintaining buildings of historical and cultural significance (Wilkinson, 2012; Conejos et al., 2015).

Environmental Protection: Adaptive reuse contributes to environmental protection by reducing construction waste and lowering greenhouse gas emissions. By repurposing existing buildings, there is a decreased need for new construction, which minimizes the extraction and consumption of raw materials (Wilkinson, 2012).

Economic Growth: Economically, adaptive reuse stimulates local economies through job creation and property value increases. The renovation and repurposing of old buildings generate employment opportunities, both during the construction phase and through the new uses of the buildings once the projects are completed (Wilkinson, 2012). Redeveloped properties can also attract new businesses and investments, possibly leading to increased economic activity in the area (Azam, 2023).

Social Equity: Socially, adaptive reuse helps preserve community ties by maintaining buildings that hold historical and cultural significance. These buildings often serve as repositories of community identity and memory (Conejos et al., 2015). By keeping these structures in use, adaptive reuse could help to maintain a sense of continuity and belonging among residents.

However, the literature suggests that while the environmental and economic benefits are often emphasized, the social or equity aspects are less frequently addressed (Tobias and Vavaroutsos, 2009). In this case, 'bearable' refers to finding a balance between economic viability and social equity so that the economic activities do not overload or undermine the social systems, making sure that development is fair and accessible to all members of society. Reasonable is about achieving a balance between environmental protection and social equity, ensuring that efforts to protect the environment do not unjustly burden specific groups of people. Ultimately, workable practical describes the balance between economic viability and environmental protection, making sure that economic activities are sustainable and do not degrade the environment, while still being economically feasible (Tobias and Vavaroutsos, 2009).

Adaptive reuse encompasses both the preservation of historical structures and their integration into the evolving urban landscape. For instance, the repurposing of a former airship hangar near Berlin into the Tropical Islands Resort illustrates the innovative economic and cultural potential of adaptive reuse projects (Janner et al., 2001). In the U.S., the transformation of various building types, from schools to warehouses, into functional spaces like apartments and offices showcases adaptive reuse's flexibility and economic viability (National Trust for Historic Preservation, 2013). According to Cantell (2005), 'adaptive reuse is not just a tool for preservation but serves as a central component of "smart growth" strategies. This approach emphasizes the creative and sustainable utilization of existing infrastructures within city cores, which contrasts with the unsustainable tendencies of a throwaway society.

2.3 Brownfield Redevelopment

Mayers and Wyatt (2004) define brownfield sites as 'places that are not currently used or as non-agricultural land resources.' These locations have become increasingly popular for development as urban sprawl consumes what are sometimes prime locations for redevelopment within or adjacent to present city limits (Tang & Nathanail, 2012). According to Lanz & Pendlebury (2022), the concept of reusing land in modern history is not new. The concept already emerged in the 1970s as a response to the burgeoning conservation movement and growing environmental awareness. Often, these brownfields are located close to already developed infrastructure in urban areas (Myers & Wyatt 2004).

Brownfield sites are diverse and can include industrial facilities, abandoned commercial properties like shopping malls, and former transportation hubs. These areas may have been contaminated or degraded by previous land use, making them challenging to repurpose without intensive efforts (Tang & Nathanail, 2012). Redeveloping these locations helps to prevent further sprawl, which is preferred for its quicker

access to services and sometimes existing public transportation, waste disposal, and utility use, all of which are much cheaper than establishing new systems for rural areas (Tang & Nathanail, 2012). Redeveloping these locations also encourages mixed land use and densification in city centers, both of which are key elements of urban sustainability (Ahmad, 2018).

2.3.1 Challenges and opportunities

The challenges and opportunities in brownfield redevelopment are summarized by Glass (2000). According to Glass (2000), brownfields are always located near city centers. The internal political dynamics in the local state and municipal deregulation will greatly influence the redevelopment of brownfields. If the state government gets more involved in enforcing rules, the city will work harder to clean up the environment, focusing on making sure rules are followed, especially when it comes to fixing up brownfields (Glass, 2000). This presents an opportunity because when the state government takes a stronger role in regulating and controlling environmental policies, cities are likely to become more assertive in redeveloping sites like brownfields. This could involve stricter enforcement measures to ensure that these areas are restored and made safe for public use, thus creating healthier living environments and potentially increasing property values. However, it also introduces challenges related to compliance and the potential financial burden on local governments and developers.

Municipal deregulation, however, may promote the opportunity of redeveloping brownfields because it simplifies the process of obtaining development approvals or financial assistance by removing barriers that could hinder building plans (Mangnus, 2021). Entering into partnerships with the private sector can be a double-edged sword in a way that the city may benefit from private funding or investment, presenting an opportunity for more efficient and resource-rich redevelopment projects, but it will also put the city in a challenging situation where it may have to accept development that is not entirely beneficial to the public (Glass, 2000; Van der Krabben & Jacobs, 2013).

Another challenge comes from competition among local governments, which can lead to an aggressive stance in seeking to redevelop under the assumption that it is better to get something done at some risk than continue to deal with the undesirable conditions (Vermeer & Vermeulen, 2012). In general, Glass (2000) also argues that the more that deregulation and entrepreneurial approaches in public management become prevalent, the more likely it will be that cities will seize the opportunity to redevelop brownfields. However, a significant challenge is that the economic benefit of brownfield redevelopment cannot always be clearly discovered, and in many cases, the development of brownfields will have an adverse effect on the surrounding area. This include increased pollution or the displacement of local residents (Vermeer & Vermeulen, 2012).

On the opportunity side, Vermeer and Vermeulen (2012) also note potential positive spillover effects of brownfield redevelopment on surrounding urban areas, highlighting opportunities for enhanced economic activity and improved quality of life. Gamper-Rabindran and Timmins (2013) state that the cleanup of hazardous waste sites, a common challenge in brownfield redevelopment, contributes to raising housing values. This provides evidence of spatially localized benefits, creating a potential for increased property values as a result of brownfield cleanup efforts (Gamper-Rabindran & Timmins, 2013).

It is also becoming more common for cities to engage in public-private partnerships for development projects just like the Netherlands (Van der Krabben & Van Grondbedrijven, 2021; de Souza, 2002), which poses both challenges and opportunities in the context of Public-Private Partnerships (PPP) within brownfield redevelopment. These joint ventures could improve the efficiency and profitability of brownfield redevelopment. However, the challenges include the complexities of sharing risks and equitable rewards (Glumac et al., 2015).

Challenges	Opportunities
Compliance Burden: Increased regulation can create financial strains on local governments and developers.	State Involvement: Stronger state regulation can lead to more assertive city efforts in cleaning up brownfields, improving public health and property values.
Public-Private Partnerships: Risk of accepting less beneficial developments due to private sector influence.	Private Investment: Partnerships can provide funding and resources, enhancing redevelopment efficiency.
Competition Among Local Governments: Aggressive redevelopment strategies may prioritize quick results over careful planning, risking adverse effects.	Improved Economic Activity: Successful redevelopment can spur local economic growth and improve quality of life in surrounding areas.
Uncertain Economic Benefits: The economic advantages of redevelopment are not always clear and can have negative impacts on the community, such as pollution and displacement.	Increased Property Values: Cleanup efforts can lead to higher housing values, benefiting the community (e.g., through localized benefits).

<p>Complexities in Public-Private Partnerships: Sharing risks and rewards can be challenging and may lead to disputes.</p>	<p>Efficient Redevelopment: Public-private partnerships can streamline processes and make projects more profitable.</p>
---	--

Figure 3: Challenges & Opportunities in brownfield development summarized.

2.4 Collaborative governance

The process of redeveloping previously developed areas within the city is often complicated, requiring strong collaboration among the stakeholders involved to ensure practicality (Eaton, 2021). Collaborating with stakeholders presents both opportunities and risks, and effective coordination of this collaboration is necessary for the overall success of the project (Eaton, 2021). Collaborative governance, according to Ansell and Gash (2008), is an approach where diverse stakeholders from various sectors and levels of government and society work together in a cooperative manner to address complex public issues, like brownfield redevelopment. Collaborative governance brings public and private stakeholders together in collective forums with public organizations to engage in consensus-oriented decision making amongst all three groups (Ansell & Gash, 2008). According to Bell & Scott (2020), the success of collaborative governance depends on internal and external drivers. Internal drivers are factors within the collaborative governance process itself, like stakeholder participation, which influence how decisions are made and what results are achieved. Effective communication and trust-building among stakeholders are internal drivers which are needed for successful collaboration. Next to these, shared goals and objectives also help align efforts towards achieving desired outcomes and fall under the internal drivers of collaborative governance (Bell & Scott, 2020). External drivers, however, include factors such as the unique challenges faced by different regions or the institutional contexts in which collaboration takes place. These external factors may include regulatory frameworks, funding availability, and community dynamics, all of which influence the feasibility and effectiveness of collaborative governance approaches (Bell & Scott, 2020). Together, these internal and external drivers shape how collaborative governance processes unfold and influence the outcomes they produce (Bell & Scott, 2020).

Municipalities, with their responsibilities in land planning and access to public resources, play an important role in collaborative governance, although they may face challenges due to limited capacity and unpredictable politics (Van Rooy, 2009). Properly organizing collaboration, facilitated by municipalities, can increase the resilience of developments in the face of changing circumstances and improve their feasibility (Van der Krabben & Jacobs, 2013; Ahmad, 2019).

2.4.1 Advantages & challenges in collaborative governance

Huxham's concept of collaborative advantage highlights the potential synergy that collaboration can bring, enabling the accomplishment of developments that may not be possible otherwise (Huxham, 1993). Collaborative advantage is about the benefits that can arise from working together in partnerships or collaborations. It shows the potential for synergy and positive outcomes that can result from joint efforts and shared resources. The concept emphasizes the ability to achieve more collectively than what could be accomplished individually, despite challenges such as conflicting interests (Huxham, 1993). Lasker et al. (2001) highlight "synergy" as the unique advantage of collaboration, which goes beyond mere resource exchange. It emphasizes that collaboration allows individuals and organizations to combine their perspectives, resources, and skills to create something new and valuable together, exceeding what they could achieve individually. Lasker et al. (2001) also highlight how collaboration can improve creativity and comprehensive thinking by encouraging the exploration of diverse perspectives and promoting a more holistic understanding of problems.

However, collaborative governance often faces challenges, such as 'collaborative inertia', which can create slower progress or even lead to conflicts. Stakeholders' individual goals and aspirations, influenced by external factors, influence their dedication and contributions to the development process, making the management of collaborative structures more complex (Vangen & Huxham, 2010). Another challenge that might appear during collaborative governance is the issue of resource allocation and distribution among stakeholders (Lemaire & Provan, 2018). This challenge arises when there is unequal access to resources or when stakeholders have differing perceptions of fairness in resource distribution. For example, in a brownfield redevelopment project, stakeholders may disagree on the allocation of funding for remediation efforts, with some advocating for more resources to be allocated to environmental cleanup while others prioritize economic revitalization initiatives. This disparity in resource allocation preferences can lead to conflicts and hinder collaborative progress (Lemaire & Provan, 2018).

Leadership also plays a crucial role in aligning stakeholders and navigating through the complexities of the development phases (Ulibarri et al., 2020). Effective leadership is needed for facilitating the establishment of relationships, setting goals, and building trust among participants during the formation stage of collaborative governance. Additionally, as collaborative governance progresses through different stages like stabilization and routinization, leadership can serve as an instrument in developing the skills necessary to sustain collaboration and gain external legitimacy (Ulibarri et al., 2020). In the end, leadership is needed to manage internal and external changes that may occur over time. This, in turn, can determine whether collaborative governance is successful.

Lastly, establishing trust among stakeholders is essential for improving collaboration, as layered trust-building over time contributes to the success of redevelopment projects (Ministry of the Interior and Kingdom Relations [Ministry BZK], 2019). Leadership and trust-building are closely connected, as effective leadership helps guide stakeholders toward shared goals and align their interests (Ministry BZK, 2019).

Collaborative Advantages	Collaborative Challenges
Collective Problem-solving: (Huxham, 1993): Synergy and positive outcomes from joint efforts and shared resources.	Collaborative inertia (Vangen & Huxham, 2010): Slower progress or conflicts due to individual goals and external influences.
Synergy (Lasker et al., 2001): Combining perspectives, resources, and skills to create something new and valuable together.	Leadership challenges (Ulibarri et al., 2020): Navigating complexities, establishing trust, and sustaining collaboration over time.
Trust-building (Ministry BZK, 2019): Establishing trust among stakeholders contributes to project success by aligning interests and guiding towards common goals	Resources allocation (Lemaire & Provan, 2018): Disparities in allocation of funding for example.

Figure 4: Collaborative advantages and challenges summarized.

In the field of collaborative governance, collaborative advantages and challenges do not always appear in the same way, even though Figure 4 may suggest otherwise. The nuance here is that advantages and challenges are not always strictly divided. Certain aspects of collaborative advantages can also become challenges, and vice versa. These interactions exist on a spectrum, shifting between opportunities and challenges depending on how well they are managed. For instance, building synergy might seem like a straightforward goal according to Lasker et al. (2001), but the path to achieving it can come with challenges such as streamlining different stakeholder agendas. Recognizing this fluidity and addressing these interactions in the governance process is necessary to understand and improve stakeholder collaboration in complex projects like brownfield redevelopment. Therefore, a distinction must be made between the effort required to create synergy, such as navigating conflicting interests and building common ground, which can be challenging, and the benefits of achieving synergy, where successful collaboration leads to positive combined outcomes and presents an opportunity. This applies to all aspects of collaborative governance. When executed effectively, they create opportunities for stakeholder

collaboration in brownfield redevelopment. However, if mismanaged, they may hinder collaborative efforts.

2.4.2 Stakeholder definition & identification

Stakeholders are generally understood as the people, teams, or organizations who affect or could be affected by an organization's pursuits, products, or policies (Serna et al., 2022).

Stakeholder identification involves identifying who these groups and people are, identifying their demands or concerns regarding the task, and evaluating their involvement in task activities. According to Salvioni and Almici (2020), appropriate stakeholder identification requires knowledge of the culture, environment, and political context in which the project will take place.

Mitchell et al. (1997) developed a framework to categorize stakeholders based on their levels of power and interest within collaborative governance. This framework is usually presented in power/ legitimacy/ urgency grid which can be seen in Figure 5. In Mitchell (1997), power is defined as a stakeholder's ability to influence the behavior, direction, or outcome of an organization. Urgency refers to the degree to which stakeholder claims demand immediate attention, based on time sensitivity and the critical nature of the issue. Legitimacy is the perceived validity of a stakeholder's claim from a societal perspective (Mitchell, 1997).

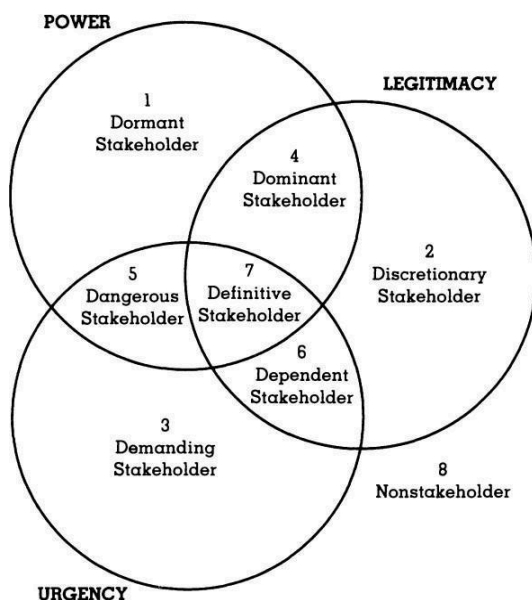


Figure 5: Stakeholder framework by Mitchell et al. (1997)

According to Mitchell et al. (1997) and Firdaus (2018), stakeholders can be classified into multiple categories. These categories are illustrated with examples of potential brownfield redevelopment stakeholders in the Arnhem-Nijmegen area.

Dormant stakeholders: These stakeholders have high power but low legitimacy and urgency. They have the potential to influence decisions but are currently inactive or disengaged. These could include neighboring property owners or housing corporations that own brownfields but have not actively engaged in redevelopment discussions. Although they have significant influence over the redevelopment process due to their ownership stakes, they may not yet see a pressing reason to engage actively, possibly because the redevelopment hasn't yet impacted their interests directly. However, their dormant status could shift if redevelopment plans threaten their property values or commercial interests. A dormant stakeholder within the context of brownfield in the region could be property owners within the region. This could be landowners that own brownfield locations where municipalities or project developers want to redevelop and possibly acquire the industrial area that they own.

Discretionary stakeholders: These stakeholders have high legitimacy but low power and urgency. They are recognized as having valid concerns but lack the influence or immediate need to drive action. This could be environmental organizations for example. In the Arnhem-Nijmegen region, these might be local non-profits or community-based environmental associations focused on sustainable urban development. While they offer valuable insights on ecological impacts and advocate for environmentally responsible redevelopment, they often lack the financial or political power to impose their agenda directly. A specific example of a discretionary stakeholder within this research could be the 'Gelders Milieufederatie' or the 'Instituut voor Natuurbeschermingseducatie,' which are environmental organizations advocating for sustainable development in the region.

Demanding stakeholders: These stakeholders have high urgency but low power and legitimacy. They have immediate needs or concerns but lack the influence or recognition to make a significant impact. This could be residents living near the brownfield sites in the area who are directly impacted by environmental contamination. Demanding stakeholders could be individuals whose daily lives are directly affected by environmental hazards of existing brownfield locations. They may demand quick action due to health concerns or the need for improved living conditions. However, due to their lack of formal power, limited knowledge on how to leverage it, or the absence of broader societal recognition, their ability to influence decision-making is restricted. An example of this group within the Arnhem-Nijmegen region are the residents living near the brownfields in Nijmegen who experience nuisance from former industrial and abandoned buildings and are unable to start a lawsuit.

Dominant stakeholders: These type of stakeholders have high power and legitimacy but low urgency. This could be developers, local government officials, or major investors who have significant influence and resources but don't have incentives to act right away. Their power comes from financial resources, regulatory authority, the ownership of land and their involvement in planning and decision-making processes. Their legitimacy is rooted in their recognized roles in urban development. While they might not always have an urgent need to act, their influence means their perspectives and expectations are prioritized in redevelopment discussions. Dominant stakeholders within the context of this research could be the municipality of Arnhem or Nijmegen or project developers when they lack direct incentives for brownfield redevelopment in the area for example.

Dependent stakeholders: These stakeholders have high legitimacy and urgency but low power. They have valid and immediate concerns but rely on others with more influence to advocate for them. Small businesses in the Arnhem-Nijmegen region that depend on the successful redevelopment of brownfield sites for economic reasons fit this category. Dependent stakeholders may include local enterprises whose future depends on the revitalization of the area. They have legitimate stakes in the outcome and may urgently require redevelopment to sustain their businesses, yet they often lack the financial or political power to advocate for themselves effectively. Examples include companies which are united under *Bedrijvenvereniging TPN West*, a business association protecting the interests of industrial companies in the Nijmegen-West industrial area.

Dangerous stakeholders: These stakeholders have high power and urgency but low legitimacy. This group may include activist organizations that actively resist specific aspects of redevelopment plans through public demonstrations or campaigns. Their power initially stems from their ability to mobilize public opinion, stage demonstrations, or leverage media coverage. Their urgency is often driven by immediate social or environmental concerns. This type of stakeholder is uncommon within the context of brownfield redevelopment in the Arnhem- Nijmegen region because for a type of stakeholder to become a dangerous type of stakeholder, activist groups must become more radical and use methods which are perceived as extreme or outside societal norms by the other stakeholders, which could unduly disrupt redevelopment efforts. A possible example is an individual who opposes to brownfield redevelopment within the area and therefore uses more extreme and illegitimate methods.

Definitive stakeholders: These stakeholders have high power, legitimacy, and urgency, making them the most critical to address in the redevelopment process. Regulatory agencies in the Arnhem-Nijmegen region, such as local environmental authorities or urban planning departments, exemplify definitive stakeholders. They have the power to approve or halt redevelopment projects, legitimacy derived from their societal role in ensuring compliance with laws and regulations, and urgency driven by deadlines or policy mandates. Their involvement is crucial to the successful progression of brownfield projects within

the region. A definitive stakeholder could be the ‘‘Omgevingsdienst Regio Arnhem’’ (ODRA) or Omgevingsdienst Regio Nijmegen (ODRN) which are regional environmental agencies overseeing regulatory compliance in this field of work.

Non-stakeholder: These are entities or individuals with no direct interest or influence in the outcomes of the redevelopment. Within this context, non-stakeholders could be people or organizations outside the immediate geographical or economic impact zone of the brownfield redevelopment. For example, individuals who do not reside, own property, or operate businesses near the targeted brownfield sites, as well as organizations with no interest in the region's urban development, fall into this category.

Besides stakeholder identification, understanding stakeholders' behavior and interests is important for predicting their future support (Eaton et al., 2021). Since attitude towards specific objects is influenced by their beliefs or system of ideas, their behavior can be viewed as manifestation of their attitude (Bagozzi, 1985). Identifying stakeholders' viewpoints is essential, as these perspectives influence their level of support and engagement (Hollebeek et al., 2022).

2.5 Operationalization

2.5.1 Conceptual model

This research focuses on stakeholder collaboration in brownfield redevelopment. Because stakeholder collaboration in this field is complex, the most important concepts are operationalized in this conceptual model, to better understand their interlinkages. The conceptual model, developed from the preceding theoretical insights, positions ‘stakeholder willingness to collaborate’ at its core. The model, which can be seen in Figure 6, examines how this willingness to collaborate influences the (un)successfulness of the redevelopment. Stakeholder collaboration is influenced by four key variables: Collaboration Advantages, Collaboration Challenges, Contextual Factors, and Stakeholder Interests. ‘Collaboration advantages’ and ‘collaboration challenges’ will be examined in detail due to their significance, as highlighted by Mitchell et al. (1997). These factors may include trust-building, synergy, resource allocation, and leadership, depending on their execution. The model will also examine how contextual factors such as regulatory environments, economic conditions, and community characteristics shape stakeholder collaboration. In addition, the model considers the potential influence of stakeholder interests on collaboration. Lastly, this research seeks to provide a framework for understanding and improving stakeholder collaboration in the context of brownfield redevelopment in the Arnhem-Nijmegen region.

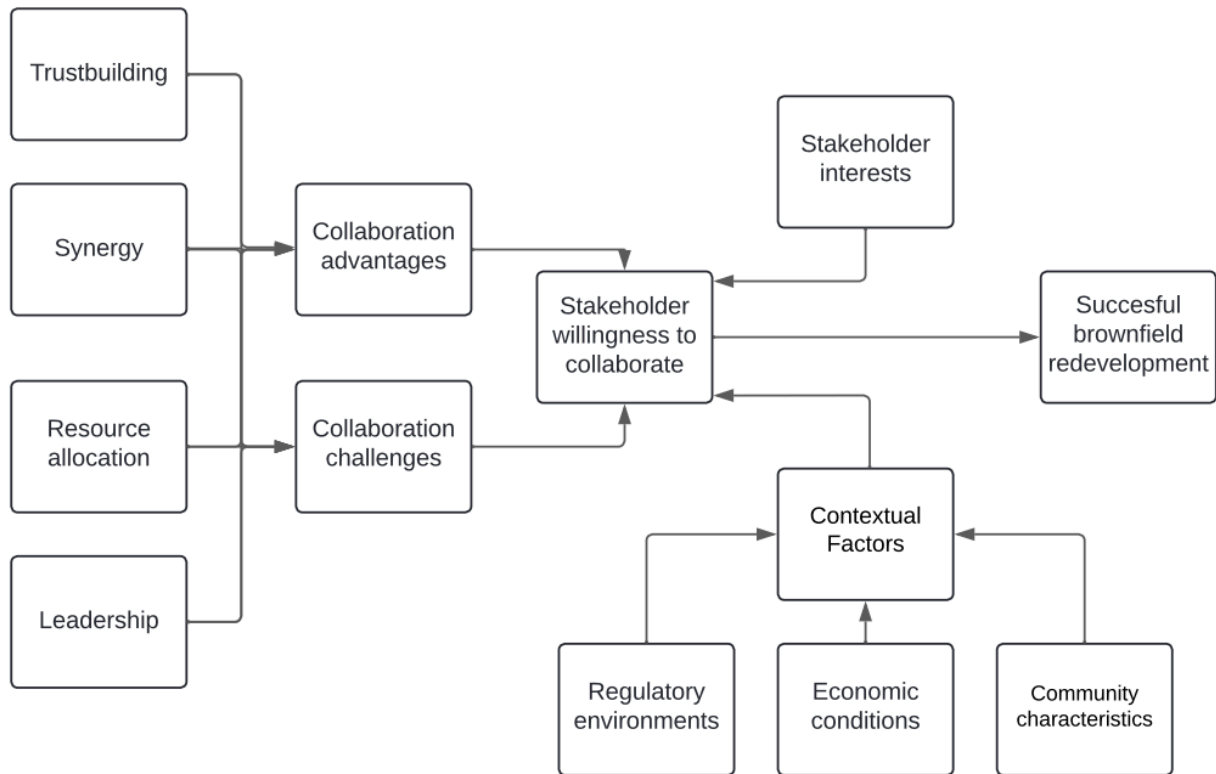


Figure 6: *Conceptual model*

2.5.1 Operationalisation of key concepts

Trust-building:

Trust-building involves developing mutual confidence and reliability among stakeholders, which is essential for effective collaboration (Ministry BZK, 2019). Trust is built through consistent communication, transparency, and fulfilling commitments.

Synergy:

Synergy refers to the improved outcomes that arise from the combined efforts of stakeholders, which are greater than the sum of their individual contributions (Lasker et al., 2001). In brownfield redevelopment, synergy can lead to more efficient resource use.

Resource Allocation:

Resource allocation is the distribution of financial, human, and material resources among stakeholders in the redevelopment process (Lemaire & Provan, 2018). Fair and efficient allocation is needed for maintaining stakeholder engagement and preventing conflicts.

Leadership:

Leadership looks deeper into what difficulties leaders face in guiding and coordinating stakeholder collaboration (Ulibarri et al., 2020). Leaders must often navigate relationship dynamics and maintain stakeholder trust and participation to realize successful redevelopment outcomes.

Collaboration Advantages:

Collaboration advantages refer to the positive effects of working together in brownfield redevelopment. Depending on execution, trust-building, synergy, resource allocation, and leadership can function as either advantages or challenges in brownfield redevelopment.

Collaboration challenges:

Collaboration challenges can be explained as negative effects that arise from working together within brownfield redevelopment. Trust building, synergy, resource allocation and leadership could become either advantages or challenges depending on how well these variables are executed within the context of brownfield redevelopment.

Stakeholder willingness to collaborate:

Stakeholder willingness to collaborate refers to the joint efforts of government agencies, private developers, and other key actors in achieving common goals in brownfield redevelopment. This is the key component of this research and is therefore located in the center of the conceptual model. Collaboration levels are amongst others determined by either collaboration opportunities and challenges (Lasker et al., 2001; Ulibarri et al., 2020; Ministry BZK, 2019; Lemaire & Provan, 2018). This can also be seen within the conceptual model. It must be noted that the conceptual model partly differs from the strict separation of challenges and opportunities compared to Figure 4 which can be seen in the theoretical framework. This model recognizes that ‘trust-building,’ ‘synergy,’ ‘resource allocation,’ and ‘leadership’ do not inherently function as either opportunities or challenges but depend on execution. As explained before these concepts can be either depending on how well these concepts are executed. For example the absence of decent leadership can lead to collaboration challenges while the presence of good leadership can lead to new collaboration opportunities and eventually a better willingness to collaborate. This also counts for the absences or presence of trust building, synergy, resource allocation and this is the reason that they can influence either collaboration challenges and opportunities.

Stakeholder Interests:

Stakeholder interests are the specific goals, concerns, and priorities of different stakeholders involved in the redevelopment process. These interests can vary widely and can have consequences for successful collaboration (Serna et al., 2022). The difference in stakeholder interest can also lead to 'collaborative inertia', which can create slower progress or even lead to conflicts. Stakeholders' individual goals and aspirations, influenced by external factors, influence their dedication and contributions to the development process, making the management of collaborative structures more complex (Vangen & Huxham, 2010). Unlike challenges or opportunities that arise from interactions or conditions within the collaboration, stakeholder interests pre-exist and shape how stakeholders perceive and engage with collaborative processes. Misaligned interests can lead to collaborative inertia, while aligned interests can foster greater willingness to collaborate (Vangen & Huxham, 2010). Therefore, in this conceptual model, stakeholder interests function as a fundamental, independent variable in determining the willingness of collaboration from stakeholders in brownfield redevelopment.

Contextual Factors:

Contextual factors are the external conditions and influences that affect stakeholder collaboration in brownfield redevelopment. These include regulatory frameworks, economic conditions, and community dynamics (Bell & Scott, 2020). These factors create broader conditions that either facilitate or hinder stakeholder collaboration. Favorable contextual factors, such as supportive regulations, a healthy economy, or broad community approval, can improve stakeholders' willingness to collaborate. On the other hand, unfavorable contextual conditions, such as regulatory barriers, economic downturns, or broad community opposition, can lead to a reduced willingness to collaborate. Their position around the central concept in the model reflects their indirect but powerful influence on stakeholders' decisions to collaborate or not. Contextual factors are placed independently from collaborative challenges and opportunities in the conceptual model because, like stakeholder interests, they represent external, pre-existing conditions that shape the broader environment in which collaboration occurs. Unlike challenges and opportunities, which emerge from the dynamics of the collaboration process itself. Contextual factors exist outside the immediate interaction between stakeholders. For example, regulatory frameworks, economic conditions, and community dynamics are external forces that stakeholders cannot directly control or negotiate within the collaboration. These factors set the stage for how collaboration unfolds but do not come from the collaboration itself, unlike challenges or opportunities that are as said before, shaped by trust, leadership, synergy and resource allocation during the process.

Regulatory Frameworks:

Regulatory frameworks include laws, policies, and government regulations that establish the rules and processes governing brownfield redevelopment. These frameworks impact how stakeholders engage in the redevelopment process by setting conditions for land use, environmental remediation, permits, and

compliance standards. Favorable or streamlined regulations can promote collaboration by reducing bureaucratic barriers, while complex or restrictive regulations may deter stakeholder willingness to collaborate due to increased costs, delays, or uncertainty in the process (Bell & Scott, 2020). One of the most important examples of a regulatory framework is the *Woondeal 2.0* which is a policy document determining the amount and characteristics of the housing units that should be built within this region over the years.

Economic Conditions:

Economic conditions significantly influence stakeholder collaboration.. Economic conditions such as market demand, land values, access to funding, and incentives for redevelopment (e.g., tax breaks or subsidies) influence stakeholder investment and interest in brownfield projects. In a strong economy, there may be more financial resources and opportunities for collaboration, while economic downturns can reduce funding availability and make redevelopment efforts more challenging, potentially limiting stakeholders' willingness to collaborate (Bell & Scott, 2020). Potential events like the financial crisis and the worldwide pandemic are also part of the economic situation.

Community Dynamics:

Community dynamics refer to the social, cultural, and political characteristics of the local population surrounding the brownfield sites within the context of the Arnhem- Nijmegen region. These dynamics influence stakeholder collaboration through political support or opposition, public engagement, and the specific needs or concerns of the community. (Bell & Scott, 2020).

Successful Brownfield Redevelopment:

Successful brownfield redevelopment is determined by the perspective of the stakeholder who might or might not qualify current forms of collaboration as an improvement compared to previous forms of collaboration (Silverthorne, 2006). The stakeholders' perceptions of whether the collaboration led to efficient resource use, timely project completion, and community engagement can serve as indicators of success. Another measurement method is the extent to which stakeholders view the collaboration as an improvement over past projects.

This is the only variable within this conceptual model that is influenced by the willingness to collaborate. ‘‘Stakeholder Willingness to Collaborate’’ in this conceptual model is the main determinant of whether the redevelopment process will be successful or not. Other factors like contextual influences or stakeholder interests affect the willingness to collaborate but do not directly result in a successful redevelopment.

3. Methodology

This chapter will provide a better understanding of the methods used to conduct this research. The chapter starts with the research philosophy and the research strategy. This research strategy is explained by the research design, the case study approach and the data collection methods. It then moves on to the data analysis which explains what method is used to analyze the data. In the end, the chapter concludes with an explanation of the validity, reliability and ethical considerations within this research.

3.1 Research philosophy

Research philosophy refers to the foundational assumptions that shape how knowledge is developed, interpreted, and applied in a study (Muhaise et al., 2020). It serves as a bedrock upon which research methodologies are constructed and results are interpreted, making it an important aspect of any research strategy (Muhaise et al., 2020). Moon and Blackman (2014) offer three components of research philosophy: ontology, epistemology, and the theoretical perspective.

Ontology, which originated in philosophy, examines the nature of reality, existence, and being (Saunders et al., 2009). It explores different entities and their existence. In essence, ontology seeks to understand phenomena, whether tangible or abstract, and how they interact within the world (Saunders et al., 2009). In this research, ontology is concerned with the nature of stakeholder collaboration in brownfield redevelopment. Specifically, it explores how collaboration, as a social construct, exists within the urban redevelopment processes. This includes recognizing the multiple realities experienced by different stakeholders (e.g., municipal planners, project developers, environmental groups), where each stakeholder perceives collaboration, challenges, and opportunities based on their unique position, interests, and experiences (Healey, 1997). By examining how these perspectives align or conflict, this research recognizes collaboration as a dynamic interaction shaped by contextual, social, and institutional factors, rather than a single objective phenomenon.

Epistemology, another component of research philosophy, examines how knowledge is perceived, acquired, and the methods used to attain it (Bates & Jenkins, 2007). This research adopts a constructivist epistemological approach, emphasizing that individuals actively construct knowledge rather than passively receive it from an external reality (Creswell, 2009). This is also in line with the focus of this research on understanding stakeholder perspectives and collaborative processes, which are shaped by subjective experiences and interactions in brownfield redevelopment.

Theoretical perspective, the third aspect of research philosophy, provides a broad framework for developing research strategies and analyzing data (Bates & Jenkins, 2007). This research applies a combination of social constructivism and structuralism to reveal the underlying social structures and processes shaping human behavior (Creswell, 2009; 2013). Social constructivism focuses on understanding how stakeholders construct their knowledge and beliefs about brownfield redevelopment through interactions and experiences. Structuralism helps to identify the underlying structures that govern stakeholder behavior, such as legal frameworks, economic conditions, and institutional roles, thus showing how these structures influence the processes and outcomes of collaboration in brownfield redevelopment.

3.2 Research strategy

3.2.1 Research design

This research employs a qualitative approach, primarily utilizing semi-structured interviews, desk research, and a case study analysis to capture the experiences and perspectives of the main stakeholders in brownfield redevelopment projects within the Arnhem-Nijmegen region. The qualitative design was selected to allow an in-depth exploration of stakeholder collaboration, which is complex and context-specific, making it well-suited for a case study approach.

3.2.2 Case study approach

The research uses a case study strategy to focus on specific brownfield redevelopment projects within the Arnhem-Nijmegen region. The case study approach enables a detailed examination of stakeholder interactions, collaborative mechanisms, and the contextual factors affecting redevelopment processes in this region. While this approach might suggest a focus on a single brownfield redevelopment project, analyzing only one project would not provide a comprehensive answer to the research questions. Therefore, this case study examines potential collaboration efforts in brownfield redevelopment within the Arnhem-Nijmegen region as discussed by stakeholders. In this research, the case is not one individual brownfield project but rather the broader pattern of stakeholder collaboration across multiple projects in the Arnhem-Nijmegen region. By examining a selection of brownfield projects, the case study method highlights variations in stakeholder collaboration and the challenges and opportunities encountered in different redevelopment processes. The presence or absence of collaboration in these brownfield redevelopments constitutes the central case of this research.

3.2.3 Data collection

Data collection in this research is twofold: by using primary data collection (semi-structured interviews) and secondary data collection (desk research). The primary data is collected through semi-structured interviews with stakeholders such as municipal planning officials, project developers, and representatives from housing corporations, environmental organizations, and sustainability organisations. This is supplemented by desk research that involves analyzing existing literature, reports, and relevant policy documents within this field to establish a foundation of knowledge about brownfield redevelopment and stakeholder collaboration in the Arnhem-Nijmegen region. By combining primary and secondary data collection methods, the research gains an insight in stakeholder dynamics, from both the theoretical and the empirical perspective.

Primary data collection

Within this research sixteen interviews are conducted to understand stakeholder dynamics in terms of collaboration. This amount of interviews captures the essence of why stakeholders are collaborating or not, but also identifies what collaborating means within the context of brownfield redevelopment. Interviewed stakeholders include project developers active in brownfield redevelopment, as well as governmental bodies such as the Municipality of Arnhem, the Municipality of Nijmegen, and the Province of Gelderland, which influence redevelopment decisions in this region. Finally, other stakeholders which are interviewed are Nature & Environment Gelderland and housing corporations who also play a relevant role as stakeholders in this context due to their contribution to social sustainability and ensuring that environmental and community interests are represented in redevelopment efforts.

Semi-structured interviews were chosen as the primary data collection method due to their ability to balance structure and flexibility (Clifford et al., 2010). According to Longhurst (2010), this approach provides an informal setting, enabling a deeper exploration of topics relevant to both the interviewer and interviewee. Semi-structured interviews are particularly valuable in capturing the opinions, thoughts, and actions of diverse stakeholders involved in the research context (Mason, 2002). This method also involves the use of a predefined set of questions outlined in an interview guide, allowing the researcher to maintain a level of structure while also encouraging open-ended discussions with respondents (Bryman, 2012).

The semi-structured interview method also provides the flexibility to adjust questions based on interviewees' responses, facilitating a more fitting exploration of relevant issues, such as collaboration challenges, stakeholder interests, resource allocation, and leadership roles. This flexibility is needed when exploring stakeholder collaboration in brownfield redevelopment, as each stakeholder may experience different challenges or contribute unique perspectives based on their roles in the project

(Healey, 1997). However, it is important to acknowledge that transcribing recordings from semi-structured interviews can be a time-consuming task, meaning that there is a need for clear selection criteria and well-defined research questions to facilitate efficient data analysis (Bryman, 2012). In the following figure the sixteen interviewees can be seen, as well as their function and the length of the interview.

	Function	Employer	Interview length
1. 19/10/2024	Project Developer	-	60 minutes
2. 25/11/2024	Account Manager	Municipality of Nijmegen	55 minutes
3. 25/10/2025	Advocate for sustainability	-	50 minutes
4. 23/10/2024	-Engineer soil pollution and remediation	-Municipality of Arnhem	70 Minutes
5. 23/10/2024	-Information Manager soil pollution and remediation	-Municipality of Arnhem	
6. 13/1/2025	Concept Developer Housing Association	-	50 minutes
7. 14/10/2024	Project Developer	-	75 minutes
8. 13/11/2024	-Consultant Worksites	-Province of Gelderland	65 minutes
9. 13/11/2024	-Policy Officer Worksites	-Province of Gelderland	
10 20/1/2025	Project Developer	-	50 minutes
11. 4/11/2024	Strategic Environmental & Business Advisor	Municipality of Nijmegen	55 minutes

12. 12/11/2024	Advisor Sustainable Development	Municipality of Nijmegen	75 minutes
13. 17/10/2024	Project Developer	-	50 Minutes
14. 9/1/2025	Specialist Participation, Energy and Water.	Nature & Environment Gelderland	50 minutes
15. 31/10/2024	Project Developer within a Public-Private Partnership	Municipality of Nijmegen	50 minutes
16. 15/1/2025	Program Manager Housing Association	-	60 minutes

Figure 7: Interviewees of the research

Secondary data collection

Desk research serves as the secondary data collection method for this research. It involves analyzing existing data from various sources, such as academic articles, government reports, industry publications, and case studies in the field of brownfield redevelopment. The examined documents include the *Woondeal 2.0*, various environmental visions from the respective municipalities within the region, and PBL documents. These PBL (Planbureau voor de Leefomgeving) documents are reports published by the Netherlands Environmental Assessment Agency, an independent research institute that advises the Dutch government on spatial planning, environmental policy, and sustainability. These documents provide analyses and forecasts on issues such as housing shortages, land use, and the future of industrial sites (PBL, 2020). The *Woondeal 2.0* is a policy agreement between the Dutch national government and regional authorities aimed at accelerating housing development, ensuring affordability, and addressing spatial planning challenges (Rijksoverheid, 2023). It sets out targets and strategies for increasing the housing supply, particularly in urban areas. The ‘Omgevingsvisies’ (Environmental Visions) are long-term spatial planning strategies developed by municipalities, provinces, or the national government under the Dutch Environment and Planning Act. These documents outline policy directions for land use, infrastructure, sustainability, and economic development, shaping how cities and regions evolve over time (Gemeente Arnhem, 2024; Gemeente Nijmegen, 2024). These documents are used to supplement the primary data and add value due to their undisputable and factual character. Within this research, secondary data collection is specifically applied to topics such as economic conditions and regulatory environments (Section 4.9) due to the availability of relevant policy documents, reports, and datasets that are easily accessible online.

3.3 Data analysis

For the data analysis, Atlas.ti (ATLAS.ti, version 25.0.1) was used to systematically organize and interpret the interview data. The analysis process followed a structured coding approach, beginning with the identification of code groups that aligned with the conceptual framework of this research. These code groups represent broader themes relevant to stakeholder collaboration in brownfield redevelopment, such as trust-building, synergy, leadership, resource allocation, stakeholder interests, and contextual factors, as well as an additional code group called ‘uniqueness of brownfield redevelopment’. This additional code, which was not part of the conceptual model, was introduced to capture the unique characteristics of brownfield redevelopment and to analyze how collaboration processes differ from those in greenfield developments.

Within each code group, specific codes were created to capture recurring patterns, concepts, and perspectives expressed by the interviewees. The coding process was conducted inductively and deductively: while some codes were predefined based on the theoretical framework, others emerged from the data during the analysis. This allowed for flexibility in capturing both expected and unexpected insights. Each interview transcript was carefully reviewed, and relevant text segments were assigned to corresponding codes. To ensure consistency, overlapping codes were refined, and patterns within each code group were analyzed to identify emerging themes and interrelationships in stakeholder collaboration. The most illustrative and representative quotations were selected to substantiate the findings, providing an insight into stakeholder perspectives.



Figure 8: Codes and Code Groups in Atlas.ti

3.4 Validity, generalizability & reliability

Validity refers to how accurately the research findings represent the true relationships being studied. Internal validity ensures that the results are genuinely caused by the factors being examined, not by other influences such as external events, measurement errors, or researcher biases (Bleijenbergh, 2013). To strengthen internal validity, this research follows strict and consistent data collection procedures to ensure the data accurately reflects the research focus. For instance, interviews are partially structured to avoid leading questions, and multiple sources, such as interviews and academic literature, are used to cross-check the data and minimize bias. This approach helps minimize external influences, such as personal biases and unclear questioning (Bleijenbergh, 2013). External validity refers to whether the findings can be applied to other contexts outside of the research (Bleijenbergh, 2013). To improve external validity, this research engages with a diverse group of participants and incorporates various perspectives, aiming to make the research findings applicable in multiple situations. This improves the generalizability of the research, which is the extent to which findings can be extended beyond the specific research context (Bryman, 2012). In qualitative research, achieving generalizability can be challenging due to the focus on specific cases. However, this research aims for analytical generalizability by identifying patterns across multiple projects and contexts (Yin, 2018). While the research is focused on the Arnhem-Nijmegen region, the insights into stakeholder collaboration in brownfield redevelopment may be applicable to similar projects in other regions. Within the context of this research, the last aspect of this section, reliability, refers to the consistency of the findings over time and across different situations (Bleijenbergh, 2013). This research ensures reliability by carefully selecting participants, consistently applying data collection methods, and carefully recording and analyzing the data.

3.5 Ethical considerations

Finally, when conducting research, ethical considerations must also be taken into account (Husband, 2020). When using semi-structured interviews, it is important to obtain informed consent from participants and make sure that the stakeholder's confidentiality and anonymity is guaranteed if requested. According to Husband (2020), research should also be conducted with sensitivity to the emotions and experiences of participants, especially within this context, because some of the ongoing brownfield projects can be a sensitive topic for some of the stakeholders. According to Sharma (2017), there is also the possibility of bias in the recruitment of participants or the collection of data. To prevent these biases, the researcher must be well aware of their position. All these limitations must be acknowledged and addressed in the research. Lastly, the privacy of participants must be protected at all times (Husband, 2020).

4. Results

4.1 Introduction to the case study

The region

The Arnhem-Nijmegen region is currently a polycentric development with the two major cities of Arnhem and Nijmegen acting as twin cores of the metropolitan region. It has a total of eighteen municipalities and covers an area of 1,161 square kilometers (Wijnacker, 2011). Since World War II, the region has transformed from a rural to an urban economy and is forecast to grow into one of the most urbanized regions of the Netherlands (Gemeente Arnhem, 2024). The Arnhem-Nijmegen urban region is situated in the eastern part of the Netherlands on the banks of the river Rhine. This region is located within the province of Gelderland and lies at a vital east-west and north-south interface of the European transport corridors (Gemeente Arnhem, 2024). As a result of its strategic location, the region also has a rich history in urban development (Wijnacker, 2011).

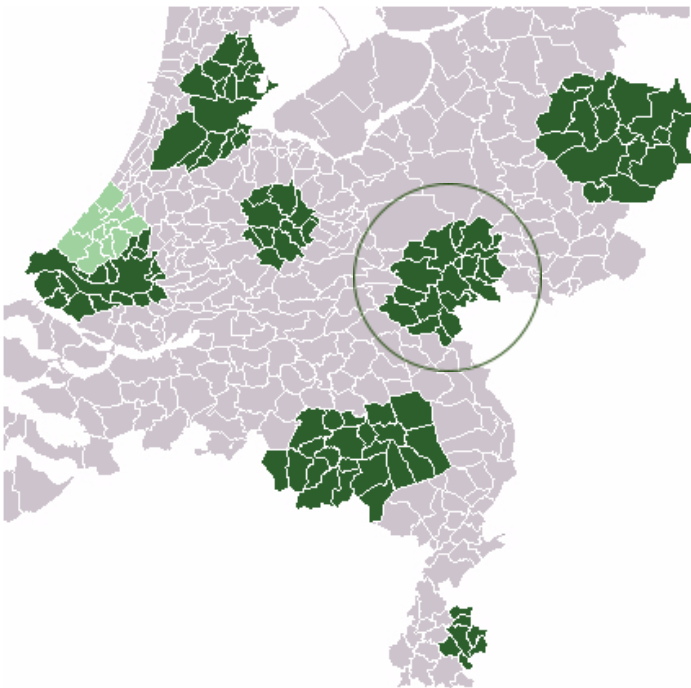


Figure 9: Arnhem Nijmegen Metropolitan area

In 2021, the Green Metropolitan Region (GMR) was officially established as a partnership between the eighteen municipalities within this area. This collaboration focuses on sustainable urban development, livability, mobility, and economic growth within the region (Rijksoverheid, 2023). The GMR's importance lies in promoting integral cooperation to address regional challenges such as housing, the

energy transition, climate adaptation, and economic growth effectively. Brownfield redevelopment plays a significant role in achieving these objectives (Rijksoverheid, 2023). A project developer working in the Arnhem-Nijmegen region noted: *“By repurposing brownfields for housing, industry, or recreation, these projects contribute to the GMR’s goal of efficient use of space, by lifting the pressure on greenfield areas and optimizing existing urban land use.”* (Interviewee 8, personal communication, November 13, 2024). An advocate for sustainability explained that a major challenge is the transformation of outdated business parks: *“A significant challenge within brownfield redevelopment in this area is the restructuring of existing industrial areas into future-proof sustainable working areas.”* (Interviewee 3, personal communication, October 25, 2024). A worksite consultant and policy officer at the Province of Gelderland further stated that: *“The ongoing housing crisis has led to a focus on residential redevelopment, but ensuring sustainable, future-proof industrial sites remains crucial for both the economy and society”* (Interviewee 9, personal communication, November 13, 2025).

Existing brownfield redevelopment is therefore not only about redeveloping old vacant buildings throughout the region into new homes but also about restructuring existing industrial sites in a way that they are sustainable, future-proof, and also optimize the use of space when looking at environmental categories, for example (PBL, 2020). This case study examines the extent of stakeholder collaboration in both housing-focused and industrial brownfield redevelopment.

4.2 Trust-building

Establishing Trust

Trust within redevelopment projects is largely dependent on how stakeholders interact over time in the Arnhem-Nijmegen region. Familiarity with each other’s working methods can facilitate negotiations and reduce uncertainty in the decision-making process. An advocate for sustainability explained: *“We’ve worked with the same partners for years, and that history makes negotiations smoother. You know what to expect.”* (Interviewee 3, personal communication, October 25, 2024). The presence of a shared long-term commitment was also mentioned as contributing to stable partnerships, as ongoing collaboration was said to help establish reliability and predictability. A program manager stated that early involvement of all relevant parties was key to trust-building: *“If stakeholders feel heard from the start, they’re more willing to compromise and invest in the process.”* (Interviewee 16, personal communication, January 15, 2024). Trust was described not as something automatically present, but as something that needed to be reinforced during the process. A project developer within a public-private partnership emphasized this point: *“Trust is the foundation. If we don’t believe in each other’s intentions, we won’t move forward.”* (Interviewee 15, personal communication, October 31, 2024).

Selecting Trustworthy Partners

The selection of reliable partners is another factor in building trust during redevelopment. The track record and reputation of an organization can influence how confidently other stakeholders engage in a collaboration with each other. Some developers, for example, seem more invested in sustainable collaboration efforts than others. A consultant and a policy officer working on worksites within the region noted: *“Not every developer shares the same vision or ethics. We carefully assess who we collaborate with to avoid setbacks.”* (Interviewees 8 & 9, personal communication, October 13, 2024). Public-private partnerships require additional screening, according to a project developer, because conflicting priorities between government and private actors can slow down projects: *“A poorly chosen partner can stall a project for years. We prioritize those with a proven commitment to sustainable development.”* (Interviewee 15, personal communication, October 31, 2024). Working with familiar partners who had demonstrated reliability in past projects was also seen as helpful. An account manager explained: *“Knowing we can count on each other over multiple projects builds reliability and speeds up decision-making.”* (Interviewee 2, personal communication, October 14, 2024).

Open Communication and Honesty

The last element of trust-building frequently mentioned by interviewees is open communication and honesty. A project developer pointed out that openly sharing information about risks, constraints, and expectations helps to create a more predictable working environment: *“If someone withholds crucial details, it erodes trust instantly. We need to be upfront about risks and constraints.”* (Interviewee 1, personal communication, October 13, 2024). Miscommunication or incomplete information can lead to conflicts later in the process, which stresses the need for clarity in project discussions. The same project developer added: *“Clear communication prevents conflicts. It’s better to address issues early than to fix misunderstandings later.”* (Interviewee 1, personal communication, October 19, 2024). An advisor for spatial development emphasized how honest dialogue supports coordination: *“Regular check-ins and honest discussions help us align our goals and prevent unnecessary disputes.”* (Interviewee 12, personal communication, November 12, 2024).

4.3 Synergy

Financial Synergy Through Joint Investments (PPP)

The financial demands of larger-scale brownfield redevelopment in the Arnhem-Nijmegen region often require stakeholders to share resources to make projects realizable. Public-private partnerships (PPP) are a useful tool that ensures necessary investments are made, particularly in cases where market forces alone

would not support redevelopment. A project developer explained that this type of financial synergy is particularly important in addressing social housing needs: *“We want at least 30% social housing—even 40% in some areas like Arnhem or Rijnpark. To achieve this, the municipality and the state have decided to seriously invest in land development together with landowners. Without such investments, these projects simply wouldn’t materialize in the Netherlands.”* (Interviewee 1, personal communication, October 19, 2024). A municipal project developer within a public-private partnership emphasized how joint financing helped keep a redevelopment project on track during the crisis in 2013: *“Given the crisis, being part of this PPP and jointly financing it—spending millions already—actually saved the project. Otherwise, municipalities would have easily pulled the plug.”* (Interviewee 15, personal communication, October 21, 2024). A concept developer also mentioned that housing corporations can also contribute to financial synergy in brownfield projects by leveraging their borrowing capacity: *“Housing corporations can borrow from institutions specifically set up for municipalities.”* (Interviewee 6, personal communication, January 13, 2025).

Synergy as a Practical Necessity

The scale and complexity of brownfield redevelopment mean that collaboration is often not optional but rather a practical necessity. Many interviewees within the Arnhem-Nijmegen region indicated that different stakeholders must rely on each other’s expertise to manage infrastructure, environmental concerns, and legal processes. A project developer explained how interdependencies naturally shape collaboration: *“In such a large area with various landowners, you inherently need each other for things like water management and underground infrastructure.”* (Interviewee 1, personal communication, October 19, 2024). An advocate for sustainability described how the integration of different skill sets allows stakeholders to address redevelopment challenges more effectively: *“Synergy also involves utilizing each other’s knowledge and skills. For example, if I have someone from the municipality at the table, I won’t ask them about structural calculations.”* (Interviewee 3, personal communication, October 25, 2024). Another project developer highlighted how coordination across organizations improves this efficiency: *“For us, it’s crucial that the municipality provides clear points of contact, so we don’t have to figure out which department handles specific issues. This simplifies collaboration significantly.”* (Interviewee 10, personal communication, January 20, 2025).

Synergy Through Competition

While synergy often comes from direct collaboration, competition can also serve as a driving force for innovation and efficiency. A project developer noted that competitive dynamics can push parties to refine their proposals and find better solutions: *“Synergy comes from challenging each other, even through a bit of competition. It pushes everyone to strive for better outcomes.”* (Interviewee 13, personal communication, October 17, 2024).

Synergy Through Alignment of Interests

In some cases, achieving synergy requires actively aligning stakeholder interests rather than assuming that collaboration will naturally happen. A project developer that is active within the Arnhem-Nijmegen region described how redevelopment projects often involve negotiations to balance competing priorities:

“You’re constantly seeking ways to enhance each other’s interests without settling for a compromise. True synergy comes from strengthening opposing interests to make them mutually beneficial.”

(Interviewee 7, personal communication, October 14, 2024). A specialist in participation, energy and who works for Nature & Environment Gelderland shared an example of overcoming community opposition through relationship-building: *“They were initially strongly opposed. But because we built a good relationship, they eventually accepted the redevelopment. If the relationship had been poor, they would have remained adversarial, causing unnecessary conflict, stalling the redevelopment process.”*

(Interviewee 14, personal communication, January 9, 2025).

Synergy Through Mutual Understanding

The last way in which synergy can be achieved within brownfield projects is through a deeper understanding of other stakeholders’ goals and constraints. Interviewees within this region frequently noted the importance of recognizing different perspectives and working toward a shared vision. A project developer explained: *“You need to understand why a city planner wants something to respond effectively. And if this understanding is mutual, it makes collaboration much smoother, creating synergy.”*

(Interviewee 13, personal communication, October 17, 2024). A spatial development advisor from the Municipality of Nijmegen explained how zoning plans can serve as a tool for balancing redevelopment priorities: *“The municipality uses zoning plans to enable housing development while achieving social objectives like sustainability and affordability. This mutual benefit creates the best kind of synergy for society.”* (Interviewee 12, personal communication, November 12, 2024).

A strategic environmental and business advisor from the same municipality added that shared understanding can also contribute to longer-term cooperation: *“When you find common ground, you can work together successfully. Over time, this fosters goodwill and even encourages collaboration on other brownfield projects.”*

(Interviewee 11, personal communication, November 4, 2024).

4.4 Resource allocation

Financial Contributions and Risk Allocation

A recurring theme in the interviews is how financial burdens and risks are shared between public and private parties. Project developers typically bring the largest capital investments, while municipalities

and other government institutions play a more facilitating or regulatory role. However, this can lead to friction, especially when costs exceed expectations or when public contributions remain limited. A project developer emphasized the imbalance in contributions between developers and municipalities: *“As a project developer, you naturally bring in most of the money. The municipality does not easily contribute.”* (Interviewee 1, personal communication, October 19, 2024). The advocate for sustainability highlighted how regional disparities affect investment choices: *“Developers can make more money in the western part of the country than in the east. So, if I have one euro to invest in Nijmegen or Leiden, and in Leiden, I get a 13% return while in Nijmegen it's 8%, I invest in Leiden.”* (Interviewee 3, personal communication, October 25, 2024). Another project developer explained how long-term financial risks complicate brownfield projects: *“When you start a brownfield redevelopment, you've done the calculations: if I can realize this program, I can afford to pay this for the land. But you can never predict 5, 10, or 20 years into the future, and that's a major risk.”* (Interviewee 7, personal communication, October 14, 2024).

Subsidies and Public Investment

Subsidies and public investments are financial instruments that can be used by the government to support brownfield redevelopment. The advocate for sustainability emphasized that subsidies should only be used when there's a clear societal benefit: *“We believe that subsidies should only be used if the societal benefit is clear. Before applying subsidies, it must first be determined whether the project can be financially viable through entrepreneurial means.”* (Interviewee 3, personal communication, October 25, 2024). The advisor for sustainable development at the Municipality of Nijmegen described the complexity of securing public funding across government levels: *“In some cases, provincial and national funds are used to relocate businesses. This happened, for example, in the Waalfront project, where we were able to use a program for the remediation of environmentally harmful businesses, this is not always the case.”* (Interviewee 12, personal communication, November 12, 2024). An account manager at the Municipality of Nijmegen noted that restrictive public investment policies can delay projects: *“Public investment is a balancing act. It has to serve a policy goal, but sometimes that goal doesn't match the timeline or financial reality of a redevelopment project.”* (Interviewee 2, personal communication, November 25, 2024).

Municipal Resource Availability

Municipalities play the most important role in facilitating brownfield redevelopment, yet they often face financial constraints and limited capacity. As a result, they must strategically prioritize projects and collaborate with market actors. According to the advocate for sustainability, municipalities tend to rely heavily on market actors for financial problem-solving: *“We believe that the market should primarily solve financial challenges. Only when the market fails do we consider stepping in, but only if it leads to a sustainable business case.”* (Interviewee 3, personal communication, October 25, 2024). The advisor for

sustainable development at the Municipality of Nijmegen mentioned that municipal staff capacity is often limited: *“Many municipalities have limited capacity, and when they do, it must be distributed across multiple projects.”* (Interviewee 12, personal communication, November 12, 2024). A project developer pointed out that overstretched municipal resources can lead to delays in redevelopment processes: *“Municipalities are overstretched. If you’re working on a redevelopment, you might wait months just to get a response on a permit or a zoning change.”* (Interviewee 13, personal communication, October 17, 2024).

4.5 Leadership

Leadership Qualities and Strategic Vision

According to the interviews, a clear vision provides direction in redevelopment projects in the Arnhem-Nijmegen region, but flexibility remains equally necessary to deal with shifting circumstances. A municipal account manager described how leaders must balance long-term objectives with adaptability: *“You must also believe in the vision that is set. A leader ensures that their vision is translated effectively, but also remains flexible to accommodate alternatives.”* (Interviewee 4, personal communication, October 23, 2024). Making informed decisions requires collaboration with experts who bring specialized knowledge. The same account manager emphasized: *“You don’t know everything, and you don’t know what you don’t know. That’s why you need a strong team around you, involving people who can assess issues correctly and solve them efficiently.”* (Interviewee 4, personal communication, October 23, 2024). From a municipal perspective, leadership in redevelopment can also involve taking action when progress stalls. An account manager explained: *“If negotiations stall due to conflicting interests, the municipality can take decisive leadership by imposing zoning regulations or even initiating expropriation.”* (Interviewee 2, personal communication, October 25, 2024).

Relationship Management and Collaboration

Leaders in brownfield redevelopment operate in an environment where multiple parties must work together. A project developer noted that managing different expectations and interests requires an ability to engage constructively with stakeholders: *“A real leader understands the sensitivities at play, can navigate them, and finds solutions that benefit all parties involved.”* (Interviewee 1, personal communication, October 19, 2024). A consultant and policy officer working on worksites explained how municipalities and private developers often align their perspectives through dialogue: *“We, as project leaders, aim to establish a shared vision for the area. We ask developers what they think is feasible, and we share our own perspective. From there, we create a joint strategy.”* (Interviewee 9, personal communication, November 13, 2024). An advocate for sustainability pointed out that stereotypes about

different stakeholders can complicate collaboration: *“There are often preconceived notions about developers or public officials. Effective leadership involves setting aside these biases and focusing on constructive dialogue.”* (Interviewee 3, personal communication, October 19, 2024).

The Role of Stakeholders

Stakeholders in brownfield redevelopment in the Arnhem-Nijmegen region take on different roles that influence both decision-making and project execution, meaning that not every stakeholder has a ‘leader’ role. Municipalities often act as facilitators, creating policy frameworks and ensuring that redevelopment aligns with broader spatial planning goals. A project developer explained: *“Municipalities set the zoning conditions, make infrastructure investments, and facilitate planning processes. Without their role, developers would face endless uncertainties.”* (Interviewee 7, personal communication, October 14, 2024). Project developers, in contrast, typically take a more directive role, coordinating different aspects of redevelopment and driving projects forward. An account manager described this responsibility: *“A project developer takes on the responsibility of structuring a project, bringing in investors, and ensuring it remains financially viable.”* (Interviewee 4, personal communication, October 23, 2024). A project developer further explained the range in developer involvement: *“Some project developers take a highly proactive role, engaging early with advisors and stakeholders, while others take a more passive approach, waiting to see how the situation unfolds.”* (Interviewee 8, personal communication, November 13, 2024).

Housing corporations and environmental organizations add further dimensions by advocating for social housing, sustainability, and community interests. A project developer emphasized that these actors influence project direction within their own roles: *“There are three main parties, each with different reasons for being involved: social housing corporations, municipalities looking to improve the area, and developers aiming for financial gain. Leadership ensures that despite differing motivations, all stakeholders align their goals.”* (Interviewee 13, personal communication, January 9, 2025).

4.6 Collaborative advantages

Public-Private Partnership (PPP) Advantages

According to most of the interviews Public-private partnerships (PPP) were seen as the the most intensive and far-reaching form of collaborative advantages between the stakeholders. PPP’s bring together regulatory oversight and private sector efficiency, creating structured frameworks for brownfield redevelopment in the Arnhem-Nijmegen region. An advocate for sustainability noted that PPP models help unlock new opportunities by addressing stagnation in the development process: *“If you look at the*

stagnation in development space in the Netherlands, public-private partnerships offer a way forward. We have been involved in several of these partnerships, and they help unlock new opportunities.”

(Interviewee 3, personal communication, October 25, 2024). The same advocate explained how combining market expertise with municipal planning control allows for more integrated decision-making: *“With PPP, you integrate market knowledge from private parties while allowing the municipality to maintain control over planning and zoning.”* (Interviewee 3, personal communication, October 25, 2024). The role of trust between public and private entities was also emphasized: *“I truly believe in PPP. It’s not a magic solution, but it does speed up realization when both sides trust each other. The government must trust the private sector, and vice versa.”* (Interviewee 3, personal communication, October 25, 2024).

A project developer added that financial feasibility improves when PPP structures facilitate external funding: *“External funding streams—whether from provincial or national levels—can support projects within a PPP framework. This is crucial, as local municipal resources alone are often insufficient.”* (Interviewee 7, personal communication, October 14, 2024). Another project developer that is involved within a PPP project within the region called “long-term collaboration” as a key factor in project continuity: *“The Waalfront redevelopment is a great example. For over 20 years, partners have supported each other through the challenges of transforming old industrial areas into new urban spaces.”* (Interviewee 8, personal communication, November 13, 2024). A consultant and policy officer working on worksites remarked on challenges related to land acquisition: *“While PPP worked well in some cases, the acquisition of land parcels was often a difficult process. Rarely does an owner willingly come forward to sell for redevelopment.”* (Interviewee 9, personal communication, November 13, 2024). A project developer also explained how shared investments are reflected in the financial structure of PPPs: *“Ground exploitation in these projects often involves shared financial commitments. In this case, both the municipality and marketside stakeholders jointly invested in land preparation and development costs.”* (Interviewee 10, personal communication, January 20, 2025).

4.7 Collaborative challenges

Conflicts in Collaboration

Differences in decision-making authority between public and private stakeholders can create friction in the Arnhem-Nijmegen region. A project developer that is active in the Arnhem-Nijmegen region explained: *“Ultimately, we own the site, so we decide what happens. However, the municipality also has authority over zoning and regulations. If they impose unreasonable demands, nothing moves forward, and the site remains undeveloped.”* (Interviewee 13, personal communication, October 17, 2024). The

same project developer noted that administrative delays can impact project timelines: *“A weak or indecisive municipal representative can delay a project significantly. They might request input from multiple departments but fail to consolidate feedback efficiently, leaving us with an incomplete or unworkable plan.”* (Interviewee 13, personal communication, October 17, 2024). Changes in municipal policies were also mentioned as a source of uncertainty by the same project developer: *“Municipal agendas shift every six months. We begin with one urban planning proposal, only to be told later that we must comply with new regulations. This unpredictability causes significant delays and financial losses.”* (Interviewee 13, personal communication, October 17, 2024). Concerns about transparency in public-sector decision-making were also raised: *“We offered this land for redevelopment 18 months ago, but they claimed it wasn’t the right time. Meanwhile, they were making plans behind closed doors.”* (Interviewee 13, personal communication, October 17, 2024).

The same project developer further explained that limited municipal capacity can lead to stagnation in brownfield redevelopment: *“The municipality simply didn’t have the capacity, and now we’ve been discussing this for three years without any progress.”* (Interviewee 13, personal communication, October 17, 2024). A participation specialist in energy and water described how public resistance can make collaboration more difficult: *“I’ve experienced standing in front of a hostile crowd completely against redevelopment projects. These situations make collaboration efforts incredibly difficult.”* (Interviewee 14, personal communication, January 9, 2025). Another project developer reflected on the risks of working with unreliable partners: *“We were too trusting. We entered a deal believing it would create jobs and relocate a facility, but the company turned out to be financially unstable.”* (Interviewee 7, personal communication, January 13, 2025).

Disadvantages of Public-Private Partnerships (PPP)

Public-private partnerships require financial commitments from both the public and private sectors, which can become a challenge when costs exceed initial projections. A local project developer that is involved in a PPP explained: *“There’s currently a €30 million shortfall in one of our PPP projects. Both the private developer and the municipality must contribute €15 million each to cover the deficit.”* (Interviewee 15, personal communication, October 31, 2024). The same project developer shared how competing interests can complicate large PPP projects: *“In one PPP project, we had six or seven private partners, along with housing corporations. When the market was strong, these partnerships quickly became competitive and contentious, making collaboration extremely difficult.”* (Interviewee 15, personal communication, October 31, 2024).

4.8 Stakeholder interests

Stakeholder Reputations and Conflicting Priorities

According to most of the interviews conducted in the Arnhem-Nijmegen region, project developers tend to focus primarily on financial viability, while municipalities prioritize regulatory frameworks and public interests. A project developer described the tension between these perspectives: *“The municipality sees us as a developer who only wants to make money, while we see them as an obstacle to progress. Both sides need to recognize each other's objectives to make collaboration work.”* (Interviewee 7, personal communication, October 14, 2024). The same project developer pointed out differences in financial expectations: *“Developers aim for 10–15% returns, while municipalities argue that 7–8% should be sufficient. The gap between these expectations impacts project feasibility.”* (Interviewee 7, personal communication, October 14, 2024).

Diverse Agendas

Stakeholders approach redevelopment from different angles, balancing economic development, environmental concerns, and housing needs. An account manager from the municipality of Nijmegen explained how policy inconsistencies can create obstacles: *“Maybe you want more social housing, maybe you want more open space, but the developer has to make it financially feasible. The challenge is that every party has its own goals, and policies don't always align.”* (Interviewee 2, personal communication, October 19, 2024). A worksite consultant and worksites policy officer from the province of Gelderland describe how conflicting land-use objectives can complicate redevelopment processes: *“The municipality wants more housing, while regional authorities stress the importance of preserving industrial zones. Striking the right balance is an ongoing challenge.”* (Interviewees 8 & 9, personal communication, October 13, 2024 & November 13, 2024). A project developer emphasized how these differing motivations require alignment through negotiation: *“Developers, municipalities, and housing corporations each have different motivations for redevelopment. Success comes when these groups align their interests despite having different reasons for participation.”* (Interviewee 7, personal communication, October 17, 2024).

Political Influence on Decision-Making

Changes in political leadership were mentioned as influencing long-term redevelopment plans in the Arnhem-Nijmegen region. An account manager noted how evolving priorities affect policy direction and stakeholder commitments: *“The biggest risk is political inconsistency. One year, we have a left-leaning government supporting affordable housing; the next, a right-leaning administration prioritizes commercial development. These fluctuations disrupt projects.”* (Interviewee 7, personal communication,

October 17, 2024). An advocate for sustainability described how political considerations shape project adjustments: *“When working with political parties, we tailor project aspects to align with their platforms. This increases buy-in but also adds a layer of political complexity.”* (Interviewee 3, personal communication, October 23, 2024). A project developer pointed out how media attention and public perception can shift priorities: *“When the media gets involved, public perception often dictates decision-making. Even well-planned projects can face opposition due to public outcry.”* (Interviewee 7, personal communication, October 14, 2025).

4.9 Contextual factors

Economic Conditions

Market dynamics and financial stability affect brownfield redevelopment priorities and investment decisions in the Arnhem-Nijmegen region. A project developer described how economic downturns can force stakeholders to revise initial plans: *“The 2008 financial crisis forced us to reassess project visions. We had to modify housing plans and take financial losses, but maintaining the redevelopment vision was key.”* (Interviewee 15, personal communication, October 31, 2024). A worksite consultant from the province of Gelderland noted how changing economic conditions can alter perceptions of land availability and demand: *“We thought we had an oversupply of industrial zones, but the market shifted, and suddenly, we faced a shortage. That required us to rethink our redevelopment strategy.”* (Interviewees 8, personal communication, November 13, 2024). This fluidity in land use demand is also reflected in PBL’s (2025) findings, which suggest that regional housing shortages are placing additional pressure on municipalities in the Arnhem-Nijmegen area to convert industrial sites into residential areas. In some cases, these shifts conflict with long-term economic zoning plans, forcing policymakers to reconsider redevelopment priorities. A sustainable development advisor from the municipality of Nijmegen described the dilemma: *“The housing shortage forces us to reconsider land use, balancing industrial needs with residential development.”* (Interviewee 12, personal communication, November 12, 2024). These ongoing tensions between housing needs and economic land use align with broader national trends observed in the *Woondeal 2.0* framework, which aims to balance housing development with industrial sustainability by prioritizing mixed-use solutions (Rijksoverheid, 2023).

Regulatory Environments

Regulatory frameworks influence redevelopment project feasibility by shaping both compliance requirements and development timelines. A project developer explained how policy changes mid-process can cause uncertainties for stakeholders: *“Municipal policies change mid-process, creating uncertainty. You start with one framework, only to adjust to new requirements halfway through.”* (Interviewee 13,

personal communication, October 17, 2024). An environmental advisor and a spatial development advisor mentioned that environmental regulations also affect redevelopment efforts, requiring additional assessments and procedural adjustments: *“PFAS contamination is now a major concern. We had to conduct additional soil studies before proceeding, which delayed the project significantly.”* (Interviewees 4 & 5, personal communication, November 4, 2024 & November 12, 2024). Recent PBL (2025) research on soil remediation policies highlights how new contamination standards are particularly burdensome for brownfield redevelopment projects in the Arnhem-Nijmegen region. These regulations, while necessary for environmental safety, often result in unexpected costs and extended project timelines. The Omgevingsvisie Nijmegen (2024) also mentions that stricter environmental policies, particularly regarding soil quality, require municipalities to work more closely with developers to prevent project stagnation. This underscores the need for early environmental assessments to minimize delays.

Stakeholder Influence

Stakeholders influence redevelopment through financial investments, political leverage, and community engagement. A project developer pointed out that landowners play a decisive role in shaping brownfield projects within the region, particularly when municipal policies introduce constraints: *“Ultimately, landowners hold the power. If the municipality imposes unrealistic demands, the site may remain undeveloped for years.”* (Interviewee 13, personal communication, October 17, 2024). An account manager from the municipality of Nijmegen highlighted how political changes can significantly influence project continuity, as shifts in local government can alter redevelopment priorities: *“A new municipal council can completely change priorities, forcing stakeholders to renegotiate agreements and delaying implementation.”* (Interviewee 2, personal communication, November 25, 2024). A policy consultant emphasized the importance of public engagement in redevelopment processes within the Arnhem-Nijmegen region: *“Local opposition can derail projects, but engaging with residents early on fosters acceptance and cooperation.”* (Interviewee 16, personal communication, November 13, 2024). The Omgevingsvisie Arnhem (2024) also highlights the role of early stakeholder involvement in brownfield redevelopment.

4.10 Successful collaboration

Understanding Each Other’s Interests

Stakeholder collaboration relies on recognizing different priorities and working toward shared outcomes in the Arnhem-Nijmegen region. Mutual understanding improves the likelihood of successful redevelopment, even when complete alignment is not possible. An advocate for sustainability explained: *“A successful project is one where all involved parties are satisfied with the outcome, even if no single*

party gets everything they initially wanted.” (Interviewee 3, personal communication, October 25, 2024). The same advocate emphasized the role of negotiation in balancing stakeholder objectives and creating workable solutions: *“Collaboration is about finding common ground. You can’t always get everything you want, but when each stakeholder sees their interests partially reflected in the outcome, cooperation is much smoother.”* (Interviewee 3, personal communication, October 25, 2024). A project developer pointed out that long-term relationships built on trust contribute to effective partnerships: *“If you can establish a shared interest, collaboration becomes much easier. Over time, this fosters a sense of reliability and willingness to work together on future projects.”* (Interviewee 1, personal communication, October 19, 2024).

Working with the Same People Over Time

Consistency in stakeholder relationships supports continuity in long-term redevelopment projects. A project developer noted that changing personnel frequently can lead to inefficiencies: *“Projects last for years, and if key people change too frequently, you end up starting over repeatedly. Maintaining the same contacts over time ensures continuity and efficiency.”* (Interviewee 7, personal communication, October 14, 2024). A project developer also described how established professional networks between developers and municipalities support more streamlined communication and decision-making: *“We have the same developer working across three projects, and that consistency makes it easier to communicate and move forward with decision-making.”* (Interviewee 10, personal communication, January 20, 2025). Another project developer emphasized that trust and familiarity reduce uncertainties and strengthen collaboration: *“Having long-term collaboration with the same stakeholders ensures a higher level of commitment and trust, which ultimately makes project execution smoother and more reliable.”* (Interviewee 7, personal communication, October 14, 2024).

Pride in Redevelopment Outcomes

Successful collaboration is also reflected in the sense of accomplishment among stakeholders upon project completion. A project developer explained that financial viability is important, but the broader impact also matters: *“Success isn’t just about financial viability. It’s about looking back and being proud of the transformation you’ve achieved.”* (Interviewee 13, personal communication, October 17, 2024). Another project developer noted that a well-executed redevelopment integrates various interests: *“In the end, if a project enhances the city and improves livability, it is a win for everyone involved.”* (Interviewee 10, personal communication, January 20, 2025).

5. Discussion

The findings within this section provide an insight into how stakeholders collaborate in brownfield redevelopment, showing both the opportunities and challenges that come with these projects. This chapter reflects on the main results, looking at how different factors shape cooperation. By considering these elements, this discussion connects the findings to broader discussions about collaborative governance in brownfield redevelopment.

5.1 stakeholder willingness and long-term collaboration

Collaboration in brownfield redevelopment depends on trust, shared interests, and established working relationships. When stakeholders have worked together before, projects tend to run more smoothly. Familiarity reduces uncertainty and simplifies negotiations. However, differences in priorities and financial constraints can complicate cooperation, requiring adjustments along the way. The findings suggest that successful projects are based on mutual benefits. When stakeholders recognize how their goals align, they are more willing to compromise and work towards solutions. This reflects the importance of trust-building and shared goals as internal drivers of collaboration, as described by Bell and Scott (2020) in the context of collaborative governance.

At the same time, power imbalances and strict regulations can create obstacles. Municipal priorities may shift, and developers can face unexpected financial setbacks, leading to renegotiations and delays. Even when collaboration is strong, external pressures such as political changes or shifting market conditions can disrupt ongoing efforts. This means that stakeholder willingness alone is not enough; projects also require institutional support and regulatory stability to maintain momentum. These dynamics highlight the fragility of collaborative intentions when not backed by consistent frameworks. For example, developers may be eager to invest, but frequent regulatory changes reduce their confidence, while smaller actors with less capacity to respond to policy shifts may withdraw entirely. In this way, external driver such as political uncertainty or fragmented governance structures can effectively limit the impact of even the most willing stakeholders (Bell & Scott, 2020). Willingness, then, should be seen not as a guarantee of successful collaboration, but as a starting point that must be nurtured through stable institutions, transparent governance, and shared accountability.

5.2 The role of leadership in overcoming barriers

Leadership helps bring different parties together and keeps projects moving. The findings show that effective leadership requires both a clear vision and the flexibility to adapt when circumstances change. When discussions stall, a strong leader can help find solutions and push things forward. However, leadership alone cannot resolve all challenges. When multiple government levels are involved, bureaucratic delays and inefficiencies are common. Some stakeholders find municipal leadership unpredictable, with policies changing in ways that create uncertainty. This highlights the need for better coordination and more consistent policies over time. In addition, not all stakeholders have equal leadership influence, which can lead to frustration among smaller actors. Large developers or municipalities often take the lead, while smaller stakeholders, such as local businesses or environmental groups, may struggle to have their voices heard. If these smaller voices are excluded from early decision-making, redevelopment efforts risk becoming one-sided or facing resistance later in the process. This can weaken stakeholder trust and limit long-term commitment.

Effective leadership, therefore, requires not just decision-making authority but also inclusivity, meaning that all relevant stakeholders are actively involved in shaping redevelopment efforts as soon as possible. Ulibarri et al. (2020) emphasize that leadership plays a central role in collaborative governance by guiding stakeholders through complex phases, aligning diverse interests, and sustaining cooperation over time. In this sense, leadership is not only about steering the process forward, it is also about creating the conditions under which all parties can participate meaningfully and persist through inevitable tensions.

5.3 The complexity of resource allocation

Funding and resource distribution play a major role in brownfield redevelopment. Developers prioritize locations where they expect the highest returns, meaning that less profitable areas struggle to attract investment. At the same time, municipalities are responsible for regulations and planning but often lack the financial resources to take on large projects alone. Public-private partnerships can help spread financial risk, but they require clear agreements from the outset. The findings also show that risk tolerance varies between stakeholders. Some developers hesitate to invest unless returns are predictable, while municipalities may be restricted by strict budget policies. Financial stability and consistent policies are needed to making redevelopment viable. These issues reflect broader concerns within collaborative governance, particularly around how financial risks and responsibilities are shared in partnerships.

Lemaire and Provan (2018) emphasize that perceived unfairness in resource allocation, such as uneven contributions or imbalanced access to subsidies, can weaken trust and reduce long-term commitment.

Beyond financial constraints, human and institutional capacity also influence resource allocation. Municipalities with experienced teams and established frameworks tend to navigate redevelopment more efficiently, whereas smaller municipalities may struggle with staff shortages or expertise gaps. The availability of skilled professionals, such as urban planners and environmental experts, significantly impacts how effectively resources are distributed and whether redevelopment remains on schedule. This gap in institutional capacity not only affects project speed but also shapes power dynamics within partnerships. When one actor controls access to critical resources, whether financial, legal, or technical, it can unintentionally dominate decision-making. In such cases, even well-intentioned collaboration risks becoming skewed in favor of those with the greatest capacity, reinforcing the importance of transparent planning and early alignment of expectations.

5.4 Institutional and political uncertainty

As stated earlier, shifting municipal priorities can create uncertainty and delays for stakeholders. Frequent policy changes make long-term agreements harder to maintain, leading to frustration among developers and investors. Regulatory frameworks shape redevelopment, but changes midway through a project often introduce setbacks and additional costs. Several stakeholders note unexpected regulatory hurdles, emphasizing the need for more predictable planning rules that allow projects to move forward with fewer disruptions. Political cycles further complicate redevelopment, as municipal governments often operate on short-term election timelines, while redevelopment projects require long-term commitment. This misalignment means that projects initiated under one administration may face delays or revisions when political leadership changes. Developers and other stakeholders must navigate this uncertainty, often adjusting their strategies to remain adaptable to shifting policy landscapes. These dynamics can be connected to Bell and Scott's (2020) identification of external drivers in collaborative governance, where institutional instability and unpredictable regulatory frameworks can severely limit the potential for effective long-term cooperation. When political decisions shift rapidly, they may disrupt earlier agreements and weaken stakeholder trust, especially for projects that require sustained coordination over many years. This uncertainty can be particularly challenging for definitive stakeholders, such as municipalities and environmental authorities, whose regulatory role makes them central to project continuity.

5.5 Balancing public and private interests

Public and private stakeholders enter brownfield redevelopment with different priorities, which can make cooperation difficult. Municipalities typically focus on public benefits such as affordable housing, environmental sustainability, and long-term urban planning, while developers prioritize financial

viability. This contrast does not necessarily lead to conflict, but it does require ongoing negotiation to align expectations. The findings suggest that successful collaboration is not just about reaching compromises but about structuring projects so that both public and private objectives reinforce each other. This need for alignment reflects the challenge of managing stakeholder interests in collaborative governance, where success depends on mutual recognition of each party's legitimacy and constraints (Mitchell et al., 1997).

Public-private partnerships provide a structured way to distribute risks and responsibilities, but their effectiveness depends on how agreements are set up. The research shows that when roles and expectations are not clearly defined, delays and disputes arise. Some stakeholders expressed frustration with shifting municipal priorities, which create uncertainty for long-term investments. Developers hesitate to commit when zoning regulations or sustainability requirements change mid-process, while municipalities face challenges in ensuring that private actors uphold broader urban planning goals. One way to make collaboration more effective is through better use of incentives.

The findings indicate that subsidies, tax advantages, and flexible zoning rules can help create conditions where public and private interests do not compete but complement each other. However, these instruments need to be applied carefully to prevent unintended consequences, such as developers relying on public funding without meeting social or environmental commitments. Municipalities must also consider how these incentives fit within long-term planning frameworks. Beyond financial agreements, trust and transparency influence whether collaboration remains productive over time. Several interviewees noted that working with the same partners across multiple projects builds confidence and reduces inefficiencies in negotiations. This supports Huxham's (1993) notion of collaborative advantage, highlighting the potential of long-term, trust-based cooperation to achieve outcomes that individual stakeholders could not realize on their own.

5.6 What makes brownfield redevelopment unique?

Brownfield redevelopment differs from other forms of urban development because it involves existing land uses, environmental restrictions, and fragmented ownership, making the process more complicated than greenfield development. Instead of working with open plots, developers must navigate established land use constraints and negotiate with multiple stakeholders, including businesses that may still be operating on-site. One of the biggest challenges is redeveloping industrial areas while balancing economic activity and environmental regulations. Many brownfield sites contain businesses that do not fit modern urban planning strategies but remain in place due to zoning laws or logistical reasons.

Municipalities aim to make industrial zones more efficient and compatible with urban expansion, yet environmental zoning laws restrict what types of businesses can remain. This often leads to difficult decisions about which industries should be relocated and how to integrate sustainability measures into redevelopment. These conditions reflect what Mangnus (2021) and Glass (2000) describe as regulatory and historical constraints that complicate adaptive planning. Unlike vacant sites in suburban areas, brownfields are closely connected to surrounding communities, meaning redevelopment directly affects residents and local businesses. Concerns about pollution, increased traffic, and changes to neighborhood character often create resistance, particularly when redevelopment plans are not communicated early on.

Early engagement with local communities is necessary to prevent delays and ensure that redevelopment projects do not face long-term opposition. These demands echo the social dimension of adaptive reuse (Conejos et al., 2015), where successful redevelopment considers not just environmental and financial goals, but also the historical and social meaning of place. The high costs of land preparation, zoning changes, and environmental cleanup require developers to weigh long-term benefits against upfront investment risks. Unlike greenfield developments, brownfield projects frequently involve hidden costs that emerge during the process. The findings suggest that predictable funding mechanisms and clearer financial structures would make brownfield redevelopment more attractive to private investors while ensuring that public objectives remain central to project planning.

6. Conclusions

This chapter summarizes the key findings of this research, answering the sub-questions before addressing the main research question. The research aimed to understand the factors that support or hinder stakeholder collaboration in brownfield redevelopment within the Arnhem-Nijmegen region. By examining different forms of collaboration, identifying barriers and facilitators, and exploring variations across project stages, this research provides insights into how stakeholder interactions influence (un)successful redevelopment outcomes.

6.1 Sub-question 1

What are the different forms of stakeholder collaborations and how is it defined in general?

Stakeholder collaboration takes different forms, ranging from structured public-private partnerships (PPP) to flexible, case-based cooperation. Municipalities, project developers, housing corporations, and environmental organizations interact in varying ways, depending on project needs. While formal partnerships provide clear agreements and shared investments, informal cooperation remains common in early planning stages or smaller-scale projects. The findings suggest that long-term working relationships and mutual trust often determine the success of collaboration, rather than a specific cooperation model. However, differences in stakeholder influence and financial stakes create an uneven playing field, which affects the level of engagement and decision-making power among actors.

6.2 Sub-question 2

What are the factors that support or hinder the successful collaboration between stakeholders according to academic literature?

The literature identifies several factors that encourage successful collaboration in brownfield redevelopment. Trust and transparency create a foundation for cooperation, reducing uncertainty and making long-term commitments more viable. Stability in policies and decision-making allows stakeholders to plan ahead without the risk of sudden regulatory changes. Leadership plays an important role in coordinating efforts, particularly in bringing together diverse interests and facilitating compromise. Institutional structures, such as well-defined land ownership policies and regulatory

consistency, provide clarity on stakeholder responsibilities, making cooperation more structured and efficient.

Conversely, collaboration is often hindered by bureaucratic complexity, financial uncertainty, and shifting policy priorities. Lengthy approval procedures and administrative inefficiencies slow down redevelopment, making it difficult for stakeholders to maintain momentum. Limited financial resources, both public and private, restrict investment potential, especially in projects requiring environmental remediation. Municipal policy shifts create uncertainty, making developers hesitant to commit to long-term plans. Unequal power dynamics further complicate cooperation, as private landowners and investors often have significant control over land use, while municipalities struggle to enforce planning objectives that balance economic, social, and environmental priorities.

6.3 Sub-question 3

How does stakeholder collaboration vary across different stages of the brownfield redevelopment process (e.g., planning, implementation, monitoring)?

Stakeholder collaboration differs across the various phases of brownfield redevelopment. In the planning phase, cooperation is primarily focused on feasibility studies, zoning requirements, and securing financial commitments, with municipalities playing a regulatory role while developers assess investment potential. During the implementation phase, collaboration shifts towards project execution, involving financial risk management, regulatory compliance, and adjustments based on site conditions. The monitoring phase sees a reduction in active collaboration, as completed projects transition into long-term management and oversight. The findings indicate that engagement is strongest in early stages, when financial and regulatory agreements are being structured, and tends to decline once major commitments have been secured.

6.4 Sub-question 4

To what extent does stakeholder collaboration influence the success of brownfield redevelopment?

The research findings show that collaboration plays a significant role in shaping brownfield redevelopment outcomes. Joint financial investments, shared risk management, and structured cooperation contribute to smoother project realization. However, collaboration alone does not guarantee success. Regulatory stability, financial feasibility, and clear agreements between stakeholders are equally necessary. Brownfield redevelopment involves multiple layers of complexity, including land ownership,

environmental remediation, and policy constraints. While collaboration facilitates coordination among stakeholders, factors such as shifting municipal policies, financial uncertainties, and conflicting priorities can still lead to delays or project stagnation. Strong leadership and long-term stakeholder engagement are crucial once again in maintaining the momentum, but external factors often determine the extent to which collaboration can be sustained over time.

6.5 Sub-question 5

What lessons can be derived to improve future collaborations within the region?

The results suggest that stable policies, early stakeholder engagement, and long-term commitments are needed for improving collaboration in brownfield redevelopment. More predictable regulations and financial models would reduce uncertainty, while sustained partnerships between municipalities, developers, and investors could strengthen cooperation efforts. Additionally, addressing stakeholder power imbalances and refining financial risk-sharing mechanisms could lead to more effective redevelopment models, reducing delays caused by misaligned priorities. A more detailed discussion of these recommendations can be found in Section 7.2.2.

6.6 Answering the main research question

What are the factors that support or hinder the successful collaboration between stakeholders in brownfield redevelopment within the Arnhem-Nijmegen region?

The research shows that collaboration in brownfield redevelopment is influenced by financial, institutional, and relational factors. Trust, leadership, and structured involvement support cooperation, while bureaucratic inefficiencies, shifting policies, and financial disparities pose significant challenges, as also highlighted by the literature within this chapter. The complexity of brownfield redevelopment stems from contamination, existing infrastructure, fragmented land ownership, and regulatory constraints, requiring stakeholders to navigate multiple layers of decision-making, making effective collaboration both necessary and difficult.

While collaboration improves feasibility and efficiency, it is not a guarantee for success. Projects with strong leadership, stable policies, and clear agreements tend to achieve better results and faster realization. However, balancing public and private interests and maintaining long-term partnerships remains a major challenge due to uncertainties and dependencies within redevelopment projects. Acknowledging these factors and developing a more structured approach could create a more reliable and effective redevelopment process within the Arnhem-Nijmegen region.

7. Reflection & Recommendations

This chapter reflects on the research process and its findings, discussing the strengths and limitations of the methodology and theoretical approach. It also presents recommendations for further research and policy improvements.

7.1 Reflection

7.1.1 Methodological reflection

Conducting sixteen interviews provided broad insight into stakeholder collaboration in brownfield redevelopment. Over time, similar patterns emerged across interviews, indicating that a level of data saturation was reached. However, including additional perspectives such as private landowners and residents living near brownfield sites, could have provided further nuance. The views of developers, municipal officials, and environmental organizations were well represented, but some stakeholder groups may have been underrepresented.

Transcribing and analyzing the interviews required considerable effort, highlighting the intensive nature of qualitative research. Atlas.ti proved useful for structuring the data, though the large volume of information required careful organization. Twelve of the sixteen interviews were conducted in person, which significantly improved the quality of the discussions. Meeting stakeholders face-to-face led to more natural conversations and deeper insights, as non-verbal cues and informal moments before and after the interviews added depth. The virtual interviews, while still valuable, sometimes felt more rigid due to technical limitations. This confirmed the importance of in-person interactions, especially for complex topics like brownfield redevelopment. It also became clear that redevelopment is heavily influenced by external factors such as economic shifts, new regulations, and political cycles. Several respondents shared examples of projects that seemed promising but became uncertain due to changing municipal policies, leadership changes, or market fluctuations. This underscores the fragile nature of long-term planning, where success often depends on factors beyond the stakeholders' control.

Finally, this research emphasized the emotional aspect of redevelopment. While academic literature often focuses on governance and efficiency, interviews revealed a more personal dimension. Stakeholders spoke about their struggles with bureaucracy, their ambitions for creating better urban spaces, and concerns about the long-term livability of redeveloped areas. These insights suggest that redevelopment is not just about technical feasibility but also about negotiation, vision, and navigating relationships across different interests.

7.1.2 Theoretical Reflection

In addition to the methodological process, this research also provided opportunities to reflect on how the findings relate to the theoretical concepts explored earlier. Many of the outcomes align closely with the theoretical framework, particularly the role of internal and external drivers in collaborative governance (Bell & Scott, 2020). Trust-building, shared goals, and leadership were repeatedly mentioned by stakeholders as key to successful collaboration, confirming their importance as internal drivers. At the same time, external influences like policy shifts, economic uncertainty, and changes in political leadership regularly disrupted collaboration, showing how dependent brownfield redevelopment is on stable institutional conditions. The stakeholder dynamics observed during the interviews also reflected the framework by Mitchell et al. (1997). Developers and municipalities often held dominant positions, while smaller actors such as environmental groups or local businesses had less influence, even when directly affected by redevelopment outcomes. This shows the need for more inclusive collaboration, and early stakeholder involvement especially in projects that aim to balance public and private interests. The interviews also supported the tension between collaborative advantages and challenges. While many stakeholders mentioned the potential of synergy, as described by Huxham (1993), they also noted how collaboration can be slow and frustrating when interests don't align matching Vangen and Huxham's (2010) concept of collaborative inertia. These insights helped reinforce the idea that collaboration is not automatically beneficial, but something that must be actively maintained and adapted over time. Lastly, adaptive reuse was often described in practical and emotional terms. Stakeholders didn't just talk about environmental or economic benefits but also about creating places that reflect community identity and improve quality of life. This social dimension which was less emphasized in the literature stood out during the interviews and confirmed that redevelopment also involves values, memories, and a sense of responsibility for shaping the future of the urban landscape.

7.2 Recommendations

7.2.1 Further research

Comparing brownfield redevelopment in different regions could offer new perspectives on collaboration, financing, and governance models. Studying cases in other Dutch cities or international contexts could reveal alternative ways to structure cooperation and handle conflicts. For example, Germany's stronger regional coordination or the UK's land value capture mechanisms could provide relevant insights compared to Dutch redevelopment efforts.

A second area for further research is longitudinal studies that track brownfield redevelopment over time. Examining how partnerships evolve from project initiation to completion could help identify key

moments that influence collaboration. For example, tracking how early agreements hold up over time or how economic and political shifts affect project continuity could provide deeper insights into the conditions that support or hinder long-term cooperation.

Another important topic is stakeholder power dynamics. Not all parties enter redevelopment with the same level of influence, and private landowners, financial institutions, and smaller businesses may play a larger role than is often assumed. Although this research recognizes these power imbalances, Investigating how these imbalances affect decision-making even stronger could lead to more balanced redevelopment strategies.

Lastly, a closer look at financial structures in brownfield redevelopment could improve project feasibility. Current funding models often rely on case-by-case financial agreements, leading to uncertainty and delays. Research into standardized financing tools, such as revolving funds that reinvest profits from completed projects into new brownfield sites, could also provide more stable long-term solutions.

7.2.2 Policy recommendations

1. Clear and Predictable Regulations

A major obstacle in brownfield redevelopment is the disconnect between policy goals and practical implementation. While municipalities aim for sustainable and mixed-use developments, rigid regulations and slow approval processes make these ambitions difficult to realize. More predictable policies and streamlined procedures would allow stakeholders to commit to long-term investments with greater confidence. However, creating such policies requires time and resources and cannot be assumed to happen automatically.

2. Early and Structured Stakeholder Involvement

Conflicts often arise when developers, landowners, businesses, and communities are not engaged early in the process. Formal consultation processes and participatory planning could help address concerns before they escalate into opposition. Community input is especially important, as redevelopment directly impacts local neighborhoods, yet residents and small businesses are sometimes left out of early discussions.

3. Long-Term Policy Consistency

Brownfield redevelopment requires years and sometimes decades of planning and execution, but shifting political priorities often disrupt progress. Changes in municipal leadership frequently lead to renegotiations, delays, or even project cancellations, making long-term investments riskier. Developing

regional frameworks that extend beyond election cycles could provide stability. Formal agreements between municipalities, regional authorities, and private stakeholders could help prevent abrupt shifts in redevelopment priorities.

4. Financial Incentives and Risk-Sharing Mechanisms

Higher upfront costs due to environmental remediation, infrastructure upgrades, and regulatory adjustments make brownfield projects financially challenging. The last policy recommendation is that more structured funding mechanisms could make redevelopment more viable. Examples include: revolving funds, where revenues from completed projects are reinvested into new brownfield sites. More systematic public-private partnerships (PPPs) to reduce the financial burden on municipalities while keeping private sector involvement stable. Tax benefits or flexible zoning regulations to encourage redevelopment without compromising urban planning goals.

By focusing on clearer regulations, early stakeholder involvement, stable policies, and better financing models, municipalities could create a more predictable and cooperative environment for successful brownfield redevelopment in the Arnhem-Nijmegen region, accelerating project implementation and helping to address the persistent challenges in the housing and industrial markets.

8. Literature

- ABF Research. (2021). *Primos Prognose 2021*. Delft: ABF Research.
- Adams, D., de Sousa, C., & Tiesdell, S. (2010). Brownfield development: A comparison of North American and British approaches. *Urban Studies*, 47(1), 75–104.
- Adams, D., & Hastings, E. M. (2001). Urban renewal in Hong Kong: Transition from development corporation to renewal authority. *Land Use Policy*, 18(3), 245-258.
- Ahmad, N., Zhu, Y., Ibrahim, M., Waqas, M., & Waheed, A. (2018). Development of a standard brownfield definition, guidelines, and evaluation index system for brownfield redevelopment in developing countries: The case of Pakistan. *Sustainability*, 10(12), 4347.
- Ahmad, N., Zhu, Y., Shafait, Z., Sahibzada, U. F., & Waheed, A. (2019). Critical barriers to brownfield redevelopment in developing countries: The case of Pakistan. *Journal of Cleaner Production*, 212, 1193–1209. <https://doi.org/10.1016/j.jclepro.2018.12.061>
- Ahmad, N., Zhu, Y., Shao, J., & Lin, H. (2020). Stakeholders' perspective on strategies to promote contaminated site remediation and brownfield redevelopment in developing countries: empirical evidence from Pakistan. *Environmental Science and Pollution Research*, 27, 14614-14633
- Alker, S., Joy, V., Roberts, P., & Smith, N. (2000). The definition of brownfield. *Journal of Environmental Planning and Management*, 43(1), 49–69. <https://doi.org/10.1080/09640560010766>
- Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of public administration research and theory*, 18(4), 543-571.
- Azam, B. (2023). *Innovative Approaches to Urban Redevelopment*.
- Bates, S. R., & Jenkins, L. (2007). Teaching and learning ontology and epistemology in political science. *Politics*, 27(1), 55-63.
- Bell, E., & Scott, T. A. (2020). Common institutional design, divergent results: A comparative case study of collaborative governance platforms for regional water planning. *Environmental Science & Policy*, 111, 63-73.

-Bezemer, D., van der Krabben, E., Barendregt, E., & van der Vlugt, G. (2022, May 30). Zonder baksteen aan de bak. (M. Janssen Groesbeek, Interviewer) AT5. Amsterdam. Retrieved May 26, 2024, from <https://dezwijger.nl/programma/zonder-baksteen-aan-de-bak>

-Bianchi, C., Bereciartua, P., Vignieri, V., & Cohen, A. (2021). Enhancing urban brownfield regeneration to pursue sustainable community outcomes through dynamic performance governance. *International Journal of Public Administration*, 44(2), 100-114.

-Boelhouwer, P. (2020). The housing market in The Netherlands as a driver for social inequalities: proposals for reform. *International Journal of Housing Policy*, 20(3), 447-456.

-Bryman, A. (2012). *Social research methods*. Oxford university press.

-Buitelaar, E. (2021). *De werking van de grondmarkt en de rol van de overheid*. PBL Planbureau voor de Leefomgeving. Den Haag: PBL.

-Canevaro, E., Ingaramo, R., Lami, I. M., Morena, M., Robiglio, M., Saponaro, S., & Sezenna, E. (2019). Strategies for the sustainable reindustrialization of Brownfields. In *IOP Conference Series: Earth and Environmental Science* (Vol. 296, No. 1, p. 01/2010). IOP Publishing.

-Cantell, S. F. (2005). *The adaptive reuse of historic industrial buildings: regulation barriers, best practices and case studies*. Virginia polytechnic institute and state university.

-CBS (2022). *Landelijke monitor leegstand 2022*. Retrieved from: <https://www.cbs.nl/nl-nl/maatwerk/2022/50/landelijke-monitor-leegstand-2022>

-CBS (2025). *Transformaties in de woningvoorraad, eerste tot en met vierde kwartaal 2024*. Retrieved from: <https://www.cbs.nl/nl-nl/maatwerk/2025/15/transformaties-in-de-woningvoorraad-eerste-tot-en-met-vierde-kwartaal-2024>

-CBS, PBL, RIVM, WUR (2024). *Wonen binnen bestaand bebouwd gebied, 2000 - 2021 (indicator 2012, versie 09, 14 september 2022)* www.clo.nl. Centraal Bureau voor de Statistiek (CBS), Den Haag; PBL Planbureau voor de Leefomgeving, Den Haag; RIVM Rijksinstituut voor Volksgezondheid en Milieu, Bilthoven; en Wageningen University and Research, Wageningen.

- Conejos, S., Langston, C., Smith, J., Lavy, S. and Lai, J.K. (2015), “Enhancing sustainability through designing for adaptive reuse from the outset: a comparison of adaptSTAR and Adaptive Reuse Potential (ARP) models”, *Facilities*, Vol. 33 Nos 9/10.
- Cowell, M. (2014), *Dealing with Deindustrialization: Adaptive Resilience in American Midwestern Regions*, *Urban Geography*, Vol. 38 No. 2, pp. 315-316.
- Creswell, J.W. (2009). *Research design: qualitative, quantitative, and mixed methods approaches*. Los Angeles, United States: SAGE Publications.
- Creswell, J.W. (2013). *Qualitative Inquiry and research design. Choosing among five approaches*. Retrieved March 25, 2024, from:
<http://www.ceil-conicet.gov.ar/wpcontent/uploads/2018/04/CRESWELLQualitative-Inquary-and-Research-Design-Creswell.pdf>
- D'Agostino, D., & Mazzarella, L. (2019). What is a Nearly zero energy building? Overview, implementation and comparison of definitions. *Journal of Building Engineering*, 21, 200-212.
- Dixon, T., Raco, M., Catney, P., & Lerner, D. N. (2007). *Sustainable brownfield regeneration: Liveable places from problem spaces*. Wiley-Blackwell.
- Eaton, W. M., Brasier, K. J., Burbach, M. E., Whitmer, W., Engle, E. W., Burnham, M., ... & Weigle, J. (2021). A conceptual framework for social, behavioral, and environmental change through stakeholder engagement in water resource management. *Society & Natural Resources*, 34(8), 1111-1132.
- Edelstein, M. R., & Warner, K. L. (2004). *Environmental contamination and the redevelopment of urban brownfields. Brownfields: A Comprehensive Guide to Redeveloping Contaminated Property*.
- Fenton, P., Gustafsson, S., Ivner, J., & Palm, J. (2015). Sustainable municipal energy planning in Sweden. *Journal of Cleaner Production*, 98, 194-203.
- Firdaus, A. (2018). *Dynamic stakeholder management approach: Using 3C-Model™ as framework (case studies from Indonesia)* (Master's thesis, University of Twente).
- Frantál, B., Josef, K. U. N. C., KLUSÁČEK, P., & Martinat, S. (2015). Assessing success factors of brownfields regeneration: international and inter-stakeholder perspective. *Transylvanian Review of Administrative Sciences*, 11(44), 91-107.

- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Cambridge University Press.
- Gamper-Rabindran, S., & Timmins, C. (2013). Does cleanup of hazardous waste sites raise housing values? Evidence of spatially localized benefits. *Journal of Environmental Economics and Management*, 65(3), 345–360. <https://doi.org/10.1016/j.jeem.2012.12.001>
- Glass, G. (2000). The challenges and opportunities of brownfield redevelopment: A sociopolitical perspective. *Journal of Environmental Planning and Management*, 43(3), 297-315.
- Glumac, B., Han, Q., Schaefer, W., & van der Krabben, E. (2015). Negotiation issues in forming public–private partnerships for brownfield redevelopment: Applying a game theoretical experiment. *Land use policy*, 47, 66-77.
- Gemeente Arnhem. (2024) *Omgevingsvisie Arnhem 2040; een toekomstbeeld voor de stad*: Retrieved from: https://www arnhem.nl/stad_en_wijken/projecten/omgevingswet/Omgevingsvisie
- Gemeente Nijmegen. (2024) *Omgevingsvisie Nijmegen 2020-2040; Stad in beweging*: Retrieved from <https://www.nijmegen.nl/over-de-gemeente/plannen/omgevingsvisie/>
- Hammond, E. B., Coulon, F., Hallett, S. H., Thomas, R., Hardy, D., Kingdon, A., & Beriro, D. J. (2021). A critical review of decision support systems for brownfield redevelopment. *Science of the Total Environment*, 785, 147132.
- Healey, P. (1997). *Collaborative planning: Shaping places in fragmented societies*. Macmillan International Higher Education.
- Hill, M. (1997). *Implementation theory: Understanding policy outcomes*. Macmillan Education.
- Hogwood, B. W., & Gunn, L. A. (1984). *Policy analysis for the real world*. Oxford University Press.
- Hollebeek, L. D., Kumar, V., & Srivastava, R. K. (2022). From customer-, to actor-, to stakeholder engagement: Taking stock, conceptualization, and future directions. *Journal of Service Research*, 25(2), 328-343.
- Huxham, C. (1993, June). Pursuing Collaborative Advantage. *The Journal of the Operational Research Society*, 44(6), 599-611. doi:<https://doi-org.ru.idm.oclc.org/10.2307/2584516>

- Husband, G. (2020). Ethical data collection and recognizing the impact of semi-structured interviews on research respondents. *Education Sciences*, 10(8), 206.
- Innes, J. E., & Booher, D. E. (1999). Consensus building and complex adaptive systems: A framework for evaluating collaborative planning. *Journal of the American planning association*, 65(4), 412-423.
- Isaksson, K., & Hagbert, P. (2020). Institutional housing companies and innovative ownership models: Comparative case studies of niche experiments in Sweden. *Sustainability*, 12(7), 2803.
- Jarvie, M. E. (2016). Brundtland Report. *Encyclopedia Britannica*. Retrieved from: <https://www.britannica.com/topic/Brundtland-Report>
- Karlsson, C. (2008). *Handbook of research on innovation and clusters: Cases and policies*. Edward Elgar Publishing.
- Lange, D., & McNeil, S. (2004). Clean it and they will come? Defining successful brownfield development. *Journal of Urban Planning and Development*, 130(2), 101-108.
- Lanz, F., & Pendlebury, J. (2022). Adaptive reuse: a critical review. *The Journal of Architecture*, 27(2-3), 441-462.
- Lasker, R. D., Weiss, E. S., & Miller, R. (2001). Partnership synergy: a practical framework for studying and strengthening the collaborative advantage. *The Milbank Quarterly*, 79(2), 179-205.
- Lemaire, R. H., & Provan, K. G. (2018). Managing collaborative effort: How Simmelian ties advance public sector networks. *The American Review of Public Administration*, 48(5), 379-394.
- Litt, J. S., & Burke, T. A. (2002). Uncovering the historic environmental hazards of urban brownfields. *Journal of Urban Health*, 79(4), 464-481.
- Manfredi, F., & Costi, D. (2023). A European Atlas of Urban Regeneration Projects: City Fact Sheets. In *Community Regeneration Masterplan: The Five Dimensions of Sustainability: Guidelines For European Cities* (pp. 43-159). Cham: Springer International Publishing.

- Mangnus, J. P. J. (2021). Implications of a more prominent role of the Dutch state on the housing market.

- Mason, J. (2002). *Qualitative researching*. Sage.

- Mehdipour, A., Kellett, J., Palazzo, E., & Larbi, M. (2024). Policy integration for brownfield regeneration: An analytical tool. *Sustainable Horizons*, 10, 100085.

- Meyer, P. B. (2003). Brownfields, risk-based corrective action, and local communities. *Environmental Practice*, 5(1), 29-36.

- Ministry BZK. (2019). *Reiswijzer Gebiedsontwikkeling 2019; Een praktische routebeschrijving voor marktpartijen en overheden*. Bouwend Nederland, Ministry of the Interior and Kingdom Relations, NEPROM, VNG. The Hague

- Mitchell, R. B., Agle and & J., Wood. (1997). Toward a Theory of Stakeholder Identification and Saliency: Defining the Principle of Who and What Really Counts', *Academy of Management Review* 22(4), 853–886.

- Mohamed, R., Boyle, R., Yang, A. Y., & Tangari, J. (2017). Adaptive reuse: a review and analysis of its relationship to the 3 Es of sustainability. *Facilities*, 35(3/4), 138-154.

- Moon, K., & Blackman, D. (2014). A guide to understanding social science research for natural scientists. *Conservation biology*, 28(5), 1167-1177.

- Morar, C., Berman, L., Unkart, S., & Erdal, S. (2021). Sustainable brownfields redevelopment in the European Union: An overview of policy and funding frameworks. *Journal of environmental health*, 84(4), 24.

- Muhaise, H., Ejiri, A. H., Muwanga-Zake, J. W. F., & Kareyo, M. (2020). The Research Philosophy Dilemma for Postgraduate Student Researchers. *International Journal of Research and Scientific Innovation (IJRSI)*, 7(4), 202-204.

- Myers, D., Wyatt, P. (2004). Rethinkings Urban Capacity: Identifying and Appraising Vacant Buildings. *Building Research & Information* 32(4), pp.285-292.

-Nijkamp, P., Rodenburg, C. A., & Wagtendonk, A. J. (2002). Success factors for sustainable urban brownfield development: A comparative case study approach to polluted sites. *Ecological Economics*, 40(2), 235-252.

-North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.

-Planbureau voor de Leefomgeving. (2009). *De toekomst van bedrijventerreinen: van uitbreiding naar herstructurering*. Den Haag: Planbureau voor de Leefomgeving.

Planbureau voor de Leefomgeving (PBL). (2020). *De toekomst van bedrijventerreinen: van uitbreiding naar herstructurering*. Den Haag: Planbureau voor de leefomgeving

-Provan, K. G., & Kenis, P. (2008). Modes of network governance: Structure, management, and effectiveness. *Journal of Public Administration Research and Theory*, 18(2), 229-252.

-Rijksoverheid (2023) *Woondeal 2.0*. Regio Arnhem-Nijmegen: Samenwerkingsagenda voor de woningbouwopgave. Retrieved from:
<https://www.groenemetropoolregio.nl/media/v5jhkggm/woondeal-2-0-webtoegankelijk.pdf>

-Rizzo, E., Pesce, M., & Smaldone, G. (2015). Rural brownfields: Values, potential for social innovation and policies in the Italian context. *Land Use Policy*, 48, 144-155.

-Ryan, C. (2015). Successful sustainable urban regeneration in difficult locations: Three Australian case studies. *Sustainability*, 7(1), 668-687.

-Saad, S. S., Serag, Y., & Battino, S. (2021). Sustainability and climate action in municipal strategies: A comparative study of cities in Egypt and Italy. *Sustainability*, 13(4), 2205.

-Scott, W. R. (2001). *Institutions and organizations*. Sage.

-Salvioni, D. M. & Almici, A. (2020). Transitioning toward a circular economy: The impact of stakeholder engagement on sustainability culture. *Sustainability*

-Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. Amsterdam, the Netherlands: Pearson Benelux BV. Retrieved March 21, 2024, from:

- Schilder, F., Buitelaar, E., Daalhuizen, F., Groot, J., Hanou, M., Lennartz, C., & van der Staak, M. (2021). *Wonen na de verkiezingen*. Planbureau voor de Leefomgeving. The Hague: PBL.
- Serna, L. R., Nakandala, D., & Bowyer, D. (2022). Stakeholder identification and prioritization: The attribute of dependency. *Journal of Business Research*.
- Sharma, G. (2017). Pros and cons of different sampling techniques. *International journal of applied research*, 3(7), 749-752.
- Silverthorne, T. (2006). What constitutes success in brownfield redevelopment? A review. *WIT Transactions on Ecology and the Environment*, 94.
- Sousa de, C. A. (2006). Urban brownfields redevelopment in Canada: The role of local government. *The Canadian Geographer/Le Géographe Canadien*, 50(3), 392–407.
<https://doi.org/10.1111/j.1541-0064.2006.00148.x>
- Stornebrink, W. (2022). Complex Collaboration: How stakeholder collaboration affects development processes in complex brownfield area development.
- Tang, Y.-T., & Nathanail, C. P. (2012). Sticks and stones: The impact of the definitions of brownfield in policies on socio-economic sustainability. *Sustainability*, 4(5), 840–862.
<https://doi.org/10.3390/su4050840>
- Tendero, M., & Bazart, C. (2024). “I can't get no satisfaction”: Soil contaminated brownfield redevelopment in France. *Cities*, 145, 104719.
- Thornton, G., Franz, M., Edwards, D., Pahlen, G., & Nathanail, P. (2007). The challenge of sustainability: Incentives for brownfield regeneration in Europe. *Environmental Science & Policy*, 10(2), 116-134.
- Tobias, L., & Vavaroutsos, G. (2009). Retrofitting buildings to be green and energy-efficient: optimizing building performance, tenant satisfaction, and financial return. Urban Land Institute.
- Ulibarri, N., Emerson, K., Imperial, M. T., Jager, N. W., Newig, J., & Weber, E. (2020). How does collaborative governance evolve? Insights from a medium-n case comparison. *Policy and Society*, 39(4), 617-637.

- Van der Krabben, E., & Buitelaar, E. (2011). Industrial land and property markets: market processes, market institutions and market outcomes: the Dutch case. *European Planning Studies*, 19(12), 2127-2146.
- Van der Krabben, E., & Grondbedrijven van , V. (2021). *De werking van de grondmarkt*. Autoriteit Consument en Markt, Den Haag.
- Van der Krabben, E., & Jacobs, H. M. (2013). Public land development as a strategic tool for redevelopment: Reflections on the Dutch experience. *Land use policy*, 30(1), 774-783
- Van Rooy, P. (2009). *Nederland boven water*. Amsterdam: Calff & Meischke.
- Vangen, S., & Huxham, C. (2010). Introducing the theory of collaborative advantage. In S. Osborne, *The New Public Governance? Emerging Perspectives on the Theory and Practice of Public Governance* (1 ed., pp. 163-184). London/New York: Routledge.
- Vermeer, N., & Vermeulen, W. (2012). External benefits of brownfield redevelopment: An applied urban general equilibrium analysis. *Journal of Benefit-Cost Analysis*, 3(3), 1-33.
- Vos, G. (2018). *Transformatie ING-pand Arnhem naar appartementen*. Retrieved from:
:https://bouwuitvoering.nl/duurzaam/transformatie-ing-pand-arnhem-naar-appartementen/
- Weber, E. P., & Khademian, A. M. (2008). Wicked problems, knowledge challenges, and collaborative capacity builders in network settings. *Public Administration Review*, 68(2), 334-349.
- Weiland, S., Hickmann, T., Lederer, M., Marquardt, J., & Schwindenhammer, S. (2021). The 2030 agenda for sustainable development: transformative change through the sustainable development goals?. *Politics and Governance*, 9(1), 90-95.
- Wijnacker, B. R. E. (2011). Revitalizing a once forgotten past? How the Arnhem Nijmegen City Region can use its industrial DNA to contribute to spatial, economic and tourist development.
- Wihlborg, E., Sörensen, E., & Wennberg, U. (2019). Collaborative governance in a digital era. *Policy & Politics*, 47(2), 235-253.
- Wilkinson, S. (2012), "Analysing sustainable retrofit potential in premium office buildings", *Structural Survey*, Vol. 30 No. 5, pp. 398-410.

9. Appendices

9.1 Interview guide

Datum: -

Geïnterviewde: -

Interviewer: -

Locatie: -

Lengte van het interview:-

Introduction of the Interview

Hallo, mijn naam is Marc Nekkers en ik ben masterstudent aan de Radboud Universiteit. Bedankt voor uw deelname aan dit interview.

Het doel van deze Master thesis is om de samenwerking tussen stakeholders in de herontwikkeling van brownfields in de regio Arnhem-Nijmegen te onderzoeken. Dit onderzoek richt zich op de factoren die de samenwerking beïnvloeden en de impact daarvan op het succes van brownfieldprojecten, met als uiteindelijk doel bij te dragen aan het aanpakken van het woningtekort in onze regio.

Het interview zal ongeveer 60 minuten duren. Alle informatie die u verstrekt, blijft vertrouwelijk en wordt uitsluitend door mij en mijn begeleider gebruikt voor academische doeleinden. Uw identiteit zal anoniem blijven in eventuele rapportages of publicaties die uit dit onderzoek voortkomen.

Voordat we beginnen, gaat u akkoord met deelname aan dit onderzoek en met de audio-opname van dit interview?

Als u verder nog vragen of zorgen heeft, kunt u gerust contact met mij opnemen via mail of telefonisch. Nogmaals hartelijk dank voor uw waardevolle bijdrage aan dit onderzoek.

Interview-questions:

Opbouwen van vertrouwen

- Hoe belangrijk is vertrouwen tussen stakeholders in de herontwikkeling van brownfields, vooral op het gebied van open communicatie, transparantie en het nakomen van afspraken?
- Kunt u voorbeelden geven van situaties waarin het vertrouwen is versterkt en de samenwerking tussen stakeholders bevorderd werd?

- Welke uitdagingen bent u tegengekomen bij het behouden van transparantie, open communicatie of het nakomen van afspraken, en hoe hebben deze factoren de het onderling vertrouwen beïnvloed?

Synergie

- Hoe creëren alle betrokken stakeholders synergie in brownfieldprojecten, waarbij gezamenlijke inspanningen leiden tot betere resultaten dan individuele bijdragen?
- Kunt u een voorbeeld geven van een situatie waarin samenwerking tussen stakeholders heeft geleid tot innovatieve oplossingen of een efficiënter gebruik van middelen?
- Heeft u situaties meegemaakt waarin een gebrek aan synergie de samenwerking ondermijnde, en zo ja, welke invloed had dit op de voortgang of de uitkomsten van het project?

Middelenverdeling

- Hoe worden financiële middelen verdeeld onder stakeholders tijdens het proces, en hoe wordt ervoor gezorgd dat deze verdeling eerlijk en efficiënt is?
- Hoe worden menselijke middelen (zoals vaardigheden, expertise en arbeidskracht) verdeeld, en welke maatregelen worden genomen om een eerlijke en efficiënte verdeling te garanderen?
- Hoe worden materiële middelen (zoals apparatuur, grond en fysieke activa) ingezet tijdens het project, en hoe wordt een eerlijk en efficiënt gebruik van deze middelen gewaarborgd?

Leiderschap

- Welke rol speelt leiderschap bij het coördineren en aansturen van samenwerking tussen stakeholders in brownfieldprojecten?
- Bent u uitdagingen op het gebied van leiderschap tegengekomen, en hoe zijn deze overwonnen om het succes van het project te garanderen?
- Hoe beïnvloedt vertrouwen in leiderschap de samenwerking tussen stakeholders, en kunt u voorbeelden geven waarbij vertrouwen in leiderschap de samenwerking versterkte of juist verzwakte?

Voordelen van samenwerking

- Wat zijn volgens u de belangrijkste voordelen van samenwerking tussen stakeholders in brownfieldprojecten?
- Welke aspecten van het opbouwen van vertrouwen, synergie, middelenverdeling of leiderschap hebben het meest bijgedragen aan deze voordelen?

Uitdagingen van samenwerking

- Heeft u situaties van "samenwerkingsinertie" meegemaakt, waarbij er conflict optrad tussen stakeholders, en hoe werden deze situaties opgelost?
- Welke aspecten van het opbouwen van vertrouwen, synergie, middelenverdeling of leiderschap leidt vaker tot uitdagingen in de samenwerking

Belangen van stakeholders

- Hoe beïnvloeden de specifieke doelen, zorgen en prioriteiten van verschillende stakeholders het samenwerkingsproces in brownfieldprojecten?
- Hoe werd dit opgelost?

9. Succesvolle herontwikkeling van brownfields

- Hoe definieert u het succes van een brownfieldproject, (vooral in termen van efficiënt middelengebruik, tijdige afronding en betrokkenheid van stakeholders)?
- In hoeverre heeft volgens u samenwerking tussen stakeholders bijgedragen aan het succesvol afronden van brownfieldprojecten?
- Kunt u voorbeelden geven van projecten waarin efficiënt middelengebruik, tijdige afronding en een goede samenwerking een belangrijke rol speelden in het bepalen van het succes?

9.2 Coding scheme

Code Group	Sub-code
Trust-building	- Selection of Trustworthy Partners - Open Communication and Honesty - Establishing Trust
Synergy	- Financial Synergy Through Joint Investments - Synergy as a Practical Necessity - Synergy Through Competition - Synergy Through Alignment of Interests - Synergy Through Mutual Understanding
Leadership	- Leadership Qualities and Strategic Vision

	<ul style="list-style-type: none"> - Relationship Management and Collaboration - The Role of Stakeholders
Resource Allocation	<ul style="list-style-type: none"> - Financial Contributions and Risk Allocation - Subsidies and Public Investment - Municipal Resource Availability
Collaboration Advantages	<ul style="list-style-type: none"> - Public-Private Partnership (PPP) Advantages - Increased Resources and Capacity
Collaboration Challenges	<ul style="list-style-type: none"> - Conflicts in Collaboration - Disadvantages of Public-Private Partnerships (PPP)
Stakeholder Interests	<ul style="list-style-type: none"> - Stakeholder Reputations and Conflicting Priorities - Diverse Agendas - Political Influence on Decision-Making
Contextual Factors	<ul style="list-style-type: none"> - Economic Conditions - Regulatory Environments - Stakeholder Influence
Successful Brownfield Redevelopment	<ul style="list-style-type: none"> - Understanding Each Other's Interests - Working with the Same People Over Time - Pride in Redevelopment Outcomes
Regulatory Environments	<ul style="list-style-type: none"> - Existing Structures - Soil Contamination
Economic Conditions	<ul style="list-style-type: none"> - Market Demand - Financial Feasibility
Uniqueness of Brownfield Redevelopment	<ul style="list-style-type: none"> - Site Complexity - Historic Land Use - Environmental Constraints

