THE IMPACT OF CONTRACTUAL AND RELATIONAL GOVERNANCE ELEMENTS ON THE OBJECTIVES WITHIN BOUWSTROOM INITIATIVES

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The impact of contractual and relational governance elements on the objectives within Bouwstroom initiatives

Master's thesis

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Publicly defended in Delft, 27 June 2025
According to the Netherlands Code of Conduct for Research Integrity

Preface

This research is written as my final product for the master degree in Management in the Built Environment at the TU Delft. The research was conducted with several housing associations, contractors and advisors within the Netherlands, which provided me with sources and other essential data for making this a successful research.

My story started at the Bachelor of the faculty of Architecture, Urbanism, and Building Sciences at the TU Eindhoven, where I did the construction management and real estate track. This, together with my part-time job at a contractor, made me decide to choose for the master track Management in the Built Environment. Throughout the study and my part-time job I developed more knowledge, skills and interest field into contract management. I bundled these characteristics into a challenging, innovative topic which is ‘Bouwstromen’.

For this preface I would like to highlight two main characteristics of myself, which are ‘hands-on culture’ and ‘practical view’. Both characteristics can be seen as the common thread throughout the research. The hands-on culture is reflected in the early decision to focus on the topic of 'Bouwstromen'. This eventually enabled me to orientate at several Bouwstroom initiatives early on, resulting in fast response with participating parties. It is important to note that the practical perspective and prior field experience gained from working in a modular contracting company, particularly in the areas of acquisitions and contracting, supported the practical orientation and relevance of the selected literature, case studies, and research focus. This resulted in interviewees responding enthusiastically on the degree of depth in the interviews, resulting in more practical implementable solutions.

Last of all, I would like to thank my supervisors for guiding me through the thesis process and all other participants for generating essential data, making it a successful research project.

**Artificial Intelligence (AI) tools are used to enhance the readability of this research*

Contents

Executive Summary

This research explores the governance structures of Bouwstroom initiatives. Traditional project-based delivery models have proven insufficient in the dual national challenge of addressing a housing shortage and meeting sustainability targets within the construction sector. Bouwstroom initiatives offer a program-based alternative with potential for streamlined construction processes, reducing costs, and sustainable innovation. However, research gaps remain regarding the integration of effective governance elements from traditional construction models into Bouwstroom initiatives. This study addresses these gaps by aiming to optimize the effectiveness of the program and by contributing both practical and theoretical insights into construction contract management.

The research is centered around the main research question: *Which governance elements can improve the achievement of objectives within Bouwstroom initiatives?* This question is answered by a series of sub-questions, exploring both existing practices and opportunities for improvement. It begins by examining which contractual and relational governance elements have been effective in traditional construction projects. The research then investigates how these elements are currently applied within Bouwstroom initiatives, through analysis of contractual documents and stakeholder experiences. Particular focus is placed on the two main objectives of Bouwstroom initiatives, which are 'lead time' and 'costs'. Building on these insights, the study proposes governance strategies, while also assessing the practical feasibility of their implementation.

The theoretical framework identifies key contractual and relational governance elements within construction projects and programs. While the contractual elements directly address the core objectives, which are 'lead time' and 'costs', the relational elements focus more on the collaborative process, indirectly influencing these outcomes. The chapter is structured around several themes, each accompanied by their relevance to Bouwstroom initiatives. The conclusion of the theoretical framework forms the basis for the deductive coding applied in the contractual document analysis and interviews, guiding the exploration of governance elements used within Bouwstroom initiatives.

The data collection chapter presents an in-depth analysis of governance elements used within two Bouwstroom initiatives: 'WoonST 2.0' and 'NH Bouwstroom.' Each case begins with a brief introduction and an overview of its organizational structure. Contractual governance elements are examined through the analysis of both project and program-level contractual documents, supplemented by interview data. Relational governance elements are analyzed exclusively through interviews. The conclusion of this chapter serves as the foundation for the cross-case analysis.

The cross-case analysis compares the two studied Bouwstroom initiatives, 'WoonST 2.0' and 'NH Bouwstroom,' to identify key similarities and differences in their contractual and relational governance elements. Based on the data collection results, a cross-case similarity table was developed to highlight contrasting governance practices, which were further analyzed to identify optimizations and potential challenges. These findings are summarized in concluding tables that also clarify their impact on 'lead time' and 'costs'. To enhance the reliability of the conclusions, an external expert critically assessed the preliminary conclusions based on their practical feasibility. Key insights from this assessment include, among others, the recommendation to incorporate turnkey PBC schedules, maintain delivery penalties due to rental agreements with tenants, and strengthen leadership roles within the organizational structure of Bouwstroom initiatives.

While the findings offer practical and scientific-theoretical value, they are based on a limited sample of two cases and a deductive framework that may not capture all relevant governance aspects. The results

should therefore be viewed as helpful within the scope of this research rather than as definitive conclusions. The study highlights the complexity of Bouwstroom initiatives, especially given their still evolving nature, multi-contracted actors, and program structure. It also reflects on the limitations of applying existing governance theories, which are primarily developed for project-based or market-driven contexts, rather than for program-based or (semi-)public-driven contexts. Future research is recommended to validate and expand upon these findings, using broader sample sizes, multiple researchers, other governance categorizations, and more diverse objectives, such as sustainability and innovation.

In conclusion, this research examines how contractual and relational governance elements can support the reduction of costs and lead time within Bouwstroom initiatives. Through the theoretical framework, case study analysis, and external assessment, the study proposes both contractual and relational governance strategies that could improve Bouwstroom initiatives. While the recommended strategies show potential, their practical feasibility depends on the geographical context, political climate, individual organizations, and the people within those organizations. Given the evolving and complex nature of Bouwstroom initiatives, the findings offer a direction rather than absolute solutions, emphasizing the need for context-specific approaches in future implementation and research.

List of Tables

List of Figures

Glossary and Abbreviations

Affordability:	extent to which tenants are able to pay the rent.
Conceptual construction:	a parametrical way of construction in which a great part of the construction project consists of a fixed construction concept with small additional variables.
Lead time:	lead time from preparation phase to the end of the execution phase.
Contractual governance:	formal mechanism in project governance that involves the establishment of a system of legally binding contracts, including clear instructions, regulations, and rules, to define the powers and duties of the parties involved (Liu et al., 2022; Rahman & Kumaraswamy, 2002).
Costs:	costs related to the preparation phase and execution phase in construction projects.
Economies of scale:	cost advantage experienced by a firm when it increases its level of output, for example by purchasing in bulk (Loo, 2025).
Execution phase:	phase from start to end on the building site (mostly including groundworks and foundations).
FA:	framework agreement.
Financial security measures:	mechanisms for purchasing parties that mitigate financial risks by checking the financial health of contracting parties.
HA:	housing associations.
Industrialized construction:	production of construction components, or entire conceptual housing units, in a factory setting, where they are completed to the highest possible degree before being transported to the construction site (Crone et al., 2007; Koolwijk & Warmelink, 2023).
MMO:	maandagmiddag overleg.
Modular construction:	construction consisting out of modular-shaped, mostly prefabricated, construction elements.
Objection:	protest resource that local residents can use to delay or cancel building plans intended to enforce their own property rights.
Pain-share/gain-share:	mechanism under which the client and contractor share the responsibility for any cost savings or overruns (Jacomit et al., 2008).
PBC:	project-based contract.
Permit phase:	environmental permit under the environment and planning act (2024) consisting of a spatial planning approval and a technical review.

Preparation phase:	phase in which the design including related documents and reports is being prepared for the environmental permit application.
Program:	overarching, multi-project framework in which more than one project is scheduled.
Project:	an on itself standing temporary undertaking aimed to create a location specific outcome.
Project delivery model:	contractual document between the client and the contracting party including terms and conditions, regularly used under the UAC 2012 or UAC-IC 2005, within construction projects.
Relational governance:	informal mechanism in project governance that complements formal contract governance, focuses on trust and collaboration, which are essential for managing changing project conditions and reducing conflicts (Kadefors, 2004; Meng, 2012; Rahman & Kumaraswamy, 2008; Wong et al., 2008; Zheng et al., 2024; Zhou et al., 2023).
Spatial procedure:	procedure in which municipalities test plans (non-conforming activities) or new projects (conforming activities) to the environment.
Sustainability:	characteristic that describes the extent to which polluting elements are reduced.
Traditional construction:	construction in which sub-elements or raw materials are joined together on the building site.

Chapter 1

Introduction

This chapter gives an introduction to the research. It starts with a problem statement, followed by a short introduction of Bouwstroom initiatives, the main topic of the research. After that, the research gap and research objective will follow. The chapter ends with the research questions including the scope and methodology used.

1.1 Problem Statement

The Netherlands is facing a significant housing shortage, with new residential construction falling far behind demand. Also, the construction industry is a major contributor to environmental challenges, accounting for 38% of CO_2 emissions in the Netherlands (DGBC, 2021). Dutch housing associations, which manage nearly 30% of the total housing stock in the Netherlands, are dealing with long waiting lists for new rental applications (CBS, 2024). In response, these associations have introduced 'Bouwstroom initiatives' to accelerate the supply of affordable housing in the Netherlands. Through these initiatives, Dutch housing associations collectively aggregate demand by standardized building concepts, aiming to achieve more efficient and sustainable housing development (NCB, n.d.). Project-based delivery models, such as fixed-price contracts, design & build, and bouwteam, are struggling to meet increasing sustainable building supply due to their limitations in balancing cost, risk, time and quality. These models often prioritize project-based characteristics such as cost certainty or risk management. On the other hand, program-based solutions can ensure cross-project improvements, potentially leading to innovation and efficiency.

Given the urgency of the housing and global warming crises, traditional project-based models fall short, characterized by their deviation in costs, deadlines and quality (Ortiz-Gonzalez et al., 2022). An innovative program-based approach, 'Bouwstroom initiatives', could provide a solution. In this model, multiple housing associations and contractors work together under a collaborative framework, allowing for better planning, shared responsibilities, and continuous learning. By standardizing processes, Bouwstroom initiatives could reduce costs, speeds up timelines, and supporting sustainable innovation within the construction sector (Güler, 2022). However, standardized housing solutions as part of Bouwstroom initiatives may limit architectural diversity and fail to meet local needs (Ponte, 2024), while demand bundling could reduce competition, resulting in decreased innovation (Lente-Akkoord 2.0, 2022). Also, TwynstraGudde (2024) reminds that the complexity of coordinating diverse stakeholders within Bouwstroom initiatives could potentially lead to delays and inefficiencies.

While Bouwstroom initiatives have the potential to accelerate housing delivery and promote sustainable innovation, opinions remain divided. These collaborative frameworks have not been implemented as frequently as 'regular' project-based models. This raises important questions about the underlying value of Bouwstroom initiatives and highlights the need for further research into new governance structures.

Bouwstroom initiatives

A Bouwstroom initiative is a program initiated by Dutch housing associations in the same geographical region, aimed at accelerating and reducing the cost of new housing construction through standardized housing concepts, collective procurement, and closer collaboration with contracted parties. Within each program, housing associations enter into a formal framework agreement with contractors, and sometimes municipalities, that specify a clear start and end date. According to NCB (n.d.), collectively

aggregating demand and standardizing requirements enables more efficient and sustainable housing development.

Different Dutch housing associations in various regions have initiated framework agreements under the Bouwstroom initiative, which involves a process of collective demand aggregation and tendering using standardized building concepts. Aedes, the association of Dutch housing associations, supports the Bouwstroom initiatives but is not involved in the contractual relationships. Price determination is due to the standardized building concepts, largely pre-arranged and fixed through contracts. Standardized building concepts enable housing associations and contractors to establish clear agreements on price, quality, and capacity in advance, promoting predictability and efficiency.

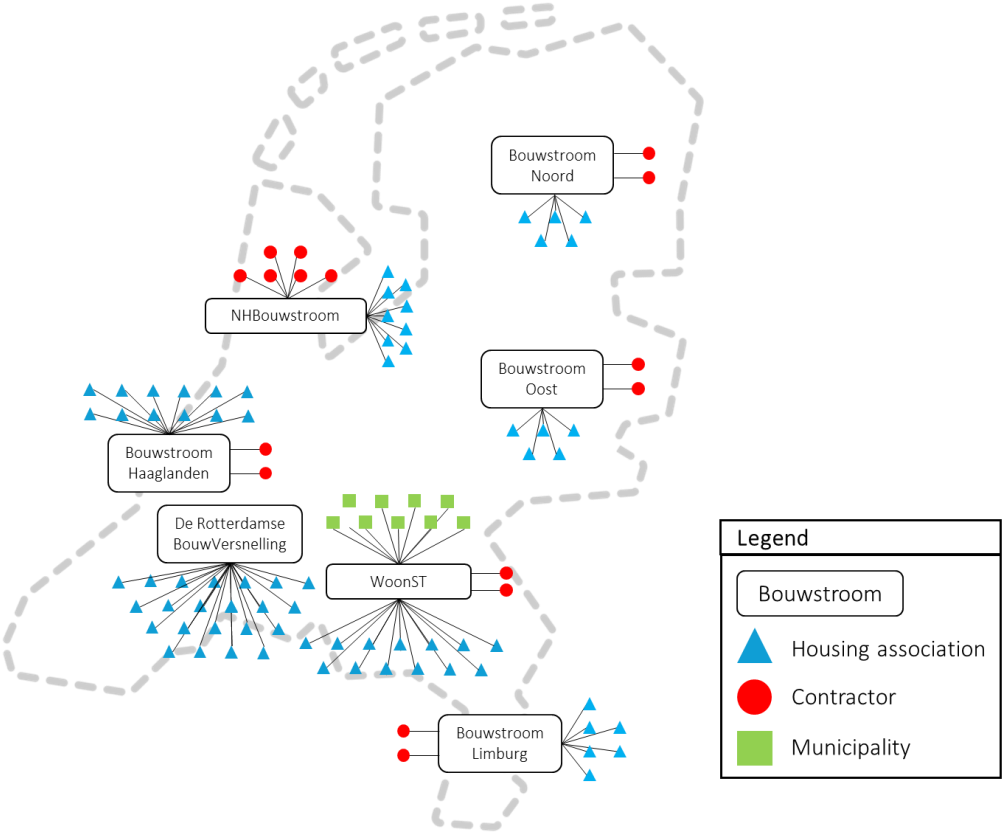


Figure 1.1: Overview actors in FA of Bouwstroom initiatives (Own work, 2024)

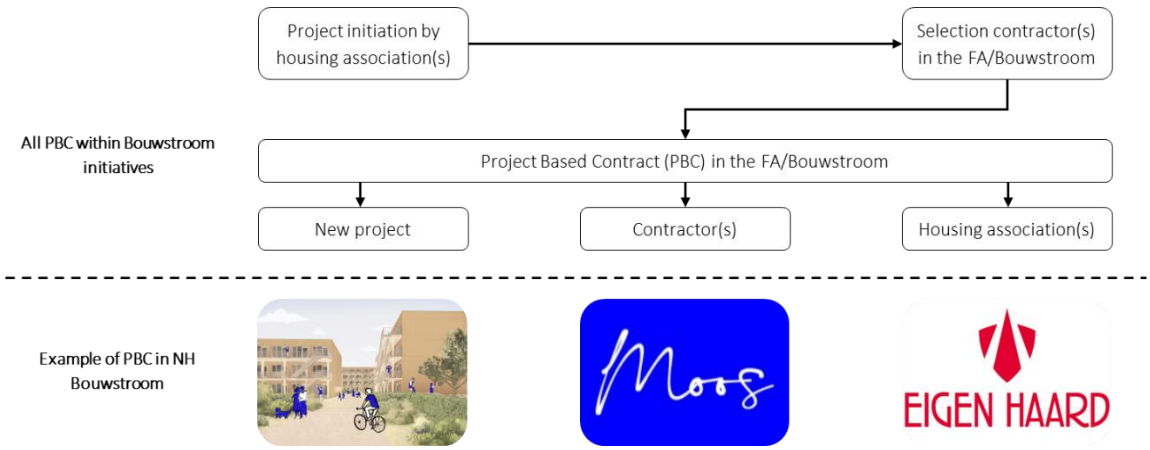


Figure 1.2: Overview legally bound actors in PBC of Bouwstroom frameworks (NH Bouwstroom, 2025; Own work, 2025)

Bouwstroom initiatives are programs, better known in the construction industry as framework agreements (FA). Figure 1.1 provides an overview of the current participants in all Bouwstroom initiatives across the Netherlands according to the given definition. Figure 1.1 shows that while some Bouwstroom initiatives consist solely of housing associations, others involve two or more contractors. Notably, the 'WoonST' even involves municipalities. Within FA, there are multiple project-based contracts (PBC). Figure 1.2 explains the PBC structure within a Bouwstroom initiative including an example.

Governance Elements

The success of Bouwstroom initiatives including their aims relate to its governance structure. Contractual governance and relational governance are widely recognized as the two most critical components in achieving successful outcomes in construction programs and projects. The construction sector is characterized by high levels of complexity, uncertainty, and the need for coordination among diverse stakeholders. Contract governance is a formal mechanism within project governance that involves establishing a system of legally binding contracts, including clear instructions, regulations, and rules to define the powers and duties of the involved parties (Liu et al., 2022; Rahman & Kumaraswamy, 2002). At the same time, relational governance, an informal mechanism in project governance that complements formal contract governance, focuses on trust and collaboration, which are essential for managing changing project conditions and reducing conflicts (Kadefors, 2004; Meng, 2012; Rahman & Kumaraswamy, 2008; Wong et al., 2008; Zheng et al., 2024; Zhou et al., 2023). Therefore, this research incorporates both contractual and relational components, addressing governance at both the program and project levels.

Research Gap

The ongoing housing and sustainability crises forces the construction industry to innovate. As discussed in the '1.1 Problem Statement', traditional project-based contracts fall short (Ortiz-Gonzalez et al., 2022). Program-based models, like Bouwstroom initiatives, give room for innovation and efficiency potentially serving as partial solution to the housing and sustainability crises.

This research addresses a gap in the literature on construction contracts, with a particular focus on governance elements that could improve the achievement of objectives within Bouwstroom initiatives. Table 1.1 lists three related papers and their respective gaps in relation to this research.

Table 1.1 Relevance and gaps in existing literature

Literature	Relevance	Identified gaps
Article (Meijer & Straub, 2025)	Multi-year programs for housing associations	Focuses on renovation projects and sustainability rather than new projects with reduced lead time and costs.
Msc Thesis (Güler, 2022)	Bouwstroom initiatives	Tests the effectiveness of Bouwstroom initiatives as program management tool rather than optimizing its objectives.
Research commissioned by Aedes (TwynstraGudde, 2024)	(Relational) success factors in Bouwstroom initiatives (FA)	The research does not focus on: - PBC; (focuses only on the FA) - contracts and contractual governance - opinions involved contractors - optimizations based on effective literature

This research has an exploratory nature, aimed to formulate governance elements that could improve the achievement of objectives within Bouwstroom initiatives, an area with limited prior research. The

study provides deeper insights into both contractual and relational governance elements, offering a more comprehensive perspective. The findings will not only advance theoretical understanding, but also offer practical solutions for optimizing project and program models within Bouwstroom initiatives and the broader construction sector.

Research Objective

The primary goal of this research is to *define governance elements that can improve the achievement of objectives within Bouwstroom initiatives*. This involves understanding how specific contractual or relational governance elements impact the critical performance 'costs' and 'lead time'. Considering the contractual governance elements, both the PBC and FA will be addressed in order to develop a more comprehensive analysis. By identifying these elements, this research aims to make practical implementable improvements that support balanced decision-making for Dutch housing associations and enhance contract value, contributing to both practical and theoretical advancements in construction contract management.

Given the pressing affordable housing shortage in the Netherlands, optimization could accelerate the construction process by creating more efficient and scalable projects including shorter lead times and lower costs per unit. Furthermore, by promoting consistency and standardization in construction practices, Bouwstroom initiatives can support the development of sustainable housing with a high degree of industrialized standardization and therefore lower failure costs (Khadim et al., 2023), contributing to both affordability and environmental goals in the Netherlands.

1.2 Research Questions

Based on the problem statement, research gap, and research objective, the main research question is formulated as follows:

Which governance elements can improve the achievement of objectives within Bouwstroom initiatives?

Sub-questions are as follows:

1. Which governance elements have been effective in construction projects?
    a. Which contractual governance elements are effective?
    b. Which relational governance elements are effective?
2. Which governance elements are used within Bouwstroom initiatives?
    a. Which governance elements are present in contractual documents?
    b. How are governance elements implemented and experienced?
3. What governance strategies can be implemented to improve the achievement of objectives within Bouwstroom initiatives?
4. Which aspects might affect the practical feasibility of the proposed strategies?

Objectives within Bouwstroom initiatives

As explained in the definition of section 2.1, the objectives within Bouwstroom initiatives are aimed to accelerate and reduce the cost of new housing construction (NCB, n.d.).

Governance elements

Governance elements in construction projects are mechanisms and practices that guide decision-making, manage stakeholder relationships, and ensure project objectives are met. They can be categorized into contractual governance, which includes formal agreements, and relational governance, which emphasizes trust and collaboration (Zheng et al., 2008).

1.3 Research Scope

This research aims to answer the following research question:

'Which governance elements can improve the achievement of objectives within Bouwstroom initiatives?'

The research question consists of two key components that require clarification in relation to the scope: 'governance elements' and the 'objectives within Bouwstroom initiatives'. The following sections clarify how these terms are defined and applied within the scope of this research.

There is more than one Bouwstroom initiative, and each initiative involves different participants with varying objectives. However, the overarching main objectives for Bouwstroom initiatives include:

1. Lead time - accelerating the preparation, permit and execution phases
2. Costs - lower construction and related process costs per housing unit
3. Sustainability - dwellings with enhanced sustainability features

While all three play an important role in Bouwstroom initiatives, 'sustainability ' is already tackled in the Dutch building decree (BBL), article 4.159 paragraph 1, by means of a specific MilieuPresentatie Gebouwen (MPG) score (BBL, 2025). Therefore the main objectives considered in this research are *'lead time'* and *'costs'*.

Affordability refers to the extent to which tenants are able to pay the rent. One way to improve affordability is by reducing costs. This study focuses solely on that aspect of affordability. Therefore, 'affordability' and 'costs' are treated as equivalent in this research.

Specific governance elements are needed in order to steer and achieve these objectives. In this research, governance elements are subcategorized into 'contractual governance elements' and 'relational governance elements'. Furthermore, in relation to the characteristics of Bouwstroom initiatives, a distinction can be made between 'program' and 'project' governance elements.

Governance elements are not in each phase as important to steer on as they are in another phase considering 'lead time' and 'costs'. For example during the procurement phase outlines for the program can be set which indicate an important phase, while during the execution, when the contract is set, not much can be done anymore. Figure 1.3 gives a schematic overview of the phases where this study focuses on.

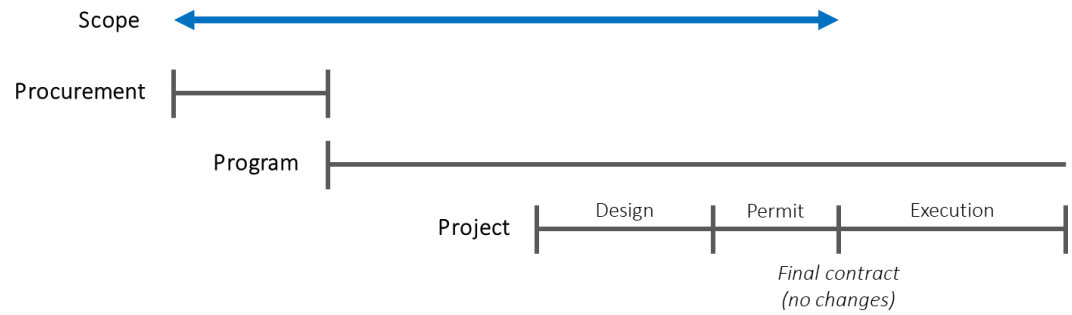


Figure 1.3: Research scope within the timeline of a Bouwstroom initiative (Own work, 2025)

This research focuses on Bouwstroom initiatives involving new, conceptual, and industrialized construction. Conceptual housing construction within Bouwstroom initiatives is formulated in 'De Woonstandaard', a manual in which various housing concepts across different rent categories are translated into several 'Product-Market Combinations (PMCs)' (NCB, n.d.). The manual serves as a guideline but does not necessarily mean that the PMCs correspond to fully standardized concepts. Slight changes such as sanitary, façade, or location specific sizing adjustments are allowed.

1.4 Methodology

Research model

Figure 1.4 presents the research model for this research. The model aims to explain how specific governance elements can improve the objectives within Bouwstroom initiatives. These governance elements are divided into two categories:

1. a contractual part, including legally binding agreement (Liu et al., 2022);
2. a relational part, including informal mechanism behind formal agreements (Zheng et al., 2024).

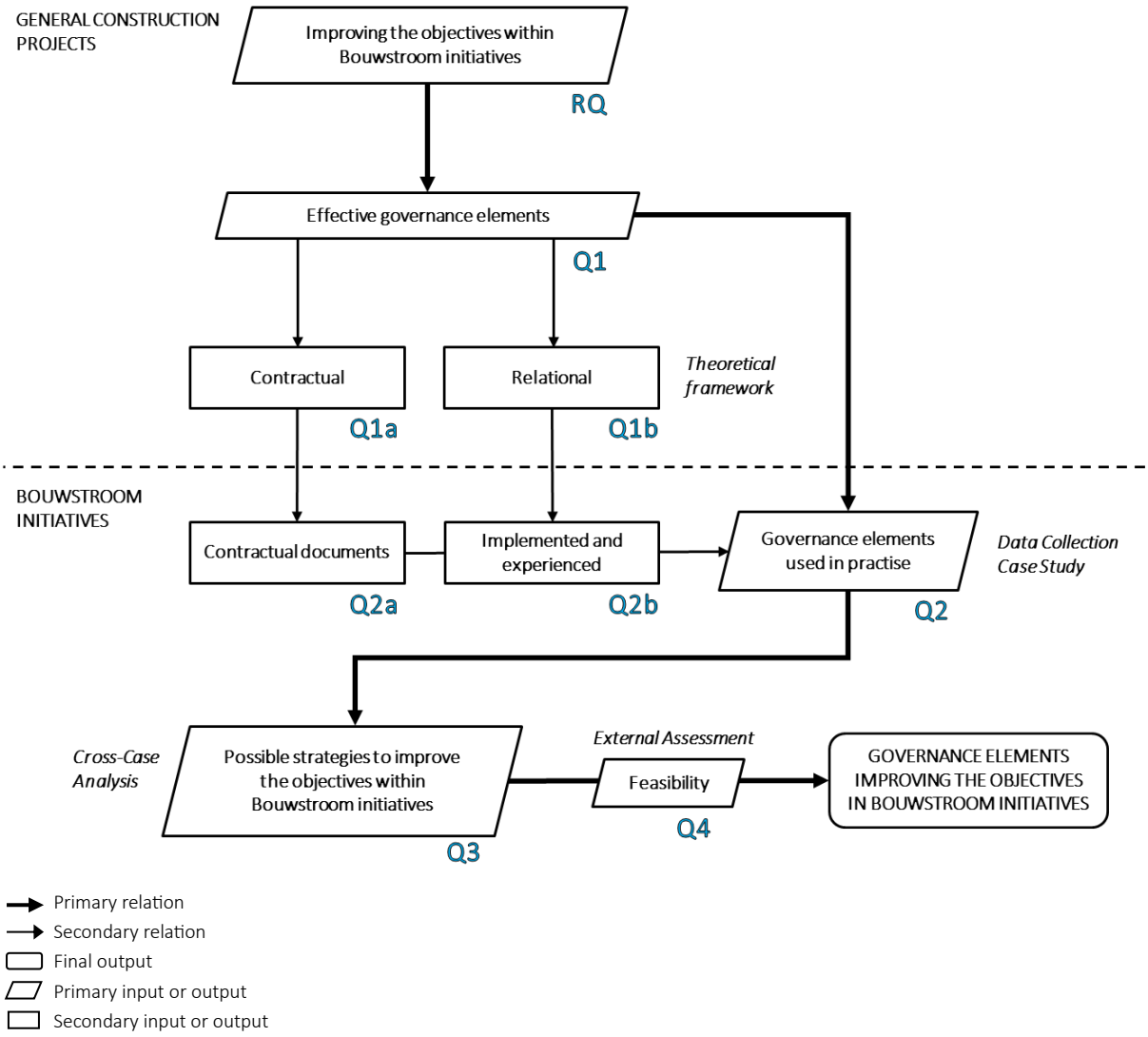


Figure 1.4: Research model (Own work, 2025)

Both components, as identified in the literature review, are essential for delivering a well-supported recommendation for improvement in construction programs and contracts (Kadefors, 2004; Meng, 2012; Rahman & Kumaraswamy, 2002; Rahman & Kumaraswamy, 2008). The part above the dotted line represents the governance elements across general construction projects, while the part under the dotted line focuses on the elements specific to Bouwstroom initiatives. The top side is crucial as it provides the foundation for comparing proven useful governance elements from general construction projects with those used within Bouwstroom initiatives.

This chapter describes which methodological approaches are used in the research. They are subcategorized based on the distribution of the sub-questions:

1. Theoretical framework
2. Data collection case study
3. Cross-case analysis
4. External assessment

Theoretical Framework

The theoretical framework aims to answer the first sub-question:

1. *Which governance elements have been effective in construction projects?*
    a. *Which contractual governance elements are effective?*
    b. *Which relational governance elements are effective?*

First, a set of existing literature studies reported in journal papers and academic books are analyzed for both contractual and relational governance elements. The conclusions retrieved from these studies on effective governance elements in construction projects are written down in this chapter with a critical view on the conclusions drawn in journal papers. The output of this chapter includes a list of deductive codes. These codes form the starting point for the comparison with present elements in Bouwstroom initiatives in the cross-case analysis.

Case study

For this research two case studies are analyzed, which are NH Bouwstroom and WoonST. The analysis of these caste studies are aimed to answer the second sub-question:

2. *Which governance elements are used within Bouwstroom initiatives?*
    a. *Which governance elements are present in contractual documents?*
    b. *How are governance elements implemented and experienced?*

Considering sub-question 2a, for each case, the framework agreement and a project agreement are used. All formal documents are analyzed in ATLAS.ti. The deductive codes used for this analysis are retrieved from the conclusion of sub-question 1a. Furthermore, new information could possibly emerge, resulting in inductive codes.

For sub-question 2b, for each case, three interviews are conducted. The interview questions relate to the conclusions from sub-question 1a, 1b, and 2a. The interviews are conducted in Dutch language and take roughly 60 minutes each. Each interview takes place at the location of the organization and is recorded and transcribed with anonymization of the interviewees. The transcription is analyzed in ATLAS.ti including deductive codes retrieved from sub-question 1a and 1b. The three interviews per case include the following interviewees:

1. Housing association A
2. Housing association B
3. Contractor

The interviewees are mainly involved in the FA stage, but have also been involved in a project as part of the FA. In each case study, the interviewees hold various positions within an organization.

Cross-case analysis

The third methodology aims to answer the third sub-question of the research:

3. *What strategies can be implemented to improve the achievement of objectives within Bouwstroom initiatives?*

To answer this sub-question, two case studies are analyzed through a cross-case comparison using the deductive codes from sub-question 1 and the results from sub-question 2. In addition, where applicable, new inductive codes that emerged in sub-question 2 are included, providing supplementary insights for the conclusion. The cross-case analysis serves as the basis for the preliminary conclusion, addressing sub-question 3.

External assessment

The conclusion of the third sub-question results in preliminary strategies for improvement. External assessment, the last method, is needed to make the preliminary strategies practical implementable. The external assessment aims to answer the last sub-question of the research:

4. *Which aspects might affect the practical feasibility of the proposed strategies?*

In addition to the six interviews conducted for the cross-case analysis, one interview was conducted with an external expert to validate or falsify the real-life applicability of the preliminary conclusions from sub-question 3. This interview contributes to answering sub-question 4.

Chapter 2

Theoretical Framework

This chapter presents a literature review of effective contractual and relational governance elements within the construction sector at both the program and project levels. It concludes with a list of deductive codes used in the cross-case analysis.

2.1 Contractual governance elements

The following sections include important contractual governance elements retrieved from academic journal papers. For each literature topic, the relationship to Bouwstroom initiatives is presented. The chapter concludes with a summary list of deductive codes.

PBC schedules and conditions

Within PBC, a distinction can be made between a single-phase PBC and a two-phase PBC. In a single-phase PBC, the contractor is selected before or during the early preparation phase and remains involved until building delivery as the contracted party. In a two-phased PBC schedule, contracts are split up between the preparation phase and the execution phase. The main difference between the two PBC schedules is related to the degree of flexibility, for example to choose another contractor due to capacity shortages or collaboration issues. Figure 2.1 illustrates a single-phase PBC and Figure 2.2 presents a two-phase PBC schedule. The choice between these contracting schedules depends on the specific characteristics of the project.

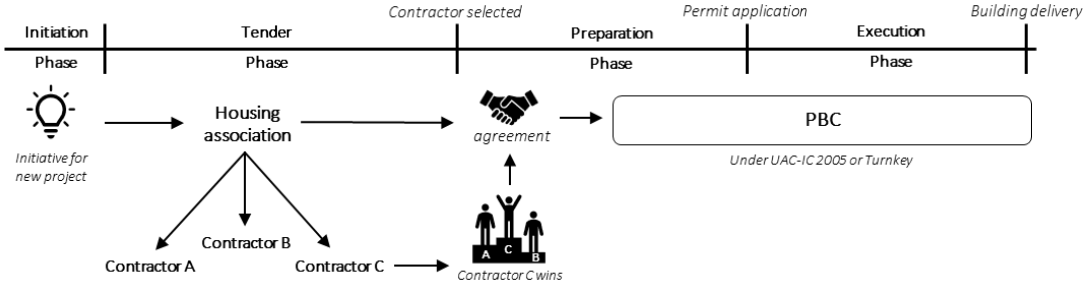


Figure 2.1: Single-phase PBC schedule (Own work, 2024)

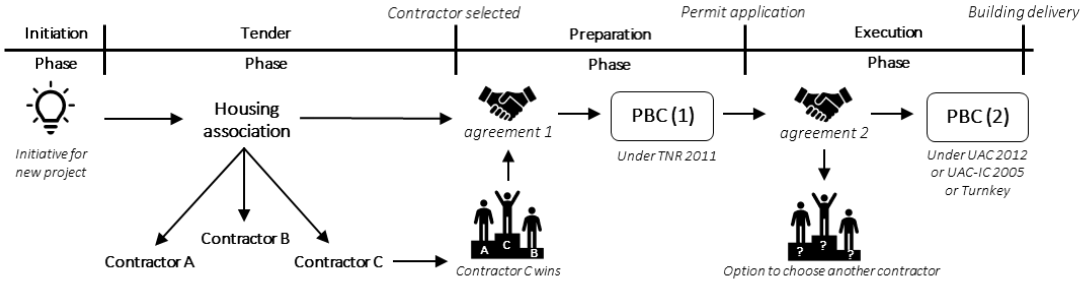


Figure 2.2: Two-phase PBC schedule (Own work, 2024)

Single-phase integrated PBC schedules, typically used under Uniform Administrative Conditions-Integrated Contracts (UAC-IC) 2005 or Turnkey conditions, combine design and execution responsibility for contractors into one contract, potentially offering more efficiency and faster project delivery. However, they require a well-defined project scope and strong stakeholder alignment early in the process, which may make them less suitable for complex projects where uncertainties can result in disputes, cost overruns, or in general scope creep. (Ahmed & Jawad, 2022).

In contrast, two-phase PBC schedules, which are contracted under The New Rules (TNR) 2011 in the first phase and under Uniform Administrative Conditions (UAC) 2012, UAC-IC 2005, or Turnkey conditions in the second phase, separate the preparation and execution phases, allowing for improved risk assessment and phased planning. This approach is ideal for complex or innovative projects, where collaboration and flexibility are key to minimizing risks (Bresnen & Marshall, 2000). However, it may lead to longer timelines and higher upfront costs, making it less attractive for straightforward projects with tight budgets (De Schepper et al., 2014).

Table 2.1 shortly explains the differences between the different contractual conditions:

Table 2.1 Typical used contractual conditions in relation to the contractor's position

Condition	Explanation	Liability contractor	Source
TNR 2011	Contractor takes the role of the consultant or architect and makes a design together with the approval of the client.	Maximum design fee	(Delta Advocaten, 2025)
UAC 2012	Contractor executes a project-based on an existing approved design.	Partially design, but mainly execution	(Delta Advocaten, 2025)
UAC-IC 2005	Contractor designs and executes a project together with the approval of the client.	Design and execution	(Delta Advocaten, 2025)
Turnkey	Contractor designs and executes a project-based on the program of requirements made by the client.	Design and execution	(Flux Partners, 2025; NCB, 2022)

Relation to Bouwstroom initiatives

From the literature about single-phase vs. two-phase PBC schedules can be learned that one is not better compared to the other, it depends on the project scope. Considering the main aims of Bouwstroom initiatives as discussed in the research scope, taking into account industrialized conceptual housing construction within Bouwstroom initiatives, an integrated contract with both design and execution liabilities for a contractor under the UAC-IC 2005 or turnkey would fit best. However, not every location, housing association, and aesthetics committee is the same. This is something which needs to be considered in making a choice between an single-phase-integrated or two-phase-separated contract. Also, giving too much freedom to the contractor could bring risks for clients considering design and permit issues. These issues in relation to the project scope will be further discussed in the next section.

Project scope and standardization product

A study by Langston (2013) showed that construction speed is 'the ratio of scope over time', where scope is treated as an output and time as an input (Figure 2.3). In the industrialized construction sector this make sense (Zidane et al., 2016). A two story building needs roughly the same amount of foundation as a three story building. The 'ratio' of scope on foundation in the three story building therefore decreases. This specific aspect is relevant to both 'lead time' and 'costs'.

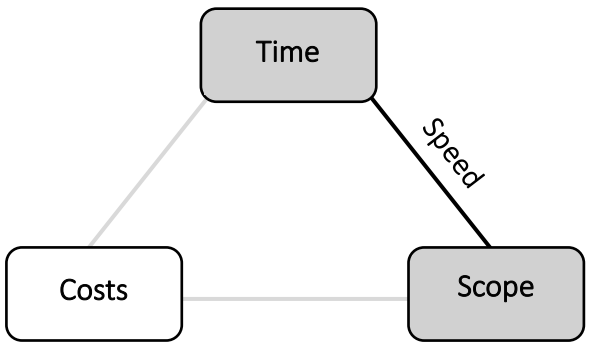


Figure 2.3: Iron Triangle (Langston, 2013; Zidane et al., 2016)

According to Ahmed & Jawad (2022), project complexity plays an important role in project success. Project complexity serves as a part of the project scope. Standardization aims to minimize the variety and quantity of prefabricated elements, improving the efficiency of both off-site manufacture and on-site assembly (Gerth et al., 2013).

While the project complexity may be decreased by standardized conceptual housing construction within Bouwstroom initiatives, real-world practices show something different. Clients, locations, and projects are unique, often reflecting specific personal preferences. Additionally, architects and aesthetics committees hold significant influence in the Netherlands. This raises the question of whether standardized housing construction within Bouwstroom initiatives can adequately meet the diverse expectations of these stakeholders. Considering 'costs', according to Hart et al. (2021), using standardized elements may unintentionally increase material costs due to over dimensioning in some cases.

Relation to Bouwstroom initiatives

In the context of Bouwstroom initiatives, the degree of standardization in new construction may reduce the complexity of the project scope. Six contractors involved in standardized conceptual housing construction in the Netherlands already have KOMO-certified building concepts (KOMO, 2024). This certification could help accelerate the process, as municipalities would no longer need to test designs against the Dutch Building Decree. Additionally, standardization may enable contractors to build more cost-efficient by reducing failure costs.

However, as discussed in the previous section, there are implications for designing and constructing standardized housing concepts. It is worth examining how much flexibility remains within Bouwstroom initiatives for adapting standardized products.

Delays project timeline

The concept of 'speed' as discussed by Zidane et al. (2016), is not limited to lead time alone. A study by Van Laar & Schets (2023) shows that construction projects, on greenfield locations with availability of ground disregarded, can be quantified in three phases until building delivery:

1. Initiative phase
2. Development phase (including preparation and permit)
3. Execution phase

In the initiative phase, the program of requirements and financial feasibility study is made. According to Figure 2.4, this phase takes an equal amount of time for both traditional and conceptual construction. However, the starting point of the initiative phase is often not clearly defined, making it difficult to estimate its exact duration. Therefore, the initiative phase will not be further elaborated upon in this research.

In the development phase, the design and permit are elaborated. The study by Van Laar & Schets (2023) suggests that the development phase for conceptual construction is shorter due to the use of fixed design elements. This is partly understandable, as standardized designs are more likely to meet building decree requirements. However, it does not hold when it comes to obtaining permits. Media reports such as 'Recipe for ghettoization' (Valstar, 2025) and 'Many planned conceptual homes still unbuilt, neighborhood often objects' (NOS, 2023) highlight that conceptual construction is frequently accompanied by lengthy spatial procedures and public objections. Van Laar & Schets (2023) also argue that the actual 'lead time' on site for conceptual construction is shorter than for traditional methods,

which is plausible given the high degree of prefabrication. Nonetheless, long-lasting spatial procedures and objections remain a significant factor of concern.

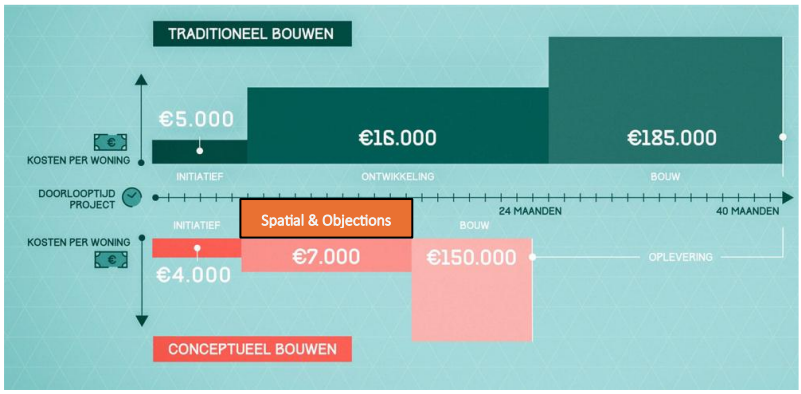


Figure 2.4: Iron triangle traditional vs. conceptual/industrialized construction (Van Laar & Schets, 2023)

Relation to Bouwstroom initiatives

In the context of Bouwstroom initiatives, it is important to gain a deeper understanding of the formal agreements established between the involved parties. This includes how production slot reservations are arranged in the factories of the contractors, the scheduling of client payments in such cases, the allocation of financial responsibilities for potential risks, and the continued applicability of contractor penalties.

Transparency, risk allocation, and responsibility

The client and contractor often have differing interests in a project: while the client typically focuses on minimizing the total cost over the life cycle of the project, the contractor tends to prioritize reducing short-term construction costs to maximize profit (Guo et al. 2014; Han et al. 2022). From a contractual governance perspective, risk allocation contains financial incentives for the contractor within formal agreements to compensate for losses in dealing with risks (Tadelis, 2012). Contractor costs could decrease through proper risk allocation by reducing costs related to risk management, risk losses, and transaction costs arising from contract dispute handling. Mitigating these risks incentivizes contractors to adopt cooperative behavior, potentially adding value to projects (Lui et al., 2009; Wu et al., 2017). An open-book policy in accordance with NEN 2699 may be required, whereby the contractor grants the professional advisors of the client access to review material costs, labor costs, overhead costs, and other associated costs (Chappell, 2021). The literature suggests that risk sharing can be beneficial for both the client and contractor through a pain-share/gain-share mechanism, in which both parties share responsibility for cost savings and overruns. This method encourages both the client and contractor to work efficiently, where collaboration can lead to innovation. If the final costs are lower than the initial target, savings are split between the client and contractor. On the other hand, if the costs exceed the target, both parties share the burden (Jacomit et al., 2008). This pain-share/gain-share mechanism has been effectively applied in infrastructure projects. A study by Hauck et al. (2004) explains that risk sharing between the client and contractor is limited through the use of a guaranteed maximum price (GMP). In such cases, the maximum financial exposure for the client, also known as the ‘maximum pain’, is the difference between the target cost contracting (TCC) amount and the GMP.

In addition, projects with long timespans are exposed to changing market conditions, including fluctuations in prices. To protect projects against financial uncertainty, price escalation clauses can be included in contracts to allow adjustments in payments based on changes in labor and material costs. According to Chammout et al. (2024), these clauses help reduce disputes by providing a clear contractual framework for cost adjustments, especially during periods of economic instability.

Relation to Bouwstroom initiatives

Considering transparency and reliability of contractors in Bouwstroom initiatives, open-book policies can be implemented. According to the literature of Chappell (2021) & Jacomit et al. (2008), more transparency, equal risk allocation, and receiving a 'fair' market-conform price can be achieved via a pain-share/gain-share mechanism. However, not every client is the same, and especially Dutch housing associations are different compared to a risk-seeking market developer aiming for the highest returns. Therefore, the aspect of risk sharing should be addressed in the interviews in addition to the analysis of the contractual documents.

With recent geopolitical tensions and the long lasting nature of Bouwstroom initiatives, market fluctuations must be taken into account within contracts aiming to lower project costs, looking at the feasibility for both contractors and housing associations. In Bouwstroom initiatives, pre-arranged price escalation clauses could reduce risks considering price and legal disputes. It is interesting to see how this is formulated within the contracts.

Penalties and rewards

Socialist civil laws describe the delay penalty it as 'a means to protect production facilities by ensuring discipline in work and adherence to deadlines' (Abdullah AL-Rabea et al., 2024). Additionally, it is characterized as 'compensation imposed by the administration automatically without the need to prove any harm to the client' (Abdullah AL-Rabea et al., 2024). Thus, the delay penalty consists of lump sum amounts predetermined in the contract, serving as both an administrative and financial measure applied when the contractor fails to complete the work within the agreed timeframe. The penalty must be explicitly stated in the contract, otherwise, the client cannot enforce it at a later stage (Abdullah AL-Rabea et al., 2024). On the other hand, contractors can also be incentivized with rewards for early project delivery or additional quality beyond the initial project scope. Incentive mechanisms such as target pricing, performance-based rewards, and collaboration incentives have been shown to be effective in reducing costs and contributing to overall project success (Fagerhaug et al., 2024).

Relation to Bouwstroom initiatives

In Bouwstroom initiatives, late project delivery results in lost rental income for housing associations. Therefore, it is reasonable to include a pre-arranged penalty that provides fair compensation for such losses. However, late delivery is not always the result of contractor actions, delays may also result from external factors or client-related issues. In such cases, flexibility in determining the amount of the penalty may be appropriate. Additionally, it would be justified to reward contractors through pre-arranged incentive mechanisms that stimulate early project delivery or improved quality.

Guarantees

Another interesting point to mention is the accelerator effect as is discussed by Winch (2010, p. 31). ''A change in levels of demand for consumer goods and services does not translate directly into demand for the investment goods used in their supply, but it is magnified. This is because investment is lumpy – a new factory is intended to pay back over more than a single year, so the initial capital investment to meet a given consumer demand is front- loaded. Similarly, when consumer demand falls, existing assets are adequate for supply and no new ones need to be purchased''.

Solid partnerships for industrialized conceptual housing construction within Bouwstroom initiatives need an interplay between purchasers and suppliers. This means, given possible purchase guarantees for purchasers, suppliers must include capacity reservation guarantees. Results by Li et al. (2021) indicate that two key conditions must be considered when incorporating capacity guarantees into

contracts: flexibility in capacity reservation and transparent risk sharing by purchasers with regard to price and demand

Relation to Bouwstroom initiatives

The industrialized conceptual construction mentioned in this research is primarily carried out in factories, representing a form of 'initial capital investment'. Due to the accelerator effect, contractors engaged in industrialized construction are not easily able to adjust to changes in consumer demand (either increase or decrease). Given the long-term and collaborative nature of Bouwstroom initiatives, it is relevant to examine how housing associations address the balance between purchase guarantees on the one hand with production security for contractors on the other hand within their contracts.

Flexible capacity reservation agreements may lead to delays in lead time, as their lack of strict commitments can create uncertainty in planning and execution. On the other hand, a lack of flexibility may lead to dissatisfaction among contractors, as it increases their exposure to continuity risks. This issue, along with the transparent sharing of price and demand risks by housing associations, needs to be further elaborated in the interviews.

Payment schedule

Industrialized conceptual housing construction within Bouwstroom initiatives requires a different financing approach compared to traditional on-site construction. Contractors make significant upfront investments in material purchasing and off-site labor. A traditional payment schedule with gradual payments may cause cash flow issues. Instead, clients may be required to pay a larger proportion of the contract value earlier in the process to ensure manufacturing continuity and avoid delays (Kurup et al., 2024). A study by Stein (2016) claims that clients should finance modular contractors in the pre-development phase, in which materials are purchased, sometimes up to 50% of the total contract value. Stein (2016) notes that clients often rely on bank loans to fund construction projects. However, banks are cautious about this financing model because the collateral is difficult to identify, for example, materials stored in factories can be allocated to multiple projects. In addition, banks are concerned about the high risk of bankruptcy among modular contractors due to significant overhead costs.

Relation to Bouwstroom initiatives

Considering shorter lead times within Bouwstroom initiatives, housing associations must agree with upfront investments, while balancing the risks as mentioned by the banks (Stein, 2016). Housing associations and their banks can achieve that by monitoring the purchases of contractors in combination with a material passport of their projects. In this way the collateral, with an additional declaration of ownership, can be better identified. Regarding the financial position of the contractor, housing associations could opt for a yearly financial report of the contractor. Considering the nature of budgeting and governance structures of Dutch housing associations, it would be interesting to see how is dealt with pre-financed industrialized construction in relation to payment schedules and milestones.

Quantity discount

Suppliers of industrialized products have a variety of costs per unit among different orders: making one unique product is more expensive than producing a large number of identical products. For this reason, industrial suppliers offer quantity discounts to purchasers, whereby the price per unit decreases as the order volume of identical products increases.

According to Munson and Hu (2010), there are two main types of quantity discounts: all-units versus incremental. The study explains that purchasers are more strongly incentivized to increase their order volume under an all-units discount structure. For example, if a purchaser intends to buy 100 units and the supplier offers a 2% all-units discount starting at a threshold of 101 units, ordering 101 units would

incentivize the purchaser, as the discount would apply to all 101 units. In contrast, under an incremental discount schedule, the discount would apply only to the additional unit beyond the threshold, making the incentive less attractive.

According to Bidgoli (2023), a fair quantity discount relies on setting a clear minimum order threshold, determined by the costs of the supplier and production efficiency. The study further explains that the discount rate and resulting economies of scale should balance the profits of the supplier and savings of the purchaser, while also accounting for internal overhead costs and market competition.

Relation to Bouwstroom initiatives

In Bouwstroom initiatives, suppliers are the contractors, while the purchasers are Dutch housing associations. Quantity discounts are only feasible when a nearly standardized building concept is included in the contract at a nearly fixed price. In contrast, customized projects undermine the potential for economies of scale. Therefore, elements such as the minimum order threshold, discount rate, and expected economies of scale should be explicitly addressed in the Bouwstroom initiative program agreement.

Conclusion

The chapter of contractual governance elements, can be concluded with the following summarizing list including points of attention for the contract analysis (Table 2.2):

Table 2.2 Summary of critical contractual governance elements in construction projects

Code	Subcode
Ca. PBC schedules and conditions	1. Project delivery model 2. Flexibility
Cb. Project scope and standardization product	1. Scope optimization 2. Presence standardized product 3. Customization options standardized product
Cc. Delays project timeline	1. Objections environment 2. Payment schedule client 3. Production slot reservation 4. Internal communication
Cd. Transparency and risk allocation	1. Open-book policy 2. Risk allocation client and contractor 3. Pain-sharing/gain-sharing 4. Pre-arranged price escalation clauses
Ce. Penalties and rewards	1. Presence pre-arranged penalty 2. Fairness penalty 3. Presence pre-arranged reward
Cf. Guarantees	1. Purchase and capacity guarantees 2. Flexibility guarantees (time and economic sensitivity)
Cg. Payment schedule	1. Milestones and payments 2. Financial security measures
Ch. Quantity discount	1. Incentives housing associations 2. 'Fair' discount contractors

2.2 Relational governance elements

Improving the achievement of objectives within Bouwstroom initiatives is not exclusively dependent on formal agreements. Given the complexity of these initiatives, this research assumes that optimizing relational governance elements can indirectly enhance reduced costs and shorter lead times. Therefore, this chapter focuses on elements that go beyond formal agreements and contractual arrangements. A study by Yeung et al. (2012) introduced a literature review on relational governance elements in contracting. From an extensive analysis of relational governance elements in contracts, five core elements are retrieved (Figure 2.5):

Figure 2.5: Five core relational governance elements (Yeung et al., 2012)

Commitment: *(project + program)*	The willingness of parties to reach the targets. These could be shared overall goals of Bouwstroom initiatives, but also, on project-level, the willingness to seamlessly complete a project.
Trust: *(project + program)*	Belief in the truth of participants, beyond formal agreements, of the words or work of others.
Cooperation and Communication: *(project + program)*	The way in which participants work together including communication with each other.
Common Goals and Objectives: *(project + program)*	Degree of shared vision and goals between participating organizations, groups, and individuals.
Win-win Philosophy: *(project + program)*	The extent to which participants are willing to compromise, meaning both parties have to give and take.

The following sections include important relational governance elements retrieved from academic journal papers. For each literature topic, the relationship to Bouwstroom initiatives is presented. The chapter concludes with a summary list of deductive codes.

Management of complex programs

Formal agreements are written down within the spectrum of contractual governance and relational governance elements are 'unformal' elements within construction projects. A study of Rönndahl et al. (2025) explains the theory of 'order and chaos' to explain how relational governance elements work within construction projects. Changes in order occur when participants do not stick to formal and

informal agreements or when agreements are not even made at all. An example could be no or vague response time agreements in the preparation phase, resulting in more chaos. Participants in a collaboration intend to keep all in perfect order and absolutely not ensure irreversible chaos occurs.

Formal agreements fall under the scope of contractual governance, while relational governance elements represent informal mechanisms within construction projects. A study by Rönndahl et al. (2025) introduces the theory of 'order and chaos' to explain how relational governance elements function in practice. According to this theory, changes in order occur when participants fail to adhere to formal or informal agreements, or when such agreements are not even made at all. For example, a lack of clear response time agreements during the preparation phase may lead to increased chaos. Although participants in collaborative projects generally strive to maintain perfect order, this is not always achieved in practice, as illustrated in Figure 2.6.

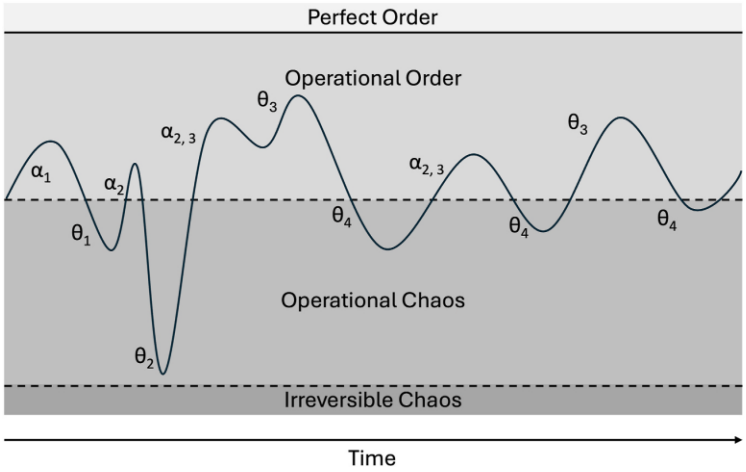


Figure 2.6: Theory of order and chaos (Rönndahl et al., 2025)

Relation to Bouwstroom initiatives

For Bouwstroom initiatives, it is relevant to observe who leads the collaboration efforts in order to minimize chaos. This topic can be evaluated through process diagrams outlining the organization structure within Bouwstroom initiatives, as well as through interviews with participants to identify potential areas for improvement.

Partnerships and trust

Trust is an important factor in the construction industry as it reduces the risk and information asymmetries (Wong & Cheung, 2004). In construction projects, risks are expressed in monetary values. Reducing the risks would therefore potentially result in lower costs per projects. On the other hand, information asymmetries can lead to duplicated efforts or rework, often resulting in higher costs and longer timelines for construction projects. In such situations, trust plays a critical role in reducing uncertainty and facilitating effective collaboration, making it a key factor to consider in this research.

According to Li et al. (2023) stable partnerships for innovative collaboration are most often established during the formation stage of a project or program. The study claims that clients should select reliable partners with a good reputation. Lau and Rowlinson (2010) confirm these statements, explaining that companies with shared objectives in the construction industry tend to have higher levels of trust compared to those with conflicting goals.

Besides the formation of partnerships, Tulokas et al. (2024) explains that maintenance of the partnership also plays an important role for trusted partnerships. The study suggests that all partners

must align their efforts and adapt to cultural change, including the discontinuation of old habits. Key factors in maintaining partnerships include frequent evaluation and effective managerial steering.

Considering activities promoting a trusted relationship, Chow et al. (2012) published a study on trust building in the construction industry. The study claims that managers leading the collaboration should promote and maintain trust by enhancing network and promoting initiatives. On the other hand, the study also finds that excessive use of procedural measures and credit assessment would lead to distrust.

Relation to Bouwstroom initiatives

In the procurement phase of Bouwstroom initiatives, contractors are mainly selected based on objective product factors rather than organizational or individual values (Brink, 2024). In the execution phase, for example within NH Bouwstroom (2025), multiple collaborative sessions are planned with the aim of building trust among all participating parties. Referring to the findings of Li et al. (2023) & Lau Rowlinson (2010), it is noteworthy that housing associations begin focusing on trust-building during the execution phase, even though organizational or individual misalignments may already emerge during the procurement phase. This is a point of attention which needs to be further elaborated in the interviews.

Housing associations have joined each other with a shared aim. Given the theory of Lau and Rowlinson (2010), organizational alignment and the level of trust would be high. However, a shared organizational aim does not always mean that individuals or individual groups are on the same page. A study by Kramer (1999) demonstrated that organizational and cultural values can distort what is referred to as 'real' trust, due to the fact that individuals within an organization are often under constant observation. For the interviews, it would be interesting to see whether there are different levels of trust between individuals, individual groups within organizations, and between different organizations.

In addition to the selection of new partnerships, proper maintenance of existing partnerships is also of great importance (Tulokas et al., 2024). Given the wide range of participants involved in Bouwstroom initiatives, it is relevant to examine how partnership maintenance is structured. This includes understanding the reasoning behind current working methods and assessing whether the collaboration activities are balanced and systematically organized, as suggested by Chow et al. (2012).

Collaboration

In the built environment, collaboration among diverse stakeholders is essential and plays a critical role in project success (Yang et al., 2011). A study by Suprapto, Bakker, and Mooi (2015), researchers from TU Delft, combined insights from multiple literature reviews with an online questionnaire involving 113 professionals focused on client-contractor collaboration and teamwork. The following sections present the most relevant findings from this study and their connection to Bouwstroom initiatives.

The first result showed that organized teamwork sessions and shared relational attitudes improve the quality of collaboration. However, project success can only be achieved if the previous mentioned factors are complemented by consistent managerial attention to teamwork on a daily basis.

The second finding revealed that relational attitudes aimed at long-term continuity between individuals extend beyond project outcomes. Suprapto et al. (2015) argue that even when a project or teamwork effort is unsuccessful, a strong relational attitude between individuals has a greater impact on creating long-term relationships than the reverse scenario. This highlights that relationship continuity is more directly shaped by relational norms and commitment than by teamwork quality or project performance alone.

The study also emphasized that project success, in terms of collaboration, can only be achieved when senior management positions from both the client and contractor share aligned relational attitudes. The study does not account for the roles of project managers or individuals in lower organizational positions.

Relation to Bouwstroom initiatives

For Bouwstroom initiatives, particularly during the framework agreement stage, it is clear that collaborative events are organized, and it can be assumed that participants generally share common relational attitudes (NH Bouwstroom, 2025). However, given the involvement of multiple organizations, it is relevant to examine how daily managerial attention is maintained to keep targets on track.

Different organizations work together under one framework agreement including multiple PBC. As can be found in the study of Suprapto et al. (2015), a strong relational attitude between two individuals is one of the most important factors for successful collaboration. Therefore, it is relevant to assess how the outcomes of completed projects influence future collaborations. Such evaluations may help identify more suitable or unsuitable partnerships between housing associations and contractors in subsequent projects.

Lastly, it would be interesting to see how varying positions within different organizations influence the shared relational attitudes.

Mutual interest

The overall conclusion in the study by Suprapto et al. (2015) regarding collaboration is that it is only effective when all team members are aligned around a mutual interest, referred to in this research as a 'shared philosophy'.

Relation to Bouwstroom initiatives

One of the main aims of the Bouwstroom initiatives is to reduce the cost per housing unit. Contractors are market-driven parties, generally aiming for profit maximization. However, they may be willing to lower unit costs in exchange for project continuity, which could help offset their high factory overhead costs. In the interviews, it will be relevant to explore the differing views of these contrasting parties on this issue.

Team resilience

Collaboration, commitment, and overall team resilience are important factors for project success. A study by Siddiquei et al. (2025), building on existing literature on team resilience, explains that two key factors enhance team resilience: challenged team members and servant leadership. Challenging team members is often a result of project or program complexity, while servant leadership refers to a leadership style focused on supporting and empowering team members.

Relation to Bouwstroom initiatives

For Bouwstroom initiatives, it is relevant to examine how both challenging work and leadership strategies are implemented, as well as the reasoning behind various managerial choices. The interviews are conducted across multiple organizational levels, making it valuable to assess which strategic choices are made at higher organizational levels and how these choices are perceived at lower levels.

External stakeholders

'2.1 Contractual governance elements' already discussed the challenges of industrialized housing construction in new neighborhoods, which often contribute to longer project lead times (NOS, 2023; Valstar, 2025). Involving external stakeholders in the process can lead to faster procedures with fewer objections, ultimately reducing delays in project timelines (Hofer et al., 2024).

Innovative partnerships are driven by mutual commitment of participating organizations. However, according to Li et al. (2023), quality and commitment of innovative partnerships can be improved by incentivizing the project or program including their team members. In the construction industry, this could be non-monetary incentives by means of deregulatory stimulants or monetary incentives by means of subsidies.

Relation to Bouwstroom initiatives

For Bouwstroom initiatives, it is relevant to examine how housing associations and contractors communicate and collaborate with external stakeholders such as municipalities and local residents. Additionally, it is important to understand the extent to which participants depend on municipalities within these processes.

With regard to government incentives, it would be valuable to explore whether local, provincial, or national authorities provide support for Bouwstroom initiatives, and, if so, how such innovative partnerships are facilitated.

Conclusion

As outlined in the definition list on page 16, all five relational core elements are relevant to both projects and programs. Therefore, this conclusion is structured around these five core elements rather than distinguishing between project and program levels. The chapter on relational governance elements concludes with the following summary list, highlighting key points of attention for the interview analysis (Table 2.3):

Table 2.3 Summary of critical relational governance elements in construction projects

Category	Code	Subcode
CC	Ra. Management of complex programs	1. Managerial steering (streamlined process)
Ct + Tt + CC + GO + WP	Rb. Partnerships and trust	1. Formation partnership 2. Maintenance collaboration 3. Types of trust 4. Trust enhancing activities
Ct + Tt + CC + GO + WP	Rc. Collaboration	1. Managerial steering (daily attention) 2. Long-term relationship between individuals 3. Link between person, company, and project 4. Multiple layer influence (by position)
Ct + CC + GO + WP	Rd. Mutual interest	1. Interest municipalities 2. Interest contractors 3. Interest housing associations
Ct + Tt + CC	Re. Team resilience	1. Impact factors team resilience
Ct + CC	Rf. External stakeholders	1. Process accelerating measures (communication) 2. Government incentives

Commitment=Ct; Trust=Tt; Cooperation and Collaboration=CC; Common Goals and Objectives=GO; Win-win Philosophy=WP

Chapter 3

Data Collection Case Study

Potential effective contractual and relational governance elements are retrieved from the theoretical framework in the previous chapter. This chapter examines the governance elements present in current Bouwstroom initiatives based on two case studies, which are WoonST 2.0 and NH Bouwstroom. This chapter aims to answer the second sub-question:

2. *Which governance elements are used within Bouwstroom initiatives?*
    a. *Which governance elements are present in contractual documents?*
    b. *How are governance elements implemented and experienced?*

First, each case is introduced with background information including the organization structure. After that, results from the contractual document analysis are presented and explained. Missing or newly emerging contractual governance elements, identified through a comparison between the theoretical framework and Bouwstroom initiatives, are classified as 'underexplored'. The underexplored elements, explained in a discussion section, together with the relational governance elements retrieved from the theoretical framework, form the basis for the interviews. Finally a conclusion of the results is included.

3.1 WoonST 2.0

3.1.1 Background information

WoonST has been in existence since 2019 and has operated under 9 municipalities within the region of Eindhoven. At the establishment of WoonST 1.0, 'affordability' and 'shorter lead times' were the main objectives. Given the success of WoonST 1.0, which resulted in the realization of more than 1.000 dwellings, WoonST 2.0 was launched in June 2024. With WoonST 2.0, construction continues to focus on the same objectives, while also aiming for a reduced environmental impact. This means building in a more circular and biobased way. The ambition is to realize 750 single-family homes and 1.750 multi-family WoonST 2.0 homes by 2030. Table 3.1 gives an overview of all affiliated participants.

Table 3.1 Participants WoonST 2.0

Nr.	Housing association	Contractor	Municipality
1.	Bergopwaarts	BAM Wonen	Best
2.	Compaen	Hurks	Eindhoven
3.	Goed Wonen		Geldrop-Mierlo
4.	Helpt Elkander		Helmond
5.	Trudo		Nuenen
6.	Thuis		Oirschot
7.	Volksbelang		Son en Breugel
8.	Wocom		Veldhoven
9.	Woningbelang		Waalre
10.	Woningstichting de Zaligheden		
11.	Woonbedrijf		
12.	Wooninc.		
13.	Woonpartners		

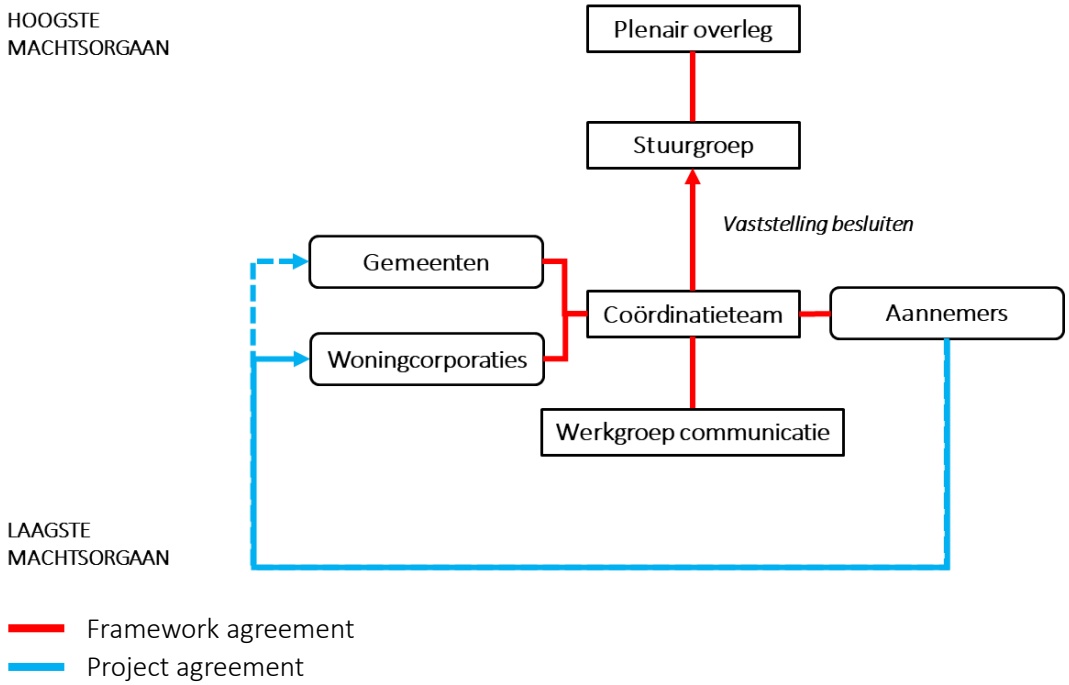


Figure 3.1: Organization structure WoonST 2.0 (Brink, 2023; Own work, 2025)

A schematic organization structure diagram can be found in Figure 3.1. The information below further explains the organization structure of WoonST 2.0 in more detail:

Plenair overleg: discussing about new projects
- All CEOs of participating housing associations
- All aldermen of participating municipalities

Stuurgroep: decision-making body at program level on decisions such as indexation
- Some CEOs of participating housing associations
- Some aldermen of participating municipalities

Coördinatieteam: developing new methods and reflecting on current methods such as indexation
- Some real estate managers of participating housing associations
- Some municipal officials of participating municipalities
- CCOs of selected contractors
- An advisor of Brink

Werkgroep communicatie: aimed to get everyone on the same page
- One real estate manager of a participating housing association
- One project developer of a participating housing association
- One purchaser of a participating housing association
- An advisor of Brink

3.1.2 Results: contractual governance elements

This section includes the results from the contractual governance elements of WoonST 2.0. The results are based on the 'program contract', 'project contract', and an additional 'addendum'. The results are presented in the following order:

1. Deductive codes present in the contractual documents of WoonST 2.0
2. Inductive codes that emerged from the contractual documents of WoonST 2.0
3. Deductive codes which are not present in the contractual documents of WoonST 2.0
4. Discussion contractual governance elements
5. Interview results based on questions emerged in the discussion section

Present deductive codes

Ca. PBC schedules and conditions

From the analysis it is evident that a design & build agreement under the UAC-IC 2005 is chosen as standardized PBC schedule. However, if both parties strongly prefer an alternative contract form, this remains possible, introducing flexibility in the selection of PBC for projects within the program.

Cb. Project scope and standardization product

WoonST 2.0 has incorporated standardized products, agreed upon during the procurement stage, into the contracts. The only deviations from the standard floorplans and overall quality of the 'basic dwelling' specified in the contract include wall-hung toilets, sun screens, and larger balconies. Other deviations with greater impact, such as corner dwellings, are outlined in the Project Specific Amendment (PSA).

Cc. Delays project timeline

At the start of each project, contractors agree upon a final date at which they must have obtained the permits at the latest:

'Alle vergunningen, ontheffingen, beschikkingen en toestemmingen (zoals bedoeld in § 10 lid 1 UAV-GC 2005), die niet vermeld staan in deze Annex, moeten uiterlijk op datum door de Opdrachtnemer zijn verkregen.'

This accounts for all permits except the environmental permit. Contractors have the duty to submit the permit, but are not explicitly responsible for objection delays considering obtaining an irrevocable environmental permit:

'Met betrekking tot het verkrijgen van vergunningen, ontheffingen etc door de Opdrachtnemer geldt het volgende: indien derden een bezwaarprocedure starten tegen een vergunning et cetera waarvoor de Opdrachtnemer verantwoordelijk is, dan treden Partijen in overleg over de gevolgen voor de D&B Overeenkomst.'

Delays of at least 2 months, resulting from mistakes made by housing associations, give the contractor the possibility to end the project contract. This accounts for delays during the execution phase, after the permit is obtained.

Cd. Transparency and risk allocation

Besides the fixed price for standardized products established in the procurement phase, contractors need to include an open-book offer for PSA.

For PSA in the preparation phase, external advisors are sometimes needed. In such cases, the contractor and housing association each cover 50% of the advisory costs.

With regard to risk allocation and responsibility, numerous provisions are outlined in the contracts. The following bullet points summarize the key elements related to costs and delays:

- Conditions considering design and execution responsibility are similar to the UAC-IC 2005
- Contractors cannot claim increment of wages or other subcontractor prices during the project
- Housing associations give contractors all available information about the current situation
- Housing associations are responsible for site preparation and site development

Ce. Penalties and rewards

In the design & build agreement, two delivery dates are formulated, which are delivery of the design and delivery of the building. The planning can be found in Figure 3.2. Late delivery results in a penalty for the contractor:

- 0,01% of the total sum per day for the design
- 0,05% of the total sum per day for the execution
- A maximum of €10.000,- per dwelling

Considering early design or building delivering, contractors cannot claim a reward from housing associations.

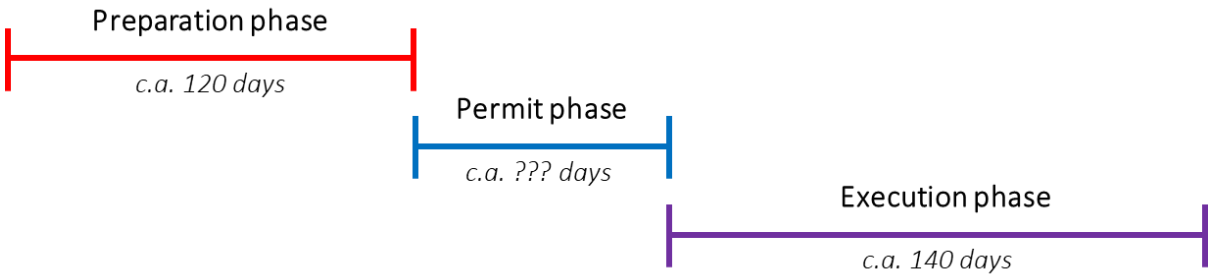


Figure 3.2: Procurement agreed planning contractors WoonST 2.0 (Brink, 2025; Own work, 2025)

Cf. Guarantees

The program contract formulates a statement about capacity guarantees. However the capacity guarantees are based on total numbers within the term of the agreement, rather than exact numbers on exact dates:

The program contract include a provision on capacity guarantees. However, these guarantees are based on total quantities over the duration of the agreement rather than specific quantities tied to exact dates:

'De Opdrachtnemer is verplicht opdrachten van de Woningcorporaties op basis van de D&B-overeenkomst binnen de looptijd van de Overeenkomst te aanvaarden en uit te voeren tot een maximum van 750 op te leveren woningen per kalenderjaar en 1 .750 woningen in totaal over de looptijd van de Overeenkomst. In het coördinatieteam vindt afstemming plaats tussen Partijen over de capaciteit van de organisatie en continuïteit van de bouwstroom. Het staat de Opdrachtnemer vrij om opdrachten voor grotere aantallen woningen te aanvaarden.'

On the other hand, housing associations do not provide any purchase guarantees, as defined in the addendum to the program contract. The contracts do not include provisions allowing for flexibility in capacity or purchase guarantees.

Cg. Payment schedule

As discussed in the 'Ce. Penalties and rewards' section, there are two main milestones in the design & build agreement, which are design completion and building delivery. Between these milestones, there is flexibility to add additional milestones in order to divide the total project sum, as outlined in the schedule shown in Figure 3.3. According to the contract, milestone payments apply only to completed tasks, and the specific milestones are determined by the housing associations, not the contractors.

Mijlpaal (afgerond werkpakket)	Percentage	Bedrag exclusief btw	Bedrag inclusief btw	Totaal exclusief btw	Totaal inclusief btw	Geschatte factuur-datum

Figure 3.3: Payment schedule format (Brink, 2023)

Lastly, the financial position of the contractor is screened in the procurement phase.

Ch. Quantity discount

In the initial design & build contract, there was a quantity discount included. This quantity discount was intended in the following way:

- Purchase until 500 dwellings above the guarantee volume 0%
- Purchase between 500 and 799 dwellings above the guarantee volume xx%
- Purchase between 800 and 1.199 dwellings above the guarantee volume xx%
- Purchase from 1.200 dwellings above the guarantee volume xx%

However, in the 'Cf. Guarantees' section can be found that there is no purchase guarantee for housing associations within the program. This decision was made after the initial design & build agreement was made and therefore no purchasing guarantee exists. Instead of a quantity discount, the new addition in the addendum of the program contract includes a general discount for standardized products. The general discount amounts 1,90% and is based on the initial price contractors have included in the procurement phase.

New emerged inductive codes

Ci.1. Maintenance

Within the contract, a fixed maintenance period of six months is included after building delivery. The contractor gets financial compensation for the maintenance period.

Missing deductive codes

The following deductive codes are present in the theoretical framework, but are not or hardly present in WoonST 2.0:

- Cb.1. Scope optimization
- Cc.2. Payment schedule client
- Cc.3. Production slot reservation
- Cd.4. Pre-arranged price escalation clauses
- Ce.2. Fairness penalty
- Ce.3. Presence pre-arranged reward
- Cf.2. Flexibility guarantees (time and economic sensitivity)
- Ch.1. Incentives housing associations
- Ch.2. 'Fair' discount contractors

These codes will be further discussed in the next discussion section.

Discussion contractual governance elements

This discussion is based on the results of the analyzed contractual documents including:

1. 'Questionable' present deductive codes
2. Inductive codes
3. Missing deductive codes
4. Relational deductive codes

'Questionable' present deductive codes

Standardized dwellings with fixed prices offer a high degree of certainty for housing associations. However, deviations are sometimes necessary and are addressed through the PSA. Within the program, the optimal degree of product standardization must be reassessed. Additionally, with fixed contractors involved, it is essential to determine how contractors can provide reliable pricing for PSA offers.

In cases where delays arise due to objections related to environmental permits, housing associations and contractors enter into consultation. Such objections may be prevented by involving municipalities and local stakeholders more actively during the preparation phase. It is relevant to assess whether and how this participatory approach is implemented in practice.

Currently, housing associations are responsible for groundworks and site development. However, shifting these responsibilities to the scope of the contractor may offer potential time and cost efficiencies.

As can be found in Figure 3.2, the design & build contract consists of a preparation phase (contractor), permit phase (municipality), and an execution phase (contractor). For the contractor, it is difficult to give guarantees about a timeline taking into account their dependency on external advisors for PSA in the preparation phase and the municipality on obtaining the irrevocable environmental permit. Included planning guarantees could potentially result in contractors calculating additional risks and therefore increasing the overall project costs.

As can be found in the 'Cd. Transparency and risk allocation' section, the only pain-sharing/gain-sharing mechanism is present for advisory costs related to PSA. In order to reduce risks considering fluctuating prices of materials and subcontractors, it could be efficient to incorporate pain-share/gain-share mechanisms between housing associations and contractors. According to the results, an open-book offer is included, but it remains unclear what is specifically included within this offer. For instance, it is not specified whether contractors share agreed purchasing prices of subcontractors and material suppliers with housing associations. If such transparency exists, it raises the question of whether housing associations, unlike market-driven parties, are willing and able to implement a pain-share/gain-share mechanism for all related prices. This also depends on whether housing associations have the internal capacity to manage and assess such mechanisms, and how they value this approach compared to having fixed price certainty upfront. Furthermore, the reliability of open-book pricing, particularly for additional negotiated PSA offers, requires careful consideration.

Inductive codes

While buildings just after delivery typically require minimal maintenance, it is noteworthy that maintenance responsibilities are assigned to the contractor. Specialized maintenance contractors may be able to perform these tasks more efficiently in terms of time and cost. Moreover, since contractors are directly involved in the program without a competitive procurement process, there is limited opportunity to ensure the best price-quality ratio for maintenance services is included.

Missing deductive codes
Scope optimization is something which mainly occurs before the preparation phase. Therefore it sounds logical that this is not included in the contracts. However, it is relevant to examine whether housing associations actively consider scope optimization.

Another point of discussion concerns the fairness of current penalty provisions and the absence of reward mechanisms within the contracts. Additionally, contractors are required to provide capacity guarantees without having control over a fixed planning schedule, as production slot reservations with exact dates and quantities are not contractually specified. Meanwhile, housing associations do not incentivize contractors to build, as they do not offer any form of purchase guarantees in return.

Furthermore, considering the clause stating that milestone payments apply only to completed tasks, it is important to assess whether the purchase of materials qualifies as a milestone and how housing associations deal with the collateral for those materials. Conversely, if material procurement is not considered as a milestone, it raises the question of how contractors are expected to pre-finance these purchases. Taken together, this arrangement appears to function more as one-sided risk allocation disadvantaging contractors, rather than a balanced, mutual collaboration.

Contractors currently have no option to claim wage increases or rising subcontractor costs. However, given that the standardized product is offered at an almost fixed price, it is essential that long-term agreements include a price indexation mechanism that accounts for economic and geopolitical fluctuations. The key issue includes the identification of a fair and transparent methodology for such indexation. In addition, it remains uncertain how contractor capacity guarantees are managed under these fluctuating conditions, as the current contracts do not contain specific clauses addressing this matter.

The addendum of the program contract eliminated the quantity discount. An alternative approach to quantity discounts could involve applying discounts based on the number of dwellings per project. For example, while some housing associations may consider small-scale projects too expensive, a discount of 10% for projects involving 100 dwellings could incentivize them to purchase through WoonST 2.0. Additionally, it is relevant to explore why a general discount is applied to the price submitted by contractors during the contracting phase.

Relational deductive codes
Considering the selection of contractors in a long-term program agreement, it is remarkable that the procurement phase only was focused on product characteristics without looking at relational aspects.

Interview results based on discussion contractual governance elements
The previous section discussed the contractual governance elements based on their presence in the contractual documents. This section presents interview findings based on the previously discussed contractual governance elements identified within the WoonST 2.0. The interview questions can be found in Appendix A.

Cb.2. Presence standardized product + Cb.3. Flexibility standardized product – housing association
Considering affordability, housing associations think that contractors are focused on the long-term relationship with clients including work continuity rather than profit maximization. With WoonST, lead times are decreased, meaning that housing associations can generate rental income earlier and have lower costs of capital. Housing associations selected in a ‘fair’ and objective way contractors in the procurement phase based on best price-quality ratio for a standardized product. During dialogue rounds

in the procurement phase, housing associations optimized the standardized product together with contractors, ensuring a practically feasible and market-aligned solution. However, housing associations always have their own specific wishes meaning that 10 out of 10 projects include PSA. Nevertheless, housing associations try to keep the PSA as small as possible and stick to the standardized concepts. For some PSA, an option list with a few possible variants including prices is already made. This definitely works out well according to the housing associations. Furthermore, housing associations do not deny the possibility that contractors calculate with high margins considering the PSA or disappointing indexation at that moment. That explains one of the main reasons they advocate for fair indexation. However, they argue that the effort required to verify prices or request offers from external subcontractors will never outweigh the potential savings from a small percentage increase in additional costs. Finally, housing associations engage an external cost expert to review PSA offers in order to assess the reliability of the contractor.

Cb.2. Presence standardized product + Cb.3. Flexibility standardized product – contractor
In response to the question of affordability, the contractor emphasizes on quality and sustainability. He argues that WoonST dwellings offer a higher level of quality compared to traditional construction, which results in increased costs. Rising prices for materials, wages, and products further contribute to the challenge of reducing the cost per unit. The contractor claims that standardization of products and processes will result in more efficiency eventually leading to lower costs and shorter lead times per dwelling. For example, making a standardized product will decrease design, advisory, and permit handling for municipalities.

Cd.3. Pain-sharing/gain-sharing – housing association
Housing associations take a mixed stance on joint purchasing of main subcontractors or materials. First of all, the housing association sector aims to work more with European tendering procedures. Secondly, housing associations are not market driving parties who prefer to be unburdened including price certainty rather than taking risks through joint purchasing. Thirdly, most housing associations do not have in-house employees for joint purchasing. Furthermore housing associations think that contractors will not cooperate in joint purchasing while a part of the profit of the contractor is included in the purchasing of materials and subcontractors. Lastly, housing associations are not averse to a pain-share/gain-share trial for one project within the WoonST.

Cd.3. Pain-sharing/gain-sharing – contractor
Joint purchasing means that contractors work on a cost-plus basis (‘in regie’). The contractor explains that they only include these constructions when subcontractors or materials get more expensive. Furthermore he explains that housing associations are not willing to participate in this risk seeking trajectory and aim to focus more on price certainty.

Ca.1. Project delivery model + Ca.2. Flexibility – housing association
Housing associations in the WoonST know how the two-phased contract model works, and sometimes, in projects other than WoonST, work with that contract model. They agree with the fact that it is a proper working model. However, they claim that mostly a lot of project specific alterations take place in a two-phased contract which do not take place in the design & build agreement of WoonST. According to the housing associations, the uniform character of the design & build agreement contributes to decreased lead times and also provides clarity. A final point worth noting is that both project delivery models function effectively in case standardization is applied whereby flexibility is limited.

Ca.1. Project delivery model + Ca.2. Flexibility – contractor

The contractor takes a mixed position in the design & build agreement over a two-phased contract model. First of all he emphasizes that a design & build strengthens the qualities of a contractor with conceptual construction. He claims that shorter lead time and reduced costs can be achieved via this project delivery model. On the other hand, he believes that a two-phased contract model places greater emphasis on the separation between the preparation and execution phases, allowing for better incorporation of wishes of the client.

Ce.2. Fairness penalty + Ce.3. Presence pre-arranged reward – housing association

One housing association claims a solid collaboration needs no penalties or small penalties for both housing associations and contractors. In this case, penalties for contractors would remain the same and penalties for housing associations could include slow response and decision making. The other housing association argues that contractors bear the risks and should therefore also be subject to penalties, without imposing penalties on the housing associations. While housing associations generally prefer the use of rewards over penalties, they are uncertain about how to incorporate reward mechanisms into contractual agreements. One housing association suggests that rewards could be integrated into the list of additional and reduced work ('meer- en minderwerken') rather than being included in the initial program or project contract.

Ce.2. Fairness penalty + Ce.3. Presence pre-arranged reward – contractor

The contractor has a positive view on the penalties and rewards methodology. However, he adds a nuance by emphasizing that the lead time schedules included in the contract are too tight to allow for rewards based on early project completion. Furthermore, he adds that response and decision making of housing associations in the preparation phase could be improved to work more efficient. With this in mind, he would like to expire the penalty in the design phase for contractors. Lastly, he questions the fairness of the fault of the contractor in late project delivery. In his opinion, in most cases, housing associations or external parties are responsible for this. Late delivery also could result in the main contractor paying penalties for subcontractors. This increases the overall project sum and makes the fairness of the execution penalty even less justified.

Cc.2. Payment schedule client + Cc.3. Production slot reservation + Cf.1. Purchase and capacity guarantees + Cf.2. Flexibility guarantees (time and economic sensitivity) – housing association

Both housing associations take a positive position towards a capacity guarantee for contractors, as it was a part of the procurement terms. The opinions are divided considering the purchase guarantee. One housing association refers to the procurement phase, stating that a purchase guarantee would only be considered if a general discount rule were applied. Since no such rule is in place, no purchase guarantee has been offered. Another housing association criticizes this approach, arguing that affiliated housing associations appear weak by publicly committing to the creation of 2.500 dwellings with 13 associations under WoonST 2.0, while at the same time being unwilling to offer purchase guarantees, not even for a small number of dwellings. The housing association also notes that relying on 'intention' rather than 'formal agreements' over the long-term could create challenges in establishing FA between main contractors and subcontractors, potentially resulting in higher prices or extended lead times. Finally, housing associations emphasize that execution contracts involving significant milestone payments can only be signed once the irrevocable permit has been obtained. Pre-financing of standardized products could potentially decrease the lead time, but this risk seeking method does not align with the nature of housing associations.

Cc.2. Payment schedule client + Cc.3. Production slot reservation + Cf.1. Purchase and capacity guarantees + Cf.2. Flexibility guarantees (time and economic sensitivity) – contractor
The contractor claims lower construction costs can be achieved by purchasing guarantees. If housing associations would give such a guarantee, the main contractor can give 'purchase guarantees' to subcontractors and material suppliers incorporating quantity discount through the whole WoonST chain. Furthermore, the contractor explains that bank guarantees also function as a one-sided obligation, placing disproportionate risk on the contractor. ''I give a bank guarantee, but what do I get in return''?

Ch.1. Incentives housing associations + Ch.2. 'Fair' discount contractors – housing association
Both housing associations agree with the possible advantage of a quantity discount. They both prefer a discount based on the total sum of purchased dwellings rather than project specific discounts. This reasoning also incentivizes small housing associations to execute projects within WoonST. However, the distribution key for allocating discounts among housing association needs to be reconsidered in collaboration with Brink.

Ch.1. Incentives housing associations + Ch.2. 'Fair' discount contractors – contractor
The contractor takes a negative position in quantity discounts for housing associations. He claims to have included a very competitive price to win the procurement and therefore no additional room for discounts can be included. He also adds that prices of wages and materials keep increasing.

Cb.1. Scope optimization – housing association
Considering scope optimization, contractors are involved in project initiations for WoonST as early as possible. Furthermore a pricing schedule considering scope optimization is made. A presentation with fictive pricing numbers of this schedule can be found in Figure 3.4.

99	98	97	96	95	94	93
101	100	99	98	97	96	95
103	102	101	100	99	98	97
105	104	103	102	101	100	99
107	106	105	104	103	102	101

Figure 3.4: Pricing schedule scope optimization (Manders, 2025; Own work, 2025)

Ci.1. Maintenance – housing association
Both housing associations have never considered including their 'onderhoudsketenpartners' as maintenance partner for the first half year. Furthermore, they claim the price contractors include for the maintenance of the first half year is very low.

3.1.3 Results: relational governance elements
This section includes the results from the relational governance elements of WoonST 2.0. The results are based on three interviews with affiliated housing associations and contractors of WoonST 2.0. The results are presented in the following order:

1. Deductive codes retrieved from the interviews with participants of WoonST 2.0

Retrieved deductive codes

Rb. Partnerships and trust – housing association

One housing association explains the reasoning behind 'only selecting on product characteristics' by means of the financial scope and amount of purchasing housing associations. Including more relational aspects in partner formation would increase the subjectivism and cronyism. The other housing association claims financial and 'Uniform Europees Aanbestedingsdocument (UEA)' pre-checks are done to check the reliability of the contractor. Furthermore he adds that contractors can always pretend to be trustworthy, therefore contractors must be selected based on the cheapest price rather than relational factors, making the relational factors even less important.

Rc. Collaboration – housing association

The preference of organizations and employees within organizations will always be present while it is human work according to one housing association. He adds that his preference is based on companies rather than persons within a company, especially emphasizing his preference for family businesses. Furthermore, he cannot neglect that historical experiences with organizations or individuals influence their trustworthiness. The other housing association establishes a clear distinction between advisory works and contractors. When it comes to advisors, he prefers organizations with short lines of communication and reliable work based on historical experiences. However, he remains focused on selecting contractors based on the lowest price rather than on the quality of past relational experiences. Both housing associations highlight the complexity of navigating municipal preferences, particularly given that each housing association is typically committed to a specific geographic location. However, they both agree that the municipality of Veldhoven has a well-organized spatial procedure for WoonST projects. The municipalities process new procedures within 100 days aiming to accelerate the permit lead time.

Rc. Collaboration – contractor

The contractor claims to have a preference for certain parties within WoonST. This preference is based on the intrinsic motivation of the housing association. According to the contractor, some housing associations remain stuck in traditional thinking about construction in which a lot of PSA need to be integrated to comply with the program of requirements of the individual housing association. For this reason, the contractor prefers housing associations that stick to the agreed product from the procurement phase with barely any PSA, guaranteeing a fast and streamlined process.

Ra. Management of complex programs + Re. Team resilience – housing association

Employees of Brink are continuously involved in the WoonST to guide participants with their expert role. Both housing associations experience this as positive. One housing association claims that the current organization diagram of the WoonST is non-hierarchical, meaning that the 'coördinatieteam' makes all plans and the 'stuurgroep' checks the boxes. While barely any decisions made in the 'coördinatieteam' are changed in the 'stuurgroep', some improvements can still be incorporated, especially in regard to faster response and decision making of the 'stuurgroep'. Furthermore both housing associations would like to see more housing associations and municipalities being involved in the 'coördinatieteam' and 'stuurgroep' to create a broader support base under the participants. The other housing association claims it would not make sense to involve more participants. According to him, participants involved in the WoonST but not in the 'coördinatieteam' or 'stuurgroep' are not motivated to build with WoonST. This can partially be explained by the fact that there are no formal purchase guarantees. According to both housing associations, the intrinsic motivation to build within the WoonST framework largely depends on the commitment and willingness of the CEO or supervisory board (RVC) of a housing association. Furthermore, both housing associations would like to see some more professionalization

considering an online dashboard and regular plenary consultations to keep participants up to date. Lastly one housing association thinks contractors are too much involved in the organization diagram, for example considering in the determination of the indexation. He expressed a preference for contractors to participate in consultations only on an on-call basis.

Ra. Management of complex programs + Re. Team resilience – contractor
The contractor thinks the current organization structure fits well. However, he thinks that municipalities must not be included this intensive within the organization schedule. ''Municipalities can be included considering locations and permit procedures, but have nothing to do with the products including their prices and terms''. Lastly he positively emphasizes that decisions made in the 'stuurgroep' encourage a large support base within organizations.

Rd. Mutual interest – housing association
The intention between different organizations varies but is mainly dependent on the intrinsic motivation of a project manager, CEO, or RVC. Both interviewed housing associations had the internal willingness to build with WoonST. One housing association incorporated the 'new project in WoonST, unless…' within their organization. With this strategy, new locations will always be executed in WoonST projects unless there are too many PSA. The other housing association incorporated it differently by means of presentations within its own organization. Furthermore, WoonST introduced roadshows in which participants presented the WoonST concept to various housing associations and municipalities. Lastly one housing association thinks that personal leadership is one of the core elements for making 'intention' a success.

Rd. Mutual interest – contractor
The contractor agrees with the thought of 'new project in WoonST, unless…'. He believes that this methodology, combined with the willingness of municipalities and the provision of purchase guarantees by housing associations, strengthens overall commitment, ultimately leading to lower costs per unit and shorter lead times.

Rf. External stakeholders – housing association
Housing associations state that municipalities are primarily responsible for assessing and approving plans. When the land is owned by the housing association, they are responsible for the participation trajectory mostly supported by the contractor. In cases where the land is municipally owned, the municipality leads the participation trajectory. However, housing associations express a preference against this arrangement, arguing that municipalities often lack sufficient employed capacity, which further contributes to delays in project lead times. Housing associations advocate for an early start to the participation trajectory, ideally beginning just after the spatial vision is published, as a means to help reduce lead times. One housing association argues that WoonST has an advantage in this process, as the early availability of a standardized design allows for more effective inclusion of local residents. However, he also mentions that local residents have 'too much power' in the spatial procedure. WoonST projects include less design flexibility potentially leading to more objections. The other housing association claims WoonST dwellings cannot be compared with containers, making the quality of the dwellings in the spatial procedure no doubt. The housing associations believe that lead times and contractor certainty could be significantly improved by integrating a timely and coordinated planning process across all participating associations. This planning should also cover the early phases of project initiation to enhance coordination between stakeholders. Another housing association expresses concern about the monopolistic role of municipalities, viewing them as traditionally organized and slow

to adapt. He suggests that the solution lies in initiating consultations at higher governance levels, such as between CEOs, RVCs, and municipal aldermen.

Both housing associations think a monetary subsidy could reduce the lead time. One housing association claims a subsidy for lead time, from foundation to completion, would help. The other housing association thinks a financial reserve would help. This reserve would then be used to pre-finance standardized dwellings during the permit procedure. In that case lead times will be decreased. However, a financial reserve is only practically feasible for standardized products.

Rf. External stakeholders – contractor

First of all, the contractor thinks municipalities could be involved more within the project initiation phase. Municipalities have lots of knowledge about potential new developments in the area. The contractor thinks municipalities can faster link unprofitable developments with WoonST dwellings. Furthermore, the contractor believes municipal teams keep increasing and changing, leading to too many municipal officials working on new projects. According to him, convincing an alderman is not sufficient enough in the current era. Furthermore, he claims that municipalities can do more by deploying official capacity and using their own land positions. He believes that municipalities continue to prioritize profit optimization, reflecting a more traditional mindset. The contractor notes that conceptual dwellings often require additional attention in addressing potential objections, as they tend to suffer from a negative public image compared to traditional construction. He emphasizes the importance of starting the participation process early and actively engaging local residents to build a broad support base for WoonST developments, which could help reduce delays. His final point highlights that while the design and execution phases in WoonST proceed rapidly, significant time savings could still be achieved in the spatial planning and permitting stages.

The contractor thinks monetary subsidies will not incentivize the production of more WoonST dwellings. However, he thinks that subsidizing biobased quality in addition to the standardized product would incentivize contractors and housing associations to build more sustainable.

3.1.4 Conclusion

The results provided in the previous chapters include a comprehensive overview of both contractual and relational governance elements within WoonST 2.0. Table 3.2 & Table 3.3 include a short summary of both contractual and relational governance elements that can be used for the cross-case analysis.

Table 3.2 Summary of critical contractual governance elements in WoonST 2.0

Code	Subcode	Conclusion
Ca. PBC schedules and conditions	1. Project delivery model 2. Flexibility	- Single-phase contract under the UAC-IC 2005 - Flexibility in choice project delivery model within the FA
Cb. Project scope and standardization product	1. Scope optimization 2. Presence standardized product 3. Customization options standardized product	- Contractors mostly involved to reach scope optimization - Standardized products established in the procurement - Customization product possible through PSA
Cc. Delays project timeline	1. Objections environment 2. Payment schedule client 3. Production slot reservation 4. Internal communication	- No formal lines are included for objection, early participation helps (relational) - Payments and production slot reservations for execution may only be done after the irrevocable permit (policy HA) - Slow response and decision making cause delays
Cd. Transparency and risk allocation	1. Open-book policy 2. Risk allocation client and contractor 3. Pain-sharing/gain-sharing 4. Pre-arranged price escalation clauses	- Open-book price agreed in the procurement - Contractor is liable during the design, execution and warranty period, the HA never - Only pain-share/gain-share for advisory costs - Price escalation clauses are partially tackled in the indexation of the standardized product
Ce. Penalties and rewards	1. Presence pre-arranged penalty 2. Fairness penalty 3. Presence pre-arranged reward	- Design & execution penalties for the contractor - No response and decision making delay penalties - Preference for reward over penalty
Cf. Guarantees	1. Purchase and capacity guarantees 2. Flexibility guarantees (time and economic sensitivity)	- HA dare not to give a purchase guarantee - Contractors give a capacity guarantee over the entire FA period - No flexibility in guarantees while barely any strict guarantees are included
Cg. Payment schedule	1. Milestones and payments 2. Financial security measures	- Contractors can start constructing after a signed order (irrevocable permit) - Financial position is verified in the procurement
Ch. Quantity discount	1. Incentives housing associations 2. 'Fair' discount contractors	- Quantity discounts would incentivize HA - Quantity discounts are replaced by a general discount on standardized products - No additional financial room for quantity discounts according to the contractor
Ci. Inductive	1. Maintenance	- Maintenance period contractor is positive

Table 3.3 Summary of critical relational governance elements in WoonST 2.0

Code	Subcode	Conclusion
Ra. Management of complex programs	1. Managerial steering (streamlined process)	- Experts of Brink guide the WoonST process which is perceived positively by participants - An online dashboard would improve the knowledge dissemination within WoonST
Rb. Partnerships and trust	1. Formation partnership 2. Maintenance collaboration 3. Types of trust 4. Trust enhancing activities	- Contractors are selected on product characteristics to keep objective and minimize prejudice - Willingness of participants is of great importance - Participants trust organizations or individuals with past positive experience more - Roadshows and collective sessions are organized to build trust and share knowledge
Rc. Collaboration	1. Managerial steering (daily attention) 2. Long-term relationship between individuals 3. Link between person, company, and project 4. Multiple layer influence (by position)	- HA prefers same/less influence contractor in decision making, contractor prefers less influence municipality - Participants prefer working with organizations or individuals with past positive experience - HA mostly think too traditional with limited space for standardized products and processes of the contractor - CEOs of HA and alderman are very influential in creating a broad support base for WoonST
Rd. Mutual interest	1. Interest municipalities 2. Interest contractors 3. Interest housing associations	- Interests and policies municipalities are important in accelerating the spatial and permit lead time - Including more organizations in the 'coördinatieteam' and 'stuurgroep' could improve the broader support - 'New project in WoonST, unless…' procedure helps
Re. Team resilience	1. Impact factors team resilience	- More cohesion between 'coördinatieteam' and 'stuurgroep' is preferred
Rf. External stakeholders	1. Process accelerating measures (communication) 2. Government incentives	- Starting early with the participation trajectory helps accelerating the spatial and permit lead time - Municipalities have to integrate more WoonST in their developments and on their ground positions - HA: subsidies for lead time or pre-financing help - Contractor: subsidies for additional biobased help

3.2 NH Bouwstroom

3.2.1 Background information

In 2022, seven housing associations in the region of Noord-Holland selected six contractors within the NH Bouwstroom. First projects have been completed in 2024. In the upcoming years, NH Bouwstroom aims to build approximately 4.000 new dwellings. Together, they are innovating in terms of construction methodology, affordability, decreasing lead times, and sustainability. NH Bouwstroom aims to standardize as efficiently as possible, are proud of the results they have achieved, but remain critical of what they deliver. Experiences from completed and ongoing projects are actively shared to continuously improve the entire Bouwstroom initiative.

In real-life practice, they notice that close collaboration between contractors, housing associations, and municipalities have already significantly accelerated projects. NH Bouwstroom looks forward to further expanding their network in the future and welcoming more housing associations and municipalities.

Table 10 Participants NH Bouwstroom

Nr.	Housing association	Contractor
1.	Eigen Haard	Bouwgroep Dijkstra Draisma
2.	Intermaris	Fijn Wonen
3.	Kennemer Wonen	Heddes Bouw & Ontwikkeling
4.	Parteon	Homes Factory
5.	Rijnhart Wonen	Hoog Over
6.	Rochdale	In The Middle Of Our Street (MOOS)
7.	Wooncompagnie	
8.	Woonwaard	
9.	Ymere	

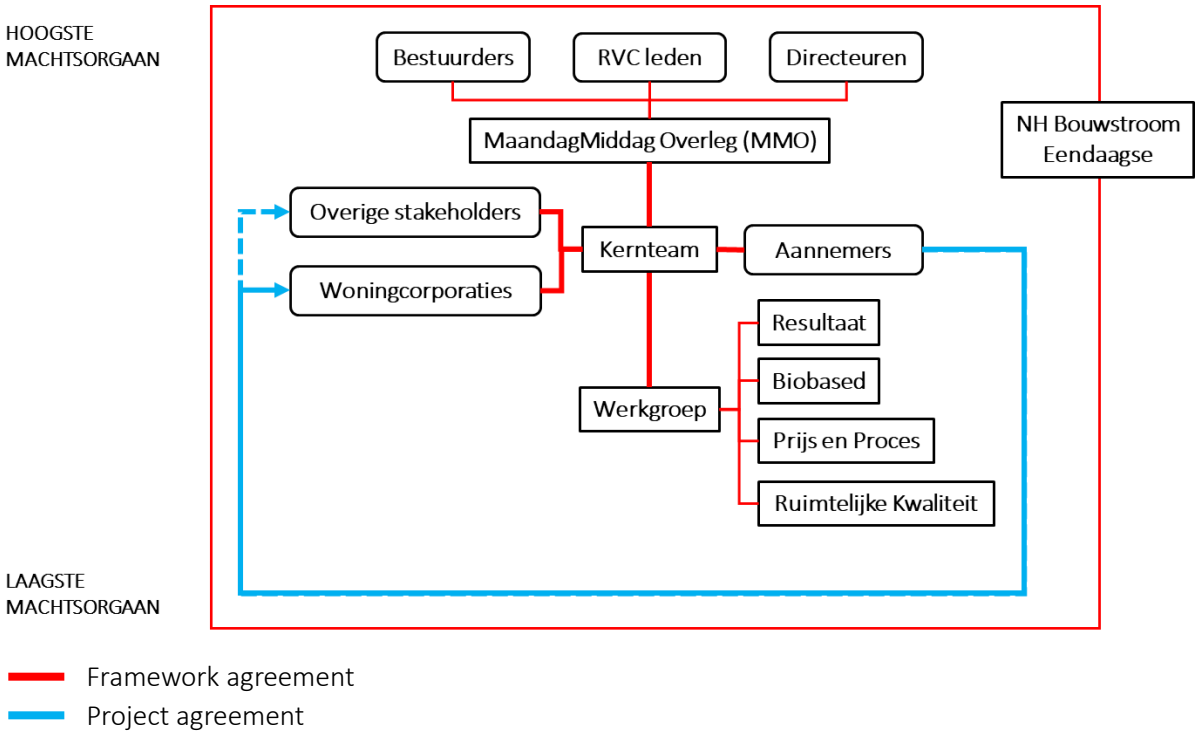


Figure 3.5: Organization structure NH Bouwstroom (Parteon, 2024; Own work, 2025)

A schematic organization structure diagram can be found in Figure 3.5. The information below further explains the organization structure of NH Bouwstroom in more detail:

NH Bouwstroom Eendaagse: reflecting and cooperation session
- All involved participants of participating housing associations
- All involved participants of participating contractors

MaandagMiddag Overleg (MMO): decision-making body at program level including discussion about program transcending problems
- Some CEOs of participating housing associations
- Some CEOs of selected contractors

Kernteam: doing the daily routine and managerial steering
- Some managers of participating housing associations
- Some managers of selected contractors

Werkgroep: aimed to improve the areas result, biobased, price & process, and spatial quality
- Some managers of participating housing associations (for each focus area)
- Some managers of selected contractors (for each focus area)

At the start of NH Bouwstroom, a 'stroomoverleg' was established to ensure alignment across the various streams, which included apartment buildings, single-family homes, and temporary housing. Currently, all streams have been merged, as only minimal differences were identified between them.

3.2.2 Results: contractual governance elements

This section includes the results from the contractual governance elements of the NH Bouwstroom. The analysis is based on the 'program contract' and 'project contract'. The results are presented in the following order:

1. Deductive codes present in the contractual documents of NH Bouwstroom
2. Inductive codes that emerged from the contractual documents of NH Bouwstroom
3. Deductive codes which are not present in the contractual documents of NH Bouwstroom
4. Discussion contractual governance elements
5. Interview results based on questions emerged in the discussion section

Present deductive codes

Ca. PBC schedules and conditions

Considering projects within the program, NH Bouwstroom uses of two-phased contract drawn up by Aedes, Bouwend Nederland, Dirkzwager, and NCB (NCB, 2022). The two-phased contract uses TNR 2011 conditions in the first phase and the UAC-IC 2005 conditions in the second phase. Considering flexibility, contractors and housing associations can decide to use another contract form than the two-phased standard contract.

Cb. Project scope and standardization product

In NH Bouwstroom, contractors are obliged to use a prefabricated or modular construction housing concept. Contractors are not allowed to deviate from the housing concept that they have submitted in the procurement phase. However, the standardization of the concept is not infinite. Housing concepts are allowed to deviate if needed for the aesthetics committee or location specific characteristics. The contract does not specify what the exact deviation of the standardized housing concept may be. The

contract does not hold an pre-arranged fixed price of a standardized housing concept. Furthermore, the reliability of the contractor's offers are assessed by an external cost expert.

Cc. Delays project timeline

Considering delays in the project timeline, barely any 'hard' terms are provided. Most of the included terms are based on 'soft' aspects like 'collaboration' and 'transparency':

''Partijen zullen bij de uitvoering van deze Overeenkomst zoveel mogelijk rekening houden met elkaars gerechtvaardigde belangen. Zij zullen in openheid en transparant met elkaar communiceren. Zij realiseren zich dat communicatie ter beperking van vertraging en eventuele faalkosten van groot belang is.''

The second phase of the contract can only start after the environmental permit is irrevocable. In addition to this, contractors do not even get financial compensation if they start earlier than the irrevocable environmental permit. Furthermore, parties that are contractually connected in the first-phase contract are not obligated to proceed together into the second phase:

''Indien de Prijsaanbieding van Aanbieder niet binnen het Budget valt of de Aanbiedersplanning niet binnen de Afnemersplanning past, heeft Afnemer de mogelijkheid om Fase 2 van deze Overeenkomst niet tot stand te laten komen.''

Cd. Transparency and risk allocation

As discussed in the 'Cb. Project scope and standardization product' section, calculations of the contractor are assessed by an external expert based on an open-book offer. An open-book policy is also included in the program considering costs made for the program. The MMO decides about the division of costs per party.

With regard to risk allocation and responsibility, numerous provisions are outlined in the contracts. The following bullet points summarize the key elements related to costs and delays:

- Conditions considering design and execution responsibility are similar to the UAC-IC 2005
- Contractors cannot claim increment of wages or other subcontractor prices during the project
- Contractors are not responsible for permit delay issues
- Housing associations are not responsible for permit delay issues that cannot be attributed to them
- Housing associations are responsible for the availability of the location in time

Ce. Penalties and rewards

From the contractual document analysis can be concluded that there are no penalties included regarding the first-phase contract and permit phase. Considering the second phase of the contract, a penalty of €125 per dwelling per day is included with a maximum of 10% of the total sum. Furthermore a penalty for the housing associations is included. This penalty concerns damage suffered due to late delivery of the building plot ready for construction with a maximum of 10% of the total sum. No rewards are included within the contracts.

Cf. Guarantees

Capacity and purchase guarantees are not included in the contracts. However, realization targets are defined in a 'soft', more relational manner, as also discussed in the 'Cc. Delays project timeline' section:

''Partijen streven naar een jaarlijkse realisatie van (bij elkaar opgeteld) tenminste 750 woningen door de samenwerking in NH Bouwstroom.''

Cg. Payment schedule
Payments occur on the basis of an agreed payment schedule within the contractor's planning:

> *''De realisatie van het Werk zal plaatsvinden conform de Aanbiedersplanning. De Aanbiedersplanning bevat onder meer de Opleverdatum. Facturering vindt plaats met inachtneming van het door Partijen overeen te komen betaal- en termijnschema voor betaling van de Prijs.''*

Considering the second phase of the contract, contractors have to pre-finance materials and labor costs:

> *''Betaling voor Fase 2 van facturen door Afnemer vindt niet plaats voordat de materialen op de bouwplaats zijn geleverd en aangebracht.''*

In the two-phased contract model, the housing association sets a target budget for the second-phase contract, based on the outcomes of the first phase.

Lastly, the financial position of the contractor is screened in the procurement phase.

New emerged inductive codes

Ci.1. Maintenance
Within the contract, a fixed maintenance period of six months (building components) and twelve months (installation components) is included after building delivery. The contractor gets financial compensation for the maintenance period.

Missing deductive codes

The following deductive codes are present in the theoretical framework, but are not or hardly present in NH Bouwstroom:

- Cb.1. Scope optimization
- Cc.2. Payment schedule client
- Cc.3. Production slot reservation
- Cd.4. Pre-arranged price escalation clauses
- Ce.2. Fairness penalty
- Ce.3. Presence pre-arranged reward
- Cf.1. Purchase and capacity guarantees
- Cf.2. Flexibility guarantees (time and economic sensitivity)
- Ch.1. Incentives housing associations
- Ch.2. 'Fair' discount contractors

These codes will be further discussed in the next discussion section.

Discussion contractual governance elements

This discussion is based on the results of the analyzed contractual documents including:

1. 'Questionable' present deductive codes
2. Inductive codes
3. Missing deductive codes
4. Relational deductive codes

'Questionable' present deductive codes

In NH Bouwstroom, housing associations have opted to deviate from the commonly used conditions by adopting a two-phased contract model of NCB (2022). This model effectively splits the UAC-IC 2005 into two parts: one before and one after the permit phase. This choice appears to be influenced by uncertainties during the permitting process, although other considerations may also play a role.

In relation to standardization and pricing, it is relevant to examine the reasoning behind how contractor offers are assessed. Such project-repeating competitions are more common in traditional construction than in program-based conceptual construction. Establishing a one-time price for a standardized product could potentially reduce price-related discussions, leading to faster project delivery and minimizing risks associated with price fluctuations.

Trust and strong collaboration are essential components of a program agreement. However, fast project delivery remains one of the primary objectives of NH Bouwstroom. It is therefore relevant to explore how participants perceive the balance between 'soft' relational elements and 'hard' contractual provisions in relation to time management within the first-phase contract. Additionally, the ways in which participants aim to reduce delays before entering into the second-phase contract need further examination. Although the contract allows for discontinuation between the first and second phases due to issues such as production slot constraints or budget limitations, this approach appears inefficient in the context of fast project delivery. Furthermore, the analysis reveals that no party is contractually responsible for handling external objections to environmental permits. Understanding how both contractors and housing associations address this issue in practice, despite the absence of a formal obligation, would provide valuable insight.

With regard to program-phase costs, it would be valuable to examine the exact amount and how these costs are distributed among participants. For project contracts, no pain-sharing/gain-sharing mechanisms are currently used. To achieve a 'fair' price, housing associations could consider joint purchasing of materials and subcontractors in collaboration with the contractor. This highlights a central dilemma: the trade-off between upfront price certainty and a 'fair' market-based price. Moreover, a predetermined target budget may encourage contractors to tailor their offers to meet the target, as market-driven entities often do so, even when their actual cost price is below that budget. An alternative approach could involve a price competition by inviting multiple contractors to submit offers, potentially resulting in lower overall costs.

Inductive codes

While buildings just after delivery typically require minimal maintenance, it is noteworthy that maintenance responsibilities are assigned to the contractor. Specialized maintenance contractors may be able to perform these tasks more efficiently in terms of time and cost. Moreover, since contractors are directly involved in the program without a competitive procurement process, there is limited opportunity to ensure the best price-quality ratio for maintenance services is included.

Missing deductive codes

Scope optimization typically takes place before the preparation phase. In NH Bouwstroom, contractors are selected through mini-competitions for each new project. It is relevant to examine how they can still contribute to scope optimization, given that they are not involved in the early stages of the process.

Milestone payments are agreed upfront by both the contractor and housing association. However, the contract states that invoices are only paid if materials are arriving on the construction site. It is remarkable that contractors pre-finance factory labor and material costs.

Production capacity issues of contractors can result in discontinuation between the first-phase and second-phase contract. In the current format, no terms considering production slot reservation in the planning are included. A probable solution could be to include production slot reservation in the first-phase contract. However, a discontinuation between the two contracts cannot take place than anymore.

Considering penalties for late delivery, a two way traffic is present in the NH Bouwstroom. However, it is remarkable that no rewards are included, potentially incentivizing both parties to work faster and smarter. Furthermore, there is no capacity or purchase obligation within the program, doubting about the essence. It is interesting to what the intrinsic motivations of participants are if they have no obligation. Lastly, the contracts have not included a discount for quantity. This potentially does not incentivize housing associations to purchase larger amount of dwellings leading to economies of scale.

In NH Bouwstroom, a penalty system for late delivery is in place. However, it is notable that no reward mechanisms are included, which could otherwise incentivize both parties to work more efficiently. Additionally, the absence of capacity or purchase obligations within the program raises questions about its underlying purpose. It is relevant to consider the intrinsic motivations of participants when no formal commitments are required. Finally, the contracts do not include quantity discounts, which may limit incentives for housing associations to purchase larger volumes of dwellings and thereby reduce opportunities to benefit from economies of scale.

Relational deductive codes
Considering the selection of contractors in a long-term program agreement, it is remarkable that the procurement phase mainly was focused on product characteristics without looking at relational aspects.

Interview results based on discussion contractual governance elements

The previous section discussed the contractual governance elements based on their presence in the formal agreements. This section presents interview findings based on the previously discussed contractual governance elements identified within the NH Bouwstroom. The interview questions can be found in Appendix A.

Cb.2. Presence standardized product + Cb.3. Flexibility standardized product – housing association
One of the housing associations claims that affordability not completely relates to the lowest initial construction costs. He focuses on the fact that NH Bouwstroom dwellings have additional quality on materials, demountability, circularity and climate adaptation. These factors ensure lower costs over the entire exploitation, leading to a lower Total Cost of Ownership (TCO). At this moment, NH Bouwstroom works with mini-competitions for each new project within the program NH Bouwstroom. One housing association thinks there is too much freedom in the way contractors can be selected for each new project. In his opinion, a housing association should include a target budget for each project, determined by a benchmark based on the costs of previously realized projects within NH Bouwstroom. In this way, housing associations will maybe not always get the cheapest project, but it saves work load for housing associations. Both housing associations claim that no one learns from varying prices, advocating in the NH Bouwstroom for ‘an almost fixed product for a benchmark price’ leading to certainty for housing associations. However, creating a solid working benchmark price needs more data of realized projects. One housing association explains the price of contractors, also in projects other than NH Bouwstroom, are validated on market conformity tests via external cost experts leading to a ‘fair’ price. He also believes contractors are not joined the NH Bouwstroom for profit maximization, but mainly for continuity of production. Furthermore, he adds that contractors accept lower profit margins on social housing while this gives also continuity in times of economic downturns.

Cb.2. Presence standardized product + Cb.3. Flexibility standardized product – contractor
First of all, the contractor claims the costs of materials and products are transparent by means of an open-book policy in combination with an additional external cost expert. Furthermore, the tail costs are added to complete the total offer. The contractor thinks the tail costs are tight and he would like to increase the tail costs with a few percentages to buy factory innovation equipment. At this moment no innovation costs are included, which according to the contractor in the future, could potentially lead to cost reductions. He also claims that the external cost expert is strict and always ensures that the contractor's price is driven down. The contractor doubts about standardization versus affordability. On the one hand, the contractor thinks customized dwellings give an additional quality. On the other hand, the contractor claims that standardization could reduce engineering costs resulting in lower costs.

Cd.3. Pain-sharing/gain-sharing – housing association
One housing association advocates for more integration of the entire construction chain via for example joint purchasing with one of the 'werkgroepen', leading to more transparency. The other housing association claims that pain-share/gain-share is used with their own 'ketenpartners', but not with contractors of the NH Bouwstroom.

Cd.3. Pain-sharing/gain-sharing – contractor
The contractor thinks joint purchasing could ensure lower unit prices, especially for main materials like timber. He also adds that a distinction must be made between larger and smaller contractors. Smaller contractors would probably earlier agree with joint purchasing and pain-share/gain-share while they have a worse negotiating position compared to larger contractors.

Ca.1. Project delivery model + Ca.2. Flexibility – housing association
One housing associations prefers a two-phased contract over a single-phased contract. With two-phased contracts, housing associations can sign the contract after the relative 'uncertain' permit procedure. While a two-phased contract is applied, still the joint and several liability for design and execution for contractors similar to the UAC-IC 2005 applies. One housing associations points out that a great flexibility exists within the NH Bouwstroom with some housing associations choosing for a design & build agreement signed in the first phase. With a two-phased contract, contractors have greater flexibility to opt out after the first-phase contract, for example due to factory capacity issues. This can potentially result in longer lead times, as a new contractor needs to be found to complete the project.

Ca.1. Project delivery model + Ca.2. Flexibility – contractor
Considering the project delivery model, the contractor claims that a single-phased contract would give more certainty upfront. He claims that there will be no reduction in lead time in case a PBC switches from a two-phased to a single-phased contract. Furthermore, he thinks that a single-phased PBC schedule could potentially lead to more efficiency while at this moment a clause is provided in the contract that housing associations can 'relatively easily' choose for a different contractor after the first-phase contract. However, at this moment in reality, contractors of the first phase are also executing the second phase but there is no obligation to do it.

Ce.2. Fairness penalty + Ce.3. Presence pre-arranged reward – housing association
Both housing associations agree with the bonus malus theory. However, both have some marginal notes. One housing association argues that implementing penalties and rewards related to shorter lead times is largely impractical due to the uncertainties associated with utilities and governmental procedures in the Netherlands. Another housing association raises concerns that reward mechanisms could create perverse incentives. For instance, a contractor capable of completing a project in 25 weeks might

intentionally propose a 30-week schedule to the housing association. By delivering the project in 25 weeks, the contractor would then qualify for a bonus based on an 'artificially extended' timeline.

Ce.2. Fairness penalty + Ce.3. Presence pre-arranged reward – contractor
The contractor thinks penalties are not in line with the Bouwstroom philosophy. He thinks penalties go not hand in hand with innovation. Furthermore he emphasizes current penalties are not fair. For example, in one project the housing association would like to have more PSA and therefore the project was delivered too late. On the other hand the contractor thinks rewards are not in proportion to the value of continuity guarantees. He claims a gap in the production costs is far worse than the reward could compensate.

Cc.2. Payment schedule client + Cc.3. Production slot reservation + Cf.1. Purchase and capacity guarantees + Cf.2. Flexibility guarantees (time and economic sensitivity) – housing association
Both housing associations agree that guarantees could decrease project lead times. The main concern relates to the financial loan system of housing associations. Housing associations are not able to develop and pre-finance at own risk, meaning the permit has to be irrevocable before signing a contract. Furthermore, additional uncertainties related to utilities, spatial planning procedures, and global factors have led housing associations to decide against offering a purchase guarantee.

Cc.2. Payment schedule client + Cc.3. Production slot reservation + Cf.1. Purchase and capacity guarantees + Cf.2. Flexibility guarantees (time and economic sensitivity) – contractor
The contractor emphasizes that continuity is the most important factor for success of industrialized construction program agreements. With this in mind, he is positive about a purchase and capacity guarantee. Additionally he thinks that these guarantees could lead to more innovation including lower unit prices and shorter project lead times. However, he includes that purchase guarantees could be difficult mainly caused by governmental uncertainties like spatial planning and permit procedures.

Ch.1. Incentives housing associations + Ch.2. 'Fair' discount contractors – housing association
Both housing associations disagree with applying a quantity discount distribution key based on a specific benchmark, for example, where dwelling 499 from housing association A receives no discount, while dwelling 501 from housing association B does. However, they agree that a mutually accepted distribution key, combined with a fair benchmark threshold for contractors, could act as a meaningful incentive for housing associations.

Ch.1. Incentives housing associations + Ch.2. 'Fair' discount contractors – contractor
The contractor is open to the idea of offering a quantity discount. He emphasizes that an purchase guarantee reduces production gaps and therefore quantity discounts can be applied.

Cb.1. Scope optimization – contractor
Contractors must be included more in the preparation and initiation phase. He thinks contractors could optimize floorplans and plan layouts to create price efficiency. At this moment, housing associations make the plans on their own without including the contractor's opinion.

3.2.3 Results: relational governance elements
This section includes the results from the relational governance elements of NH Bouwstroom. The results are based on three interviews with affiliated housing associations and contractors of NH Bouwstroom. The results are presented in the following order:

1. Deductive codes retrieved from the interviews with participants of NH Bouwstroom
2. Inductive codes that emerged from the interviews with participants of NH Bouwstroom

Retrieved deductive codes

Rb. Partnerships and trust – housing association

The housing associations both claim that the DNA of the contractors is included in the procurement phase of the NH Bouwstroom. One housing association emphasizes that they aimed to have a good mix of contractors with small startups and large listed companies. The other housing association claims that purely selecting on relational elements in procurements does not align with the nature of housing associations who search for objective partner selection.

Rc. Collaboration – housing association

One housing association claims that preference for a contractor based on positive historical experiences sometimes occurs within their organization. However, he thinks that this occurs less often over time and that this is also less incorporated within the NH Bouwstroom, where parties mainly are select based on objective product criteria. The other housing association also claims to be as objective as possible in the selection of contractors or advisors. Both housing associations state that selection based on subjective relational aspects is becoming less common, as there is an increasing emphasis on adhering to European tendering regulations within Dutch housing associations.

Rc. Collaboration – contractor

The contractor states that he is not in a position to select clients based on past experiences. However, he acknowledges noticeable differences between housing associations and therefore has preferences for certain organizations and individuals. He also emphasizes that he collaborates with the same advisors and architects, arguing that different advisors leads to inefficiencies in product development.

Ra. Management of complex programs + Re. Team resilience – housing association

Both housing associations experience the organization structure as positively and non-hierarchical; ''every voice is heard''. The organization structure operates based on innovation, brainpower, and knowledge. One housing association even claims the NH Bouwstroom can be seen as an organization itself rather than a framework agreement. Both housing associations also claim that CEOs only tick the boxes, further explaining the non-hierarchical structure. However, one housing association thinks CEOs and the MMO can respond and decide faster leading to shorter process lead times. Both the housing associations are positive about management of the NH Bouwstroom by the 'kernteam'. It is important to note that NH Bouwstroom is currently in the scale-up phase, indicating that working groups and consultation structures are still evolving and remain open to further development.

Ra. Management of complex programs + Re. Team resilience – contractor

The contractor agrees with the organization structure. However, he thinks that housing associations are overrepresented in the schedule. He thinks more efficiency can be created when contractors are more presented within the schedule, especially on the initiation and preparation phase.

Rd. Mutual interest – housing association

Both housing associations agree that a formal purchase and capacity guarantees could potentially lead to lower costs and shorter lead times. However, there are too many uncertainties to give a formal purchase guarantee. Considering the intention without formal guarantees, both housing associations claim that every participant is devoted to realize new projects. With this in mind, both do not think their

own intention forms a pitfall for realizing new projects within NH Bouwstroom. One housing association states that decisions made by the RVC have the greatest influence on organizational intention.

Rd. Mutual interest – contractor
The contractor argues that the level of intention is generally higher among contractors than among housing associations. Contractors need to maintain continuity by keeping their factories operational, as a lack of new projects results in significant overhead costs. At the same time, he believes that housing associations could, in some cases, demonstrate a stronger commitment. Lastly he admits that the intention of housing associations involved in the initiation of NH Bouwstroom have a higher level of intention compared to the new affiliated housing associations.

Rf. External stakeholders – housing association
Both housing associations see the importance of government involvement. They would like to incorporate this involvement of municipalities more into the NH Bouwstroom leading to shorter lead times and faster procedures. One housing association emphasizes that budget deviation of municipalities and changing civil servants at municipalities are difficult to manage considering the development of new locations. Both housing associations claim that starting early with participation trajectories help in reducing objections. One housing association thinks municipalities must act stricter to 'empty' objections or making the rules for objection more strict. Lastly, one housing association claims that increased standardization results in faster development procedures based on realized projects within the NH Bouwstroom.

One housing association advocates for a subsidy or saving within the NH Bouwstroom to prefinance standardized products in the permit phase. This could result in planning and continuity for contractors and shorter project lead times. However, a high standardization degree is required. One housing association has a negative position on subsidies, while he thinks it could give perverse incentives to participants considering innovation and costs.

Rf. External stakeholders – contractor
The contractor advocates for more involvement of municipalities and aesthetics committees within the NH Bouwstroom. He also claims that spatial procedures and permits take even longer with conceptual construction, the opposite of the desired effect. Brasa Village is an example where close involvement of the municipality was included. For this project, the municipality had assigned a team leading to fast procedures and shorter lead times. Lastly, the contractor thinks municipalities and local residents must be educated more about conceptual construction, potentially leading to less objections in the future.

The contractor thinks that a subsidy could potentially help NH Bouwstroom, especially considering costs to cover innovation. At this moment, the cost expert erases additional costs for innovation, for example for new factory equipment to eventually produce dwellings with lower costs per unit. A subsidy could cover these costs. Furthermore, he expresses support for a subsidy aimed at pre-financing standardized dwellings during the permit phase.

New emerged inductive codes

Rg.1. Evaluating and consulting – housing association
Both housing associations consider NH Bouwstroom to be in a scale-up phase, characterized by continuous learning and daily knowledge development. They believe that continuous evaluation and consultation with other projects, government bodies, and Bouwstroom initiatives can contribute to improving both the methodology and execution of NH Bouwstroom.

3.2.4 Conclusion

The results provided in the previous chapters include a comprehensive overview of both contractual and relational governance elements within the NH Bouwstroom. Table 3.4 & Table 3.5 include a short summary of both contractual and relational governance elements that can be used for the cross-case analysis.

Table 3.4 Summary of critical contractual governance elements in NH Bouwstroom

Code	Subcode	Conclusion
Ca. PBC schedules and conditions	1. Project delivery model 2. Flexibility	- Two phase contract under the UAC-IC 2005 - Flexibility in choice project delivery model within the FA
Cb. Project scope and standardization product	1. Scope optimization 2. Presence standardized product 3. Customization options standardized product	- Contractors barely involved to reach scope optimization - Some standardized products, but many project specific designs
Cc. Delays project timeline	1. Objections environment 2. Payment schedule client 3. Production slot reservation 4. Internal communication	- No formal lines are included for objection, early participation helps (relational) - Payments for execution may only be done after the irrevocable permit (policy HA), production slot reservation is at risk of the contractor - Slow response and decision making cause delays, especially CEOs and RVCs of HA
Cd. Transparency and risk allocation	1. Open-book policy 2. Risk allocation client and contractor 3. Pain-sharing/gain-sharing 4. Pre-arranged price escalation clauses	- Open-book price per project in competition - Contractor is liable during the design, execution, and warranty period, the HA never - Only pain-share/gain-share for FA costs - Price escalation clauses are not included due to the 'project-based pricing' methodology
Ce. Penalties and rewards	1. Presence pre-arranged penalty 2. Fairness penalty 3. Presence pre-arranged reward	- Execution penalty for the contractor, late delivery building plot penalty for HA - No response and decision making delay penalties - The contractor prefers to exclude all penalties
Cf. Guarantees	1. Purchase and capacity guarantees 2. Flexibility guarantees (time and economic sensitivity)	- HA dare not to give a purchase guarantee - Contractors don't have a capacity guarantee - Barely any strict guarantees are included - Contractor advocates for a purchase guarantee
Cg. Payment schedule	1. Milestones and payments 2. Financial security measures	- Contractors must sometimes start constructing earlier than a signed order (irrevocable permit) - Contractors get paid when the dwellings are on site - Financial position is verified in the procurement
Ch. Quantity discount	1. Incentives housing associations 2. 'Fair' discount contractors	- Quantity discounts would incentivize HA - No quantity or general discount because there are barely no standardization - It is possible to have quantity discounts in combination with an purchase guarantee (contractor)
Ci. Inductive	1. Maintenance	- Maintenance period contractor is positive

Table 3.5 Summary of relational contractual governance elements in NH Bouwstroom

Code	Subcode	Conclusion
Ra. Management of complex programs	1. Managerial steering (streamlined process)	- The 'kernteam', an internal group, guides the process which is perceived positively by participants - The online dashboard is there, but can be improved on the themes planning and benchmark price
Rb. Partnerships and trust	1. Formation partnership 2. Maintenance collaboration 3. Types of trust 4. Trust enhancing activities	- Contractors are mainly selected on objective product characteristics, but DNA of the contractor is included - Willingness of participants is of great importance - No partner selection based on positive historical experience accounts - Verlovingsmarkten and collective sessions are organized to build trust and share knowledge
Rc. Collaboration	1. Managerial steering (daily attention) 2. Long-term relationship between individuals 3. Link between person, company, and project 4. Multiple layer influence (by position)	- HA prefers more influence CEOs, contractor wants more influence in consultations - Participants prefer working with advisors with past positive experience to create efficiency and innovation - Contractor thinks HA must act more progressive, for example by removing penalties and include early payments - CEOs of HA are very influential in creating a broad support base for NH Bouwstroom
Rd. Mutual interest	1. Interest municipalities 2. Interest contractors 3. Interest housing associations	- Interests and policies municipalities are important in accelerating the spatial and permit lead time - Including the opinion of the contractor more in the initiations and groups could lead to more efficiency - CEOs and RVCs HA decide about demand
Re. Team resilience	1. Impact factors team resilience	- 'Kernteam' steers the process well, but contractors can be involved more in the process
Rf. External stakeholders	1. Process accelerating measures (communication) 2. Government incentives	- Starting early with the participation trajectory helps accelerating the spatial and permit lead time - Municipalities must give more attention to NH Bouwstroom initiatives to accelerate lead times - HA: subsidies for pre-financing help - Contractor: subsidies for innovation equipment help
Rg. Inductive	1. Evaluating and consulting	- Evaluating and consulting current methodology helps

Chapter 4

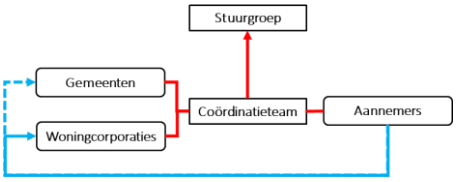
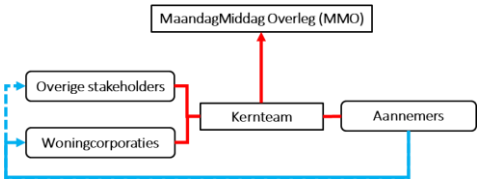
Cross-Case Analysis

This chapter presents a cross-case analysis of WoonST 2.0 and NH Bouwstroom. It begins with a comparative overview of the two organizations to establish contextual understanding. Following this, a detailed cross-case analysis is conducted, focusing on both contractual and relational governance elements. Key similarities and differences between the two cases are identified and discussed. The chapter concludes by outlining the main opportunities for optimization, associated potential challenges, and how these factors relate to shorter lead time and reduced costs.

4.1 Type of organization

For the cross-case analysis, both WoonST 2.0 and NH Bouwstroom are analyzed. Table 4.1 gives a summary of the most important differences in organizational structure.

Table 4.1 Organizational structure comparison

Category	WoonST 2.0	NH Bouwstroom
Organization structure (summary)		
Establishment year(s)	2020 (WoonST 1.0) 2024 (WoonST 2.0)	2022
Main aims	Main themes: - affordability; - shorter lead times. Sub theme: - sustainability.	Main themes: - sustainability; - quality; - affordability; - shorter lead times; - collaboration.
PBC within FA	In the procurement phase (FA): - contractor selection - agreed standardized products for fixed prices	In the procurement phase (FA): - contractor selection For each new PBC a mini-competition: - selection for product and prices

4.2 Contractual governance elements

This section presents the cross-case analysis of the contractual governance elements, based on the codes derived from the theoretical framework and the data collection chapter. It begins with Table 4.2, which outlines the similarities between WoonST 2.0 and NH Bouwstroom, focusing specifically on the contractual governance elements identified in the data collection chapter. The degree of similarity is categorized as 'Yes', 'Mixed', or 'No'. Subsequently, for the elements marked as 'Mixed' or 'No', a comparative analysis is conducted to identify optimizations and potential challenges.

Table 4.2 Cross-case comparison contractual governance elements

Code	Subcode	Cross-case similarities
Ca. PBC schedules and conditions	1. Project delivery model	1. Mixed
	2. Flexibility	2. Yes
Cb. Project scope and standardization product	1. Scope optimization	1. No
	2. Presence standardized product	2. Mixed
	3. Customization options standardized product	3. Mixed
Cc. Delays project timeline	1. Objections environment	1. Yes
	2. Payment schedule client	2. Mixed
	3. Production slot reservation	3. Mixed
	4. Internal communication	4. Mixed
Cd. Transparency and risk allocation	1. Open-book policy	1. Yes
	2. Risk allocation client and contractor	2. Mixed
	3. Pain-sharing/gain-sharing	3. Mixed
	4. Pre-arranged price escalation clauses	4. Yes
Ce. Penalties and rewards	1. Presence pre-arranged penalty	1. Yes
	2. Fairness penalty	2. Mixed
	3. Presence pre-arranged reward	3. Mixed
Cf. Guarantees	1. Purchase and capacity guarantees	1. Mixed
	2. Flexibility guarantees (time and economic sensitivity)	2. Yes
Cg. Payment schedule	1. Milestones and payments	1. Mixed
	2. Financial security measures	2. Yes
Ch. Quantity discount	1. Incentives housing associations	1. Mixed
	2. 'Fair' discount contractors	2. No
Ci. Inductive	1. Maintenance	1. Yes

Ca.1. Project delivery model

While WoonST 2.0 and NH Bouwstroom differ in their contract form, with one using a single-phase and the other a two-phase approach, both include the design responsibility under the UAC-IC 2005 terms. Given the continuity of contractors within NH Bouwstroom, a single-phased contract may be more appropriate, as it offers greater security between phases.

In contrast, a two-phase contract increases the risk of failure costs and delays, particularly if the contractor from the first phase does not continue into the second phase. Implementing a single-phase PBC in NH Bouwstroom may limit the flexibility for participants but reduces uncertainty by minimizing the risk of terminating the collaboration after the first phase.

Cb.1. Scope optimization

Resulting from the data collection chapter, scope optimization goes hand in hand with standardization of products. WoonST 2.0 therefore has a pre-arranged scope optimization table (Figure 3.4) in which the price and scope optimizations are included. Furthermore, housing associations of WoonST 2.0 aim to involve contractors as early as possible in project initiations considering scope optimization of PSA. NH Bouwstroom nor has a standardized product, nor includes contractors in the initiation phase. Considering price efficiency, contractors could be involved earlier in the process.

The main challenge lies in the current design of NH Bouwstroom. At present, NH Bouwstroom uses mini-competitions for contractor selection, which makes early involvement of contractors impractical. However, excluding these mini-competitions could enable greater contractor involvement from an earlier stage, which in turn could facilitate better scope optimization.

Cb.2. Presence standardized product + Cb.3. Customization options standardized product

WoonST 2.0 features a highly standardized product, while NH Bouwstroom uses a concept book with standardized products with a lower overall level of standardization. Both initiatives also include PSA alongside their standardized concepts. Project-specific designs can offer advantages by better meeting the preferences of municipalities and aesthetic committees, which may result in quicker approvals and shorter lead times. However, when standardized products are well integrated into municipal and aesthetic procedures, they can also streamline the approval process and lead to even shorter lead times. In addition, standardized products tend to reduce failure costs, resulting in reduced overall costs. Therefore, if well aligned with local requirements, standardized products are the most effective fit within a Bouwstroom initiative.

Clients, municipal bodies and aesthetics committees all have their own opinion. Using standardized products could work, but all external parties must be convinced. Clients must get rid of their standardized program of requirements, municipal bodies must guarantee faster procedures for standardized dwellings, and aesthetics committees must accept non-traditional designs.

Cc.2. Payment schedule client + Cc.3. Production slot reservation + Cd.2. Risk allocation client and contractor + Cg.1. Milestones and payments

In both Bouwstroom initiatives, execution contracts get signed after the irrevocable permit. However, in NH Bouwstroom, contractors sometimes have to start factory production before the irrevocable permit. Milestones will be paid by the housing associations after the contract is signed. In the ideal situation, considering a shorter lead time, contractors would start producing during the permit period.

There are two key challenges related to production during the permit period. First, if the permit is not approved or if objections delay the process, housing associations may be left without a location for the dwellings. Second, if contractors begin production before receiving payments from the housing associations, they bear all the financial risk. In the event that the permit is ultimately not granted, contractors would be forced to sell the dwellings they financed themselves.

In both Bouwstroom initiatives, industrialized building components are used. The main difference between the WoonST 2.0 and the NH Bouwstroom lies in the project delivery model. As discussed in ‘Ca.1. Project delivery model’, contractors in the NH Bouwstroom feel more obliged to reserve production capacity, since housing associations are able to select a different contractor in case no production capacity is available. Contractors rely on continuity and therefore housing associations must include more certainty regarding production slot reservation.

Housing associations do not want to bear any execution or property risks before the irrevocable permit. However, contractors rely on continuity and must reserve factory capacity before that time. Oblige contractors with production capacity reservation would bear all the risks at the contractor but would be the most efficient considering project lead time. On the other hand, when production space is reserved but not used, contractors could increase their prices in future projects or would not enter in new projects within Bouwstroom initiatives.

Cc.4. Internal communication
Contractors of both Bouwstroom initiatives complain about the response and decision making time of housing associations. While housing associations of the NH Bouwstroom partially agree, housing associations of WoonST 2.0 largely agree with the contractors. These communication delays are mainly related to the preparation phase. The intrinsic motivation of housing associations, supplemented by a formal response and decision making agreement, would accelerate the process.

There is hardly any challenge regarding the execution of this optimization. However, the size of housing associations differs, which may lead to variations in response times. Additionally, the size and importance of the tasks involved in decision-making can vary, meaning that setting a fixed duration would not be appropriate.

Cd.3. Pain-sharing/gain-sharing
Pain-sharing/gain-sharing is applied in the WoonST 2.0 considering the advisory costs and in the NH Bouwstroom considering costs made in the FA stage. The opinions considering pain-sharing/gain-sharing in the execution phase are divided between both Bouwstroom initiatives, but also between individuals within the Bouwstroom initiatives. Most parties agree that pain-sharing/gain-sharing in the form of collaborative purchasing of main elements could lead to economies of scale and a fair price. A new ‘werkgroep’ could be designed to work on this topic in both Bouwstroom initiatives.

For the pain-sharing/gain-sharing mechanism, multiple challenges are included. First of all, housing associations are non-risk seeking organizations, meaning they would be better served by a fixed price. Also, housing associations do not have employed capacity for joint purchasing initiatives. Contractors do also not prefer this methodology, while working ‘in regie’ potentially leads to lower profit margins. Lastly, larger contractors already have economies of scale, meaning an addition of more parties would make no sense.

Ce.2. Fairness penalty
In the WoonST 2.0, design and execution penalties are included for the contractor. In NH Bouwstroom, an execution penalty is included for the contractor and a late delivery building plot penalty is included for the housing association. The opinions about penalties vary between Bouwstroom initiatives, but also between individuals within the Bouwstroom initiatives. Housing associations with a traditional mindset prefer penalties, while progressive housing associations prefer to exclude penalties. In general, most participants think penalties do not belong to such innovative concept as Bouwstroom initiatives. Therefore they would be satisfied to work on trust, rather than penalties.

Trust is a relational aspect, regularly not being laid down in formal agreements. Excluding all penalties would mean participants could abuse the trust of the counterpartying participant, for example deliver a project whenever they want.
Ce.3. Presence pre-arranged reward

In both Bouwstroom initiatives, no rewards are included. Participants of WoonST 2.0 claim to be satisfied with rewards for early building delivery or higher quality, while participants of NH Bouwstroom take a neutral position regarding rewards.

The challenge again, just as in 'Ce.2. Fairness penalty', mainly depends on trust. One housing association also pointed out that a reward could lead to perverse incentives for example by issuing incorrect project delivery schedules. Lastly one contractor claims a reward will never outweigh costs related to a gap in their factory production.

Cf.1. Purchase and capacity guarantees
In the WoonST 2.0, a capacity guarantee is included over the entire FA period. In NH Bouwstroom, no capacity guarantees are included. In both Bouwstroom initiatives, no purchase guarantees are included. From the results section can be concluded that contractors are able to lower their prices and shorten lead times when purchase guarantees are provided, which can be explained by the need to maintain continuity in their factories or factories of their subcontractors.

Geopolitical tensions, along with the long-lasting nature of Bouwstroom initiatives, market fluctuations, and changing interest rates, explain that housing associations will not provide a purchase guarantee. At the same time, participants are generally not opposed to offering a purchase guarantee for a limited amount of dwellings. However, further research is needed to determine what constitutes a feasible and effective purchase guarantee in this context.

Ch.1. Incentives housing associations + Ch.2. 'Fair' discount contractors
In both Bouwstroom initiatives, but especially WoonST 2.0 due to their standardized products, quantity discounts would incentivize housing associations to purchase more dwellings within the program. One condition that must be met contains a quantity discount based on a standardized product. The opinions about 'fair' quantity discounts between contractors of WoonST 2.0 and NH Bouwstroom differ. The contractor of WoonST 2.0 claims he has no financial room to lower the cost per dwelling. The contractor involved in NH Bouwstroom argues that quantity discounts based on a certain production threshold can lead to cost reductions, as increased production output lowers the cost per unit.

While both Bouwstroom initiatives view quantity discounts as a potential benefit, challenges remain. NH Bouwstroom lacks standardized products, which means contractors could adjust project-specific pricing to offset the discount, undermining its intended effect. In contrast, WoonST 2.0 does use standardized products, but the contractor claims there is no financial margin left to offer a discount. Transparent consultation and negotiation between parties could help identify a balanced and effective approach.

4.3 Relational governance elements

This section presents the cross-case analysis of the relational governance elements, based on the codes derived from the theoretical framework and the data collection chapter. It begins with Table 4.3, which outlines the similarities between WoonST 2.0 and NH Bouwstroom, focusing specifically on the relational governance elements identified in the data collection chapter. The degree of similarity is categorized as 'Yes', 'Mixed', or 'No'. Subsequently, for the elements marked as 'Mixed' or 'No', a comparative analysis is conducted to identify optimizations and potential challenges.

Table 4.3 Cross-case comparison relational governance elements

Code	Subcode	Cross-case similarities
Ra. Management of complex programs	1. Managerial steering (streamlined process)	1. No
Rb. Partnerships and trust	1. Formation partnership	1. Mixed
	2. Maintenance collaboration	2. Yes
	3. Types of trust	3. Mixed
	4. Trust enhancing activities	4. Yes
Rc. Collaboration	1. Managerial steering (daily attention)	1. No
	2. Long-term relationship between individuals	2. Yes
	3. Link between person, company, and project	3. Mixed
	4. Multiple layer influence (by position)	4. Mixed
Rd. Mutual interest	1. Interest municipalities	1. Mixed
	2. Interest contractors	2. Mixed
	3. Interest housing associations	3. Mixed
Re. Team resilience	1. Impact factors team resilience	1. No
Rf. External stakeholders	1. Process accelerating measures (communication)	1. Yes
	2. Government incentives	2. Mixed
Rg. Inductive	1. Evaluating and consulting	1. No

Ra.1. Managerial steering (streamlined process)

The managerial steering in WoonST 2.0 is executed by consultants of Brink. The managerial steering in the NH Bouwstroom is executed by the 'kernteam', an internal team including delegated participants. Both methodologies are perceived in their own Bouwstroom initiative as positive. NH Bouwstroom, considering a streamlined process, has introduced an online dashboard for information sharing. The WoonST 2.0 does not have an online dashboard. Both Bouwstroom initiatives would like to incorporate an online dashboard, in which the NH Bouwstroom would like to upgrade their dashboard.

Developing or upgrading an online dashboard takes effort and costs. These characteristics could form a pitfall for participants. Also, maintaining an online dashboard takes intrinsic motivation of participants to keep the dashboard up to date.

Rb.1. Formation partnership + Rb.3. Types of trust

Housing associations of NH Bouwstroom select contractors based on objective selection criteria, similar to the European tendering conditions. Housing associations of WoonST 2.0 aim to do the same, but include that historical experiences with contractors could influence their choice. Considering the complex structure with many affiliated actors, housing associations should act as objective as possible

in the selection of contractors. A potential optimization could be an additional 'werkgroep' testing the objectivity on the selection of contractors.

Housing associations are still individual organizations. Others testing the objectivity of contractor selection could probably lead to conflicts between organizations. Including objective selection criteria solely within the mini-competitions in NH Bouwstroom would help prevent conflicts and eliminate the need for an objectivity 'werkgroep'.

Rc.1. Managerial steering (daily attention) + Rc.3. Link between person, company, and project + Rc.4. Multiple layer influence (by position) + Re.1. Impact factors team resilience

Table 4.4 Opinions about managerial steering (daily attention)

Participants	WoonST 2.0	NH Bouwstroom
Housing association	- Same/Less influence contractor - Same influence CEOs of HA - More cohesion between groups: 'coördinatieteam' and 'stuurgroep'	- More influence CEOs of HA - Same cohesion between groups
Contractor	- Less influence municipality	- More influence contractor - More influence municipality

Table 4.4 shows that the two Bouwstroom initiatives hold opposing views on managerial steering, particularly regarding involvement in decision-making. This suggests that finding a middle ground could enhance the managerial steering process and potentially lead to greater efficiency.

The main challenge in adjusting managerial steering within Bouwstroom initiatives lies in the conflicting interests between organizations and the individual roles within them. Some individuals may be reluctant to their decision-making authority, while others may be hesitant to take on additional management responsibilities.

In both Bouwstroom initiatives, contractors believe that CEOs and RVCs of housing associations act conservative. In the WoonST 2.0, the contractor would like to see more acknowledgement and intrinsic motivation for standardized products and processes. In both Bouwstroom initiatives, contractors and some project managers from housing associations indicate that penalties and rewards do not align with the innovative mindset of Bouwstroom initiatives. Some housing associations in Bouwstroom initiatives should step out of their comfort zone and act based on progressive relational agreements rather than conservative contractual agreements. This challenge relates to the change of mindset. Changing mindsets of CEOs and RVCs could be possible depending on the individual characters of the delegated persons. Clearly emphasizing the advantages of Bouwstroom initiatives, could potentially help changing mindsets.

Rd.1. Interest municipalities + Rd.2. Interest contractors + Rd.3. Interest housing associations

Table 4.5 Interest of municipalities, contractors, and housing associations

Interest	WoonST 2.0	NH Bouwstroom
Municipalities	- Contractual involved, but must increase, for shorter permit procedures	- Not contractual involved, but must increase, for shorter permit procedures
Housing associations	- Increase involvement more different HA within the 'stuurgroep' and 'coördinatieteam'	- Same involvement different HA

	- 'New project in WoonST, unless…' procedure helps	
Contractors	- High, continuity is of great importance	- High, continuity is of great importance

From Table 4.5 can be learned that the participants of both Bouwstroom initiatives are dependent on the interests or decisions of municipal bodies. Also, in the WoonST 2.0, the broad involvement of all affiliated organizations can be improved.

Both the involvement of municipalities and the engagement of all affiliated participants in WoonST 2.0 require intrinsic motivation and sufficient organizational capacity. As highlighted in 'Rc.4. Multiple layer influence (by position)', the main action Bouwstroom initiatives can take is to clearly emphasize the advantages of participation.

Rf.2. Government incentives

Table 4.6 Government monetary incentives

Participants	WoonST 2.0	NH Bouwstroom
Housing association	- Lead time construction subsidies - Pre-financing subsidies	- No lead time construction subsidies - Pre-financing subsidies
Contractor	- Additional biobased materials	- Innovation equipment factories

From Table 4.6 can be learned that housing associations of both Bouwstroom initiatives would see pre-financing subsidies as a positive development. The pre-financing can be used to start producing dwellings in the permit phase leading to shorter lead times. One condition of pre-financing includes standardization of the pre-financed product. Housing associations involved in WoonST 2.0 believe that subsidies linked to early project delivery, based on a project delivery benchmark, could help reduce lead times. In contrast, housing associations within NH Bouwstroom argue that such subsidies may create perverse incentives, thereby weakening the effectiveness of this optimization. Additionally, the contractor in WoonST 2.0 is focused on obtaining subsidies for relatively expensive biobased materials, aiming to promote more climate-resilient buildings. Meanwhile, the contractor in NH Bouwstroom prioritizes subsidies for factory innovation equipment, with the goal of achieving more efficient production processes, reducing costs, and shortening project lead times.

All subsidy incentives are possible in theory, however the political climate and the associated focus areas are of great importance.

Rg.1. Evaluating and consulting

Although 'evaluating and consulting' was originally identified as an inductive code specific to NH Bouwstroom, it holds potential value for both Bouwstroom initiatives. Ongoing evaluation and consultation with other projects, government bodies, and Bouwstroom initiatives could contribute to improving the overall methodology and execution of Bouwstroom initiatives.

The primary challenge lies in organizing these evaluation and consultation sessions. A dedicated management body, individual, or group of individuals must take the initiative and responsibility to coordinate and facilitate these efforts.

4.4 Conclusion

This section summarizes the cross-case analysis. Table 4.7 & Table 4.8 include preliminary optimizations and associated potential challenges for the contractual governance elements and the relational governance elements based on the results retrieved from the cross-case analysis. For each optimization, the applicability to 'lead time' or 'costs' is indicated based on findings from the contractual document analysis and the interviews. The 'X' between brackets denotes a correlation with 'lead time' or 'costs' that cannot be completely explained by the data collected.

Table 4.7 Conclusion cross-case analysis contractual governance optimizations

Code	Optimization / Solution	Potential challenge	Lead time	Costs
Ca.1.	Single-phase PBC schedule	Reduction in freedom vs two-phase PBC schedule	(X)	(X)
Cb.1.	Early contractor involvement	Competition takes place after scope optimization	X	X
Cb.2. + Cb.3.	Integrating more standardized products	Individual wishes clients, municipal bodies, and aesthetics committees	X	(X)
Cc.2. + Cg.1.	Start production during or before the permit and spatial procedure	HA will not pre-finance and contractors will not bear the risks	X	
Cc.3. + Cd.2.	Reserve a production timeslot in factories with penalties for HA in case of not meeting the initial timeslot	HA prefer late delivery over upfront agreed penalties	X	
Cc.4.	Faster response and decision making HA by intrinsic motivation and formal agreements	Size HA and degree of importance decisions differs	X	
Cd.3.	Designing a 'werkgroep' for collaborative purchasing	HA are non-risk seeking, and do not have the in-house capacity; contractors do not prefer to work 'in regie'		(X)
Ce.2.	Exclude formal penalties	Some participants could abuse the trust	(X)	(X)
Ce.3.	Include formal rewards	Some participants could abuse the trust, potentially leading to perverse incentives	(X)	
Cf.1.	Include purchase and capacity guarantees	HA do not dare due to geopolitical and economic uncertainties	X	X
Ch.1. + Ch.2.	Include quantity discounts for standardized products	Degree of standardization is too low and contractors have no financial room		X

Table 4.8 Conclusion cross-case analysis relational governance optimizations

Code	Optimization / Solution	Potential challenge	Lead time	Costs
Ra.1.	An online dashboard	Developing takes effort and costs; maintaining takes intrinsic motivation	(X)	(X)
Rb.1. + Rb.3.	Design a 'werkgroep' for objectivity in partner selection	Limits HA freedom as individual organizations	X	X
Rc.1. + Re.1.	Better division in degree of influence under participants	Conflicting interest of organizations and individuals within organizations	(X)	
Rc.3. + Rc.4.	CEOs and RVCs HA must act less conservative	Changing mindset is not always possible, it depends on the character of individuals	X	
Rd.1. + Rd.2. + Rd.3.	More involvement of municipalities; more involvement of all participants within a Bouwstroom initiative organizational structure	Political climate and municipal capacity could influence the involvement; intrinsic motivation of all participants is an important condition	X	
Rf.2.	Include subsidies for pre-financing, biobased materials, and innovation factory equipment	Political climate and focus area is of great importance	X	X
Rg.1.	Continuous evaluating and consulting with other projects, government bodies, and other Bouwstroom initiatives	Management body, individual, or group of individuals must take the initiative to organize these sessions	(X)	(X)

To conclude, both Bouwstroom initiatives contain strengths and weaknesses, and combining the best elements from each can support a continuous learning process aimed at optimizing future Bouwstroom initiatives. At the same time, given the differing objectives of each initiative, a tailored, Bouwstroom-specific approach will always be necessary. The next chapter will focus on externally assessing the proposed optimizations.

Chapter 5

External Assessment

In this chapter, the preliminary conclusions of section '4.4 Conclusion' are externally assessed in relation to their real life application. The assessment is based on an interview with a Bouwstroom expert from Brink, who either validates or falsifies the preliminary conclusions. Interview questions can be found in Appendix B.

Background information Brink

Brink is a research and consultancy company focusing on policy, strategy, real estate development, construction, and maintenance advice. Brink is involved within five of the seven ongoing Bouwstroom initiatives within the Netherlands:

1. Bouwstroom Haaglanden
2. Bouwstroom Limburg
3. Bouwstroom Oost
4. De Rotterdamse Bouwversnelling
5. WoonST 2.0

Within the ongoing Bouwstroom initiatives, Brink is involved throughout the entire process. Their role spans from the initiative phase to the procurement phase and includes actively supporting and guiding process managers during implementation. In addition to their involvement in existing initiatives, Brink also contributes its expertise to the development of new Bouwstroom initiatives, such as Bouwstroom Arnhem-Nijmegen, according to the interview findings.

5.1 Contractual governance elements

Table 5.1 presents the externally assessed preliminary conclusions regarding contractual governance element optimizations, based on the preliminary conclusions drawn from the cross-case analysis.

Table 5.1 Externally assessed conclusion contractual governance optimizations

Code	Optimization / Solution	External assessment on preliminary optimization
Ca.1.	Single-phase PBC schedule	The difference between a single-phased and a two-phased is just a matter of feeling and do barely differ from each other. Bouwstroom Haaglanden is experiencing with a *turnkey PBC*, this PBC unburdens HA even more than a design & build under the UAC-IC 2005, which is experienced as *positive*.
Cb.1.	Early contractor involvement	Involved parties *reflect positively* on early contractor involvement. *Excluding mini-competitions and selection of contractors within the procurement phase* are conditions that must be met.
Cb.2. + Cb.3.	Integrating more standardized products	At this moment, small adaptations of concepts, facades, and HA project specific wishes are still in play which is not entirely bad. However, in order to optimize Bouwstroom initiatives, *mindsets of municipal bodies, aesthetic committees and HA must be changed to include as much standardization as possible*.

Cc.2. + Cg.1.	Start production during the permit and spatial procedure	Individual HA make individual decisions and risk considerations considering pre-financing in the permit phase. It *depends whether a HA prefers shorter lead time or the pre-financing risk*. Also, a *trajectory* from initiative to building completion takes *many years*, making *lead time of permit and spatial procedures negligible*.
Cc.3. + Cd.2.	Reserve a production timeslot in factories with penalties for HA in case of not meeting the initial timeslot	In some Bouwstroom initiatives, HA could decide to *choose for this based on a risk consideration*. However, this is more of a *customized solution rather than a general solution*.
Cc.4.	Faster response and decision making HA by intrinsic motivation and formal agreements	This theme is *currently worked on for daily response* in several Bouwstroom initiatives. However *important decisions*, such as investment decisions, are *largely influenced by political climate* for example the height of the 'liberalisatiegrens'. Therefore *formal agreements would not fit*.
Cd.3.	Designing a 'werkgroep' for collaborative purchasing	There are a few components that implicate this optimization. *Trust needs to be improved* due to the early-stage collaboration, *HA do not have employed capacity*, a *fixed indexation covers the cost deviations over the entire program length*, and *participants would like to stick to their own role*. This means a contractor needs to contract for a fixed price including the risks, and a HA needs to purchase including risk minimization.
Ce.2. Ce.3.	Exclude formal penalties Include formal rewards	*Building completion penalties are a must* within contracts for HA. The *rental agreements HA enter with tenants* including a delivery date is of *critical importance*. 'HA mostly prefer to deliver the building 2 months later with a 100% planning security rather than delivering the building earlier including some marginal notes considering rental agreements. With this in mind, *formal rewards for early delivery would offer negligible advantages* to HA.
Cf.1.	Include purchase and capacity guarantees	Bouwstroom Haaglanden is the first Bouwstroom initiative that included a formal purchase and capacity guarantee. However, this is based on 'regular' traditional construction with an average benchmark of 50 dwellings a year with 10 housing associations. However, in most Bouwstroom initiatives, the *aimed initial amount of dwellings is mostly achieved* making it an *informal guarantee* based on prior experience for involved parties.
Ch.1. + Ch.2.	Include quantity discounts for standardized products	Quantity discounts are included in some Bouwstroom initiatives. However, these are rather general discounts based on the prognosed purchase of HA within the entire program rather than a quantity discount based on a benchmark. This *general discount can be incorporated more within Bouwstroom initiatives to incentivize HA*.

5.2 Relational governance elements

Table 5.2 presents the externally assessed preliminary conclusions regarding relational governance element optimizations, based on the preliminary conclusions drawn from the cross-case analysis.

Table 5.2 Externally assessed conclusion contractual governance optimizations

Code	Optimization / Solution	External assessment on preliminary optimization
Ra.1.	An online dashboard	Bouwstroom initiatives could be optimized by an *online dashboard for knowledge sharing and continuous learning*. It would help to include, next to regular prices of standardized products, *PSA prices* of options. Furthermore, *program and project related decisions and knowledge* can be shared via this platform.
Rb.1. + Rb.3.	Design a 'werkgroep' for objectivity in partner selection	A 100% objectivity is hardly to achieve. However, *within the procurement* procedures it is *aimed to select partners as objective as possible* due to different (subjective) interests of participating HA and the total expected program value. Also, *excluding project-based mini-competitions would reduce the amount of, possibly subjective, selection moments compared to one-time program-based partner selection*. Overall, *Bouwstroom initiatives help to increase objectivity considering partner selection within the HA sector* compared to PBC.
Rc.1. + Re.1.	Better division in degree of influence under participants	Experience learnt that it is important to *include both project managers and CEOs of both HA and contractors*. However, dependent on the size of the Bouwstroom initiative, *it is better to work with a delegation rather than including too much parties within the repetitive consultations*. Lastly real-life examples have learnt that *including aldermen, CEOs HA, and CEOs contractors give many power to decision making* for new projects.
Rc.3. + Rc.4.	CEOs and RVCs HA must act less conservative	Some CEOs and RVCs of HA take off more dwellings, while some take off less. This distribution works fine for all participants and *mindsets of individual CEOs and RVCs of HA do not have to change to make a Bouwstroom initiative more successful*.
Rd.1. + Rd.2. + Rd.3.	More involvement of municipalities; more involvement of all participants within a Bouwstroom initiative organizational structure	Many *improvements can be achieved by municipal entities*. Three potential optimizations include: *decreasing the power of individual municipal officials*, steering on *active land policy*, and *knowledge sharing including advising developers on Bouwstroom projects.* Furthermore, the *intrinsic motivation* of *all contractors is high* due to their continuity interest. While not *all HA* are involved in the same degree, this involvement and *intrinsic motivation mix is mostly well-balanced*.
Rf.2.	Include subsidies for pre-financing, biobased materials, and innovation factory equipment	Overall *subsidies*, including also development subsidies, could *improve* Bouwstroom initiatives. However*, a thorough assessment* must be conducted for each subsidy *within each Bouwstroom* to determine whether the benefits outweigh the required effort.
Rg.1.	Continuous evaluating and consulting with other projects, government bodies, and other Bouwstroom initiatives	On the level *within Bouwstroom initiatives*, some could *organize more plenary events to stay aligned*. On the level outside of Bouwstroom initiatives, there are consultations between different Bouwstroom initiatives. However, *a knowledge sharing event organized by Aedes between all Bouwstroom initiatives* could potentially lead to an improvement by inter-learning processes.

5.4 Conclusion

Overall, the conclusions of the cross-case analysis in Chapter 4 corresponded well with the results of the external assessment. However, several optimizations identified through the external assessment showed significant deviations from the preliminary optimizations formulated in the cross-case analysis. The optimizations that were falsified are outlined below:

1. Turnkey PBC schedules are generally considered to be the most suitable for Bouwstroom initiatives. (Ca.1.)
2. Entering rental agreements with tenants that specify the building delivery date is highly important for housing associations. As a result, including formal penalties are necessary, while rewards in such a case do not make sense. (Ce.2. + Ce.3.)
3. Although purchase and capacity guarantees are difficult to formalize within Bouwstroom initiatives, the initially targeted number of dwellings is often achieved in ongoing Bouwstroom initiatives. These construction volume predictions, based on other ongoing Bouwstroom initiatives rather than their own, often serve as a valid assumption for contractors within their own Bouwstroom initiative. Therefore, these assumptions can be seen as 'informal' purchasing guarantees. (Cf.1.)
4. To ensure efficiency in the organizational structure, it is preferable to select a delegation of participants rather than involving all participants. Additionally, having a clearly defined and authoritative decision-making body at the top of the organization structure of Bouwstroom initiatives is essential for guiding new projects. (Rc.1. + Re.1.)
5. A mix of 'active' and 'passive' housing associations within a Bouwstroom initiative works fine. Not all housing associations need to take an active role for the initiative to succeed. (Rc.3. + Rc.4.)

Chapter 6

Discussion

This chapter presents the limitations and discussion of the research findings. It begins with a reflection on the research objective and research scope, followed by a critical discussion of the theoretical framework and data collection methods. The chapter then addresses the cross-case analysis, including the external assessment, followed by a section on the scientific contribution of the study. Finally, it concludes with recommendations for future research.

6.1 Research objective and research scope

This research aims to answer *which governance elements can improve the achievement of objectives within Bouwstroom initiatives?* Before discussing the results, it is essential to firstly address several marginal notes related to the research objective, structured around the three key elements of the research scope: 'governance elements', 'objectives', and 'Bouwstroom initiatives'.

Governance elements

In this research, a distinction is made between 'contractual governance elements' and 'relational governance elements'. While this categorization can cover a large amount of governance elements within construction programs and projects, another categorization would maybe result in a different outcome. For example, a focus on other governance categories, emphasizing organizational or individual values, norms, and standards, could have led to different insights. Similarly, the research could have examined project-level versus program-level governance, which would have clarified the distinction between governance elements related to individual projects and those tied to the broader program.

Objectives

The objectives for Bouwstroom initiatives as discussed in this research contain 'lead time' and 'costs'. While this research focuses specifically on accelerating the preparation, permit, and execution phases, it is important to acknowledge that the total lead time of a construction project embraces a broader scope, including the initiative phase. New housing development cannot proceed without the initiative phase, yet it remains underexplored in this study. In terms of costs, the research considers only initial investment costs. This overlooks the long-term operation period typically adopted by housing associations. These organizations often prioritize low maintenance costs and high residual property values, factors better captured by a 'Total Cost of Ownership' (TCO) approach rather than a focus on initial investment alone. Moreover, Bouwstroom initiatives involve multiple organizations with differing objectives, some of which extend beyond the scope of this research. These may include objectives related to sustainability and innovation. For instance, in the procurement phase of WoonST 2.0, sustainability is explicitly included as a selection criterion, with requirements such as a low MPG score, a high Building Circularity Index (BCI), and the use of biobased materials (Brink, 2024).

Bouwstroom initiatives

Bouwstroom initiatives are programs under development, meaning that conclusions could get outdated. The conclusion of this research, based on the first half of 2025 as reference period, can help Bouwstroom initiatives with achieving the objectives, but will not count as the only 'hard' solution. Bouwstroom initiatives can be regarded as complex programs with many affiliated actors based on different geographical contexts, political climates, individual organizations, and the people within those

organizations. For this reason, in order to make a generalized conclusion about all Bouwstroom initiatives, a larger sample size including all Bouwstroom initiatives needs to be taken into account.

6.2 Theoretical framework and data collection

As discussed in '6.1 Research objective and research scope', the theoretical framework is centered around the main objectives 'lead time' and 'costs'. While each deductive code presented in the theoretical framework relates to either lead time, costs, or both, it cannot be concluded that all relevant themes concerning these aspects within construction projects have been completely covered. The breadth of available journal papers, books, and other academic sources related to lead time and costs is simply too extensive. Conducting a preliminary analysis of contractual documents and orienting interviews could have contributed to a more focused and targeted search strategy for the theoretical framework. In conclusion, no consistent or clearly defined approach was adopted in selecting academic sources on governance elements influencing lead time and costs, as it would have exceeded the scope and timeframe of this research.

A more comprehensive literature study could have provided stronger support for the governance elements discussed in the theoretical framework. However, the primary purpose of the governance elements in the theoretical framework is to form a deductive code list, which serves as a starting point for data collection in the case studies. A similar point applies to the five relational governance elements of Yeung et al. (2012). This theory is used to form a basis for relational governance elements, but the final conclusion of '2.2 Relational governance elements', is not entirely framed around this theory. Another point of discussion concerns the number of subcodes assigned to each code. While the codes are aimed to provide clear categorization, all subcodes are considered equally important, meaning that a code with only one subcode holds the same value as a code with four subcodes. For this reason, the conclusion of the data collection chapter, cross-case analysis, and external assessment, focuses on subcodes rather than main codes.

The data collection for the contractual governance elements and relational governance elements is based on contractual documents and interviews conducted with housing associations and contractors involved within the case studies. However, the starting point and research area of the data collection is mainly based on the deductive codes retrieved from the theoretical framework. While these codes covered a large amount of both the contractual governance elements and the relational governance elements, data is collected with a tunnel vision and biased perspective based on the deductive codes. This also explains why there are barely any inductive codes, such as KPIs, retrieved in the data collection chapter.

6.3 Cross-case analysis including external assessment

The cross case analysis is based on two Bouwstroom initiatives. While both Bouwstroom initiatives have a varying approach and governance structure, no absolute conclusions can be drawn for all Bouwstroom initiatives.

The cross-case analysis for both the contractual governance elements and the relational governance elements provides a table including cross-case similarities based on the data collection chapter. While the similarities in Table 4.2 & Table 4.3 are based on results retrieved from the data collection chapter, little logical reasoning is included to make the similarity comparison. After that, 'Mixed' or 'No' similarities between the two cases are highlighted for the final conclusion of the cross-case analysis. To minimize the usage of the researcher his logical reasoning in the conclusion of the cross-case analysis, brackets are placed for 'lead time' and 'costs' to indicate the potential doubt. Besides the small portion related to logical reasoning, nearly all data is based on the contractual document analysis and

interviews. The results of the cross-case analysis could reach a higher academic level by the avoidance of logical reasoning. It also needs to be mentioned that the exact impact of 'lead time' or 'costs' is not included within the cross-case analysis. For example, 'Ch. Quantity discount' ensures a decrease of 2-5% of the overall project costs.

The external assessment is based on an interview discussing the optimizations of the cross-case analysis including their potential challenges. A few points of discussion needs to be considered. First of all, data used for the comparison is based on the researcher his analysis of contractual data and interview results. There is a possibility that the researcher did not include all data that needs to be included. Including multiple researchers reviewing the data or incorporating additional academic sources could have strengthened the academic level of validation and falsification in the external assessment. For some conclusions, sample size poses a problem. For example, conclusions about CEOs, RVCs, and municipal bodies are made without including them in the research. Also, conclusions about topics centered around different positions within organizations are hardly to make given the current sample size. Furthermore, the contractual inductive code 'Ci.1. Maintenance' is not included in the cross-case analysis, as interviewees indicated that the total maintenance sum and the actual maintenance carried out in practice is so minimal that it is considered negligible. Lastly, the sample used for the external assessment needs to be discussed. Only one person is interviewed who only was involved in WoonST 2.0, not in NH Bouwstroom. Furthermore, the interviewee of Brink benefits from a positive view on the work Brink does within Bouwstroom initiatives, making them not as independent as is mentioned throughout the research. Lastly, the external assessment could be improved by critically checking the contractual governance optimizations by a legal expert.

6.4 Scientific contribution

While the findings of this research support practical improvements, it also contributes to the broader academic field on governance elements in the construction sector. It is important to mention that most literature studies are focused on project governance elements rather than program governance elements. The studies of Langston (2013) & Zidane et al. (2016) explained that 'speed' or 'lead time' in the construction industry is mainly determined based on 'the ratio of scope over time' (Figure 2.3). For projects within programs, it is important to mention that many other factors such as 'decision making of clients and municipal bodies' and 'guarantees' play a pivotal role.

Furthermore, it is important to mention the unique character of Dutch housing associations. Studies of Fagerhaug et al. (2024) & Jacomit et al. (2008) concluded that the pain-share/gain-share mechanism functions effectively to distribute financial gains more equitably among participants. However, it is important to note that this does not work for housing associations that lack employed capacity and prioritize fixed prices and unburdening. This risk-averse nature of housing associations also challenges the theory proposed by Yeung et al. (2012), whose conclusions on 'common goals and objectives' and a 'win-win philosophy' appear more applicable to relational contracting between market parties rather than to risk-avoiding public clients. Additionally, Yeung et al. (2012) primarily focus on one-to-one partnerships, whereas Bouwstroom initiatives are characterized by partnering involving multiple stakeholders. In such networks, which involve multiple clients, contractors, and sometimes municipalities, 'managerial steering' must be included to the 'cooperation and communication' factor, ensuring effective process coordination.

Chapter 7

Conclusion

The aim of this exploratory research is to *define governance elements that can improve the achievement of objectives within Bouwstroom initiatives.* The governance elements are categorized in contractual governance elements and relational governance elements, the objectives used include lead time and costs, and the analyzed Bouwstroom initiatives include WoonST 2.0 and NH Bouwstroom.
The main research question is formulated as follows:

Which governance elements can improve the achievement of objectives within Bouwstroom initiatives?

Sub-questions explained in the following sections are formulated to answer the main research question.

7.1 Sub-question 1

Which governance elements have been effective in construction projects?

To answer this sub-question, a theoretical framework was developed based on an analysis of existing literature, including journal articles and academic books, focusing on both contractual ('C') and relational ('R') governance elements. The effectiveness of these elements in construction projects has been critically assessed, drawing attention to both common patterns and limitations in the existing literature. A presentation of these findings is provided in Table 7.1. The table shows that most correlations with the objectives are found within the contractual governance elements. In contrast, correlations associated with relational governance elements primarily relate to lead time and, in many cases, cannot be completely explained by the findings of the theoretical framework.

Table 7.1 Conclusion sub-question 1

Code	Element	Conclusion	Lead time	Costs
Ca.	PBC schedules and conditions	1. Integrated PBC schedule 2. Flexibility in contractual conditions	(X)	(X)
Cb.	Project scope and standardization product	1. Early contractor involvement for scope optimization 2. Standardized housing concepts/products 3. Balanced mix of customization options	X	X
Cc.	Delays project timeline	1. Effort-based lines for objection delays 2. High early payments for industrialized construction 3. Reserve a production slot to meet planning goals 4. Fast response and decision making	X	
Cd.	Transparency and risk allocation	1. Open-book policy for transparency 2. Balanced risk allocation client and contractor 3. Pain-sharing/gain-sharing for equal risk distribution 4. Pre-arranged price escalation clauses	(X)	(X)
Ce.	Penalties and rewards	1. Pre-arranged penalties to prevent negligence 2. Fair penalty in proportion to damaged suffered 3. Pre-arranged rewards to stimulate innovate solutions	(X)	(X)
Cf.	Guarantees	1. Include purchase and capacity guarantees 2. Allow flexibility in guarantees for external uncertainties	X	X

Cg.	Payment schedule	1. Ensure payments/milestones reflect executed work 2. Check financial positions to prevent payment issues	(X)	
Ch.	Quantity discount	1. Quantity discounts incentivizes housing associations 2. Fair discount in proportion to additional profit contractor		X
Ra.	Management of complex programs	1. Include managerial steering for (complex) programs	X	X
Rb.	Partnerships and trust	1. Solid partnerships are based on shared relational aspects 2. Partnerships and collaboration must be maintained 3. Consider individual, group, and organizational trust 4. Collective activities enhance trust	(X)	
Rc.	Collaboration	1. Keep daily attention on the managerial steering process 2. Relationship between individuals is key for collaboration 3. Ensure alignment between individual, company, and project 4. Flat organization structure with equal influence by position	(X)	
Rd.	Mutual interest	1. Closely involved municipalities 2. Closely involved contractors 3. Closely involved housing associations	X	
Re.	Team resilience	1. Strong and effective team resilience	(X)	(X)
Rf.	External stakeholders	1. Close communication with external stakeholders 2. Include monetary and non-monetary incentives	X	(X)

X=correlation with objective based on findings; (X)=correlation with objective that cannot be completely explained by the findings

7.2 Sub-question 2

Which governance elements are used within Bouwstroom initiatives?

For this sub-question, deductive codes formulated in the theoretical framework were analyzed for their presence in contractual documents for contractual ('C') governance elements. Deductive codes that were absent from the contractual documents but included in the theoretical framework are addressed in the interviews, along with the relational ('R') governance elements. The data used to answer this sub-question is derived from the WoonST 2.0 and NH Bouwstroom case studies. A summary of these findings is presented in Table 7.2. The table highlights several similarities between the two case studies, with notable differences primarily present within the contractual governance elements, such as early contractor involvement and the level of standardization. Preliminary optimizations, based on a cross-case analysis, will be discussed in the following section.

Table 7.2 Conclusion sub-question 2

Code	Element	Conclusion WoonST 2.0	Conclusion NH Bouwstroom
Ca.	PBC schedules and conditions	1. Single-phase integrated PBC schedule 2. Flexible PBC conditions	1. Two phase integrated PBC schedule 2. Flexible PBC conditions
Cb.	Project scope and standardization product	1. Early contractor involvement 2. High level of standardization 3. Some customization options	1. Barely early contractor involvement 2. Medium level of standardization 3. Many customization options
Cc.	Delays project timeline	1. No obligations to prevent objections 2. Payments after irrevocable permit	1. No obligations to prevent objections 2. Payments after irrevocable permit

		3. Production slot set after permit 4. Slow response and decision making	3. Production slot set after permit 4. Slow response and decision making
Cd.	Transparency and risk allocation	1. One one-book price for FA 2. Contractor is always liable 3. Barely no pain-sharing/gain-sharing 4. Price escalation clause in indexation	1. One one-book price per project 2. Contractor is always liable 3. Barely no pain-sharing/gain-sharing 4. No price escalation clause
Ce.	Penalties and rewards	1. Pre-arranged late delivery penalties 2. Negligence penalty for contractor only 3. No pre-arranged rewards	1. Pre-arranged late delivery penalties 2. Negligence penalty for both parties 3. No pre-arranged rewards
Cf.	Guarantees	1. No purchase and capacity guarantees 2. No flexibility, while no guarantees	1. No purchase and capacity guarantees 2. No flexibility, while no guarantees
Cg.	Payment schedule	1. Start work at first payment 2. Financial positions checked	1. At times start work before payments 2. Financial positions checked
Ch.	Quantity discount	1. General instead of quantity discount 2. Agreed general discount	1. No quantity discount 2. No (fair) quantity discount
Ci.	Inductive	1. Maintenance period for contractor	1. Maintenance period for contractor
Ra.	Management of complex programs	1. Managerial steering by Brink (external)	1. Internal managerial steering
Rb.	Partnerships and trust	1. Objective partner selection 2. Partnerships are maintained 3. Prior experiences influence trust 4. Collective activities are organized	1. Nearly objective partner selection 2. Partnerships are maintained 3. Current experiences influence trust 4. Collective activities are organized
Rc.	Collaboration	1. Less contractor and municipality 2. Working with trusted partners 3. Housing associations act conservative 4. Influential CEOs and aldermen	1. More contractor and CEOs 2. Working with trusted advisors 3. Housing associations act conservative 4. Influential CEOs
Rd.	Mutual interest	1. Program involved municipalities 2. High interest contractors 3. Mixed interest housing associations	1. Project involved municipalities 2. High interest contractors 3. Mixed interest housing associations
Re.	Team resilience	1. More cohesion between groups	1. More contractor involvement
Rf.	External stakeholders	1. Early dialogues accelerate processes 2. No governmental incentives included	1. Early dialogues accelerate processes 2. No governmental incentives included
Ci.	Inductive		1. Evaluating and consulting helps

PBC=Project Based Contract; FA=Framework Agreement; CEO=Chief Executive Officer Housing Association

7.3 Sub-question 3

What governance strategies can be implemented to improve the achievement of objectives within Bouwstroom initiatives?

In this sub-question, preliminary conclusions are drawn based on a cross-case analysis. The findings result from a combination of insights derived from sub-question 1 and sub-question 2, using both

publicly available academic literature and case-specific data from contractual documents and interviews of WoonST 2.0 and NH Bouwstroom. Figure 7.1 & Figure 7.2 present preliminary optimizations, categorized according to their correlation with lead time and costs. A strong correlation indicates that the correlation is supported by the research findings. In contrast, a weak correlation refers to correlations where a link with lead time or costs is suggested, but cannot be fully explained by the data collected. As shown in the figures, most optimizations appear to be more strongly associated with improving lead time rather than costs. Additionally, the research reveals that correlations tend to be either strong for both lead time and costs or weak for both. This pattern is influenced by the timeline of data collection during the research, for instance data such as the online dashboard, were obtained after the formulation of the theoretical framework. In general, optimizations identified in both the theoretical framework and the data collection chapter tend to show stronger correlations.

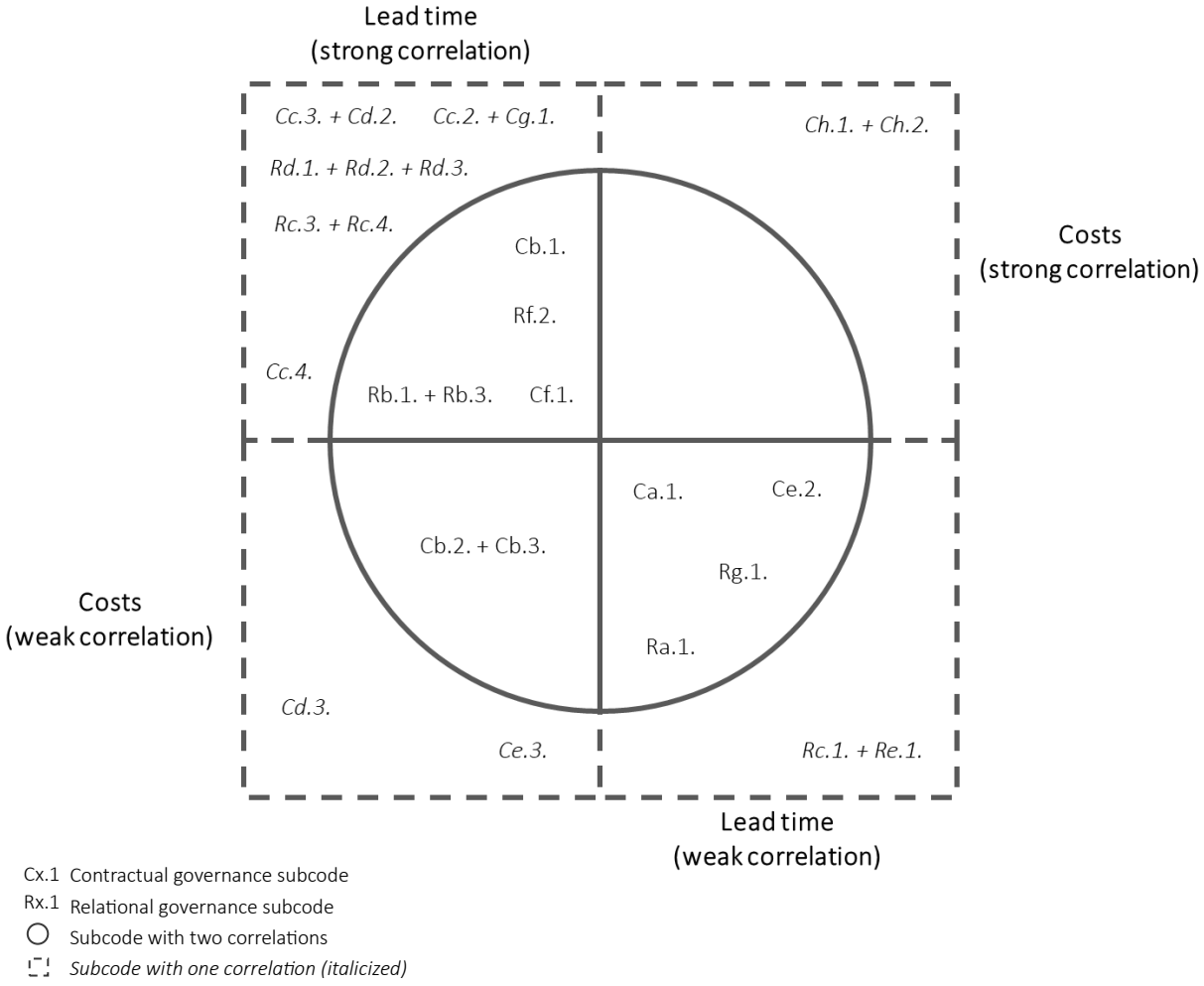


Figure 7.1: Conclusion sub-question 3, subcodes version (Own work, 2025)

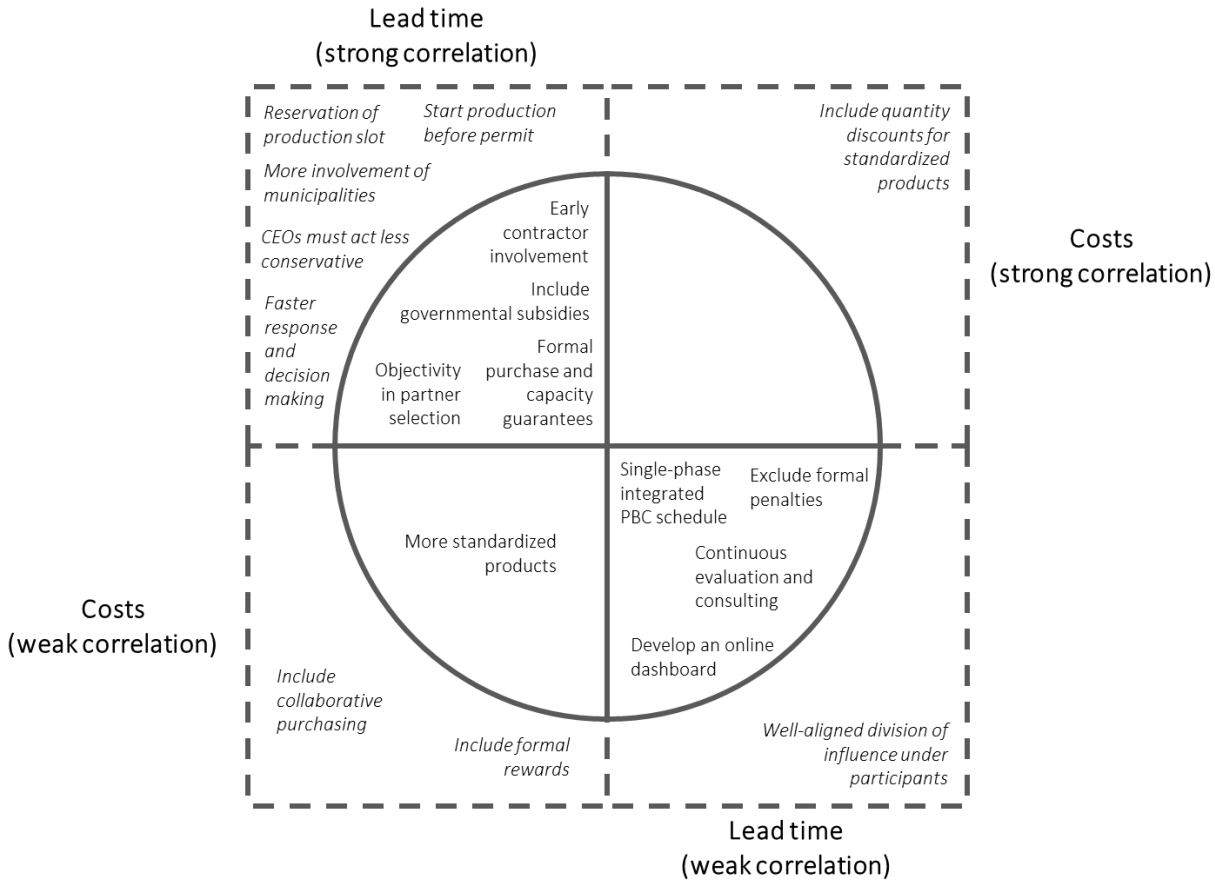


Figure 7.2: Conclusion sub-question 3, optimizations version (Own work, 2025)

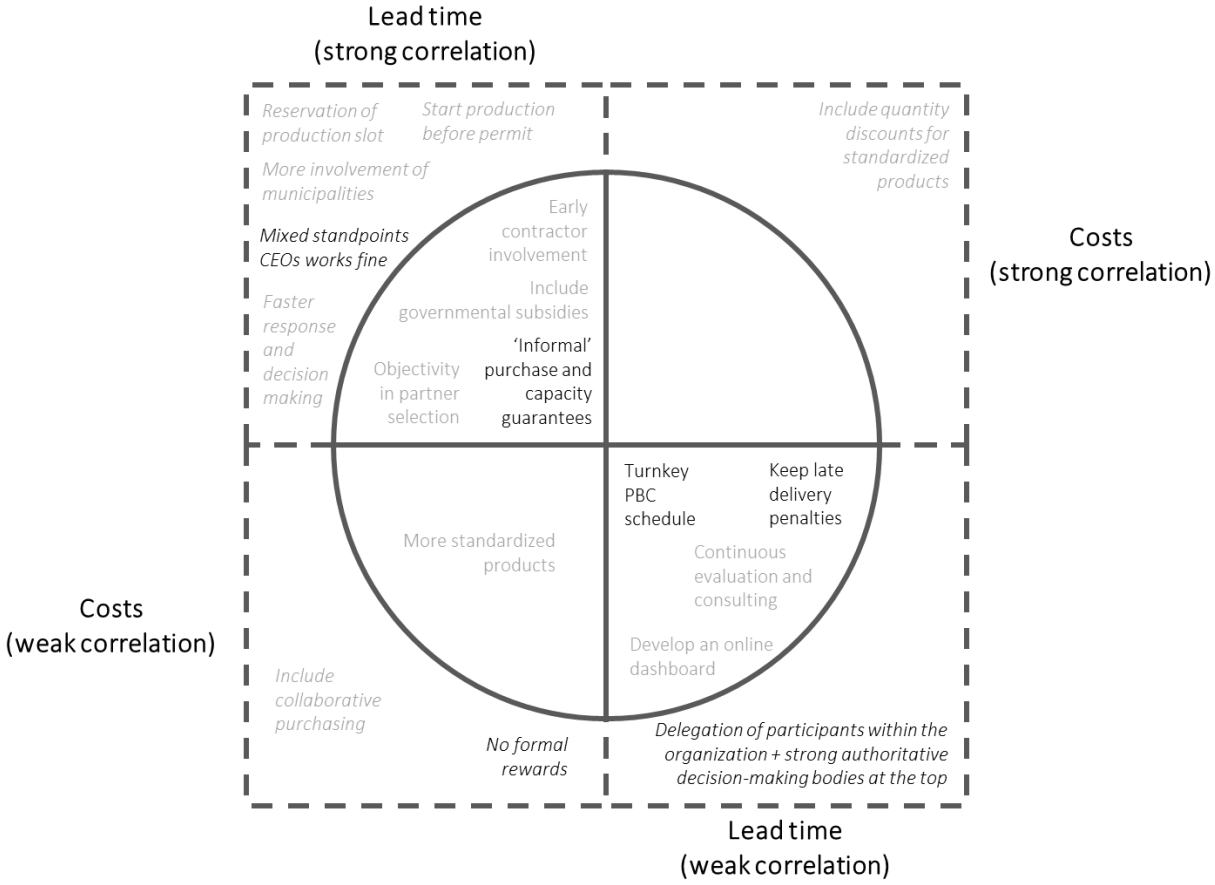
7.4 Sub-question 4

Which aspects might affect the practical feasibility of the proposed strategies?

An external expert critically assessed the preliminary conclusions from sub-question 3 regarding their practical feasibility. In this external assessment, both validations and falsifications were identified. The validated optimizations, which align with those in Figure 7.2, are shown in light grey in Figure 7.3. The falsified optimizations, which deviate from Figure 7.2, are shown in black in Figure 7.3. The reasoning behind the falsified optimizations presented in Figure 7.3 is explained in more detail below:

- Turnkey PBC schedules should be used to unburden housing associations that have limited in-house capacity, while also granting contractors the freedom to implement their own housing concepts.
- Delivering the building on schedule is essential, as housing associations have rental agreements in place with tenants. Therefore, delivery penalties must be maintained. Formal rewards, however, are not appropriate, as early delivery does not result in tenants moving in earlier.
- Housing associations consider formal purchase guarantees too risky. However, construction volume forecasts, based on other ongoing Bouwstroom initiatives rather than their own, often provide contractors with a reliable basis for planning. These forecasts are therefore treated as ‘informal’ purchasing guarantees and can serve as a meaningful indication of expected construction volumes. Contractors will only provide capacity guarantees if they have certainty in the form of a purchasing guarantee from the housing associations.

- Instead of involving all participants in every decision, a representative delegation is sufficient to maintain organizational clarity. In addition, strong, authoritative leadership from CEOs and aldermen at the top of the organizational structure enables faster decision-making processes.
- Not all CEOs of housing associations need to take a progressive stance for Bouwstroom initiatives to succeed. A mix of differing perspectives within the group can work effectively and even be beneficial.



XX Contractual or relational governance optimizations
XX External assessed alteration on preliminary contractual or relational governance optimizations
○ Optimization with two correlations
⁚ *Optimization with one correlation (italicized)*

Figure 7.3: Conclusion sub-question 4 (Own work, 2025)

7.5 Research question

Which governance elements can improve the achievement of objectives within Bouwstroom initiatives?

This study aims to identify which contractual and relational governance elements contribute to lower costs and shorter lead times in Bouwstroom initiatives. The study is based on data collected from scientific sources on effective contractual and relational governance elements in construction projects, case studies including contractual documents and interviews, and an external assessment of preliminary optimizations to test their practical feasibility. Table 7.3 presents the contractual and relational governance elements that support achieving the objectives of reduced lead time and cost. A standard 'X' denotes a correlation based on research findings, while a 'X' between brackets denotes a correlation that cannot be completely explained by the research findings.

Table 7.3 Conclusion research question

Code	Optimization	Lead time	Costs
Cb.1.	Early contractor involvement to enable scope optimization.	X	X
Cf.1.	Include purchase and capacity guarantees, preferably formal, but practically feasible 'informal' guarantees based on historical forecasts of construction volumes.	X	X
Rb.1. + Rb.3.	Ensure partner selection is based on objective product characteristics rather than prior positive experiences.	X	X
Rf.2.	Include subsidies for pre-financing construction activities prior to the permitting process, as well as for biobased solutions and innovations in factory equipment.	X	X
Cb.2. + Cb.3.	Incorporate a high level of standardized housing concepts. Individual housing associations should not or minimally modify these based on their own specific program of requirements.	X	(X)
Cc.2. + Cg.1.	Start production during or even before the permit and spatial planning procedures. High standardization allows for interchangeability, enabling relocation of produced dwellings if a permit is not granted.	X	
Cc.3. + Cd.2.	Reserve production slots in factories, with potential penalties for housing associations that fail to meet the scheduled timeslot.	X	
Cc.4.	Encourage faster decision-making among housing associations through intrinsic motivation, possibly reinforced by formal agreements.	X	
Rc.3. + Rc.4.	The success of Bouwstroom initiatives does not require all CEOs to take a progressive stance. A mix of perspectives can be advantageous.	X	
Rd.1. + Rd.2. + Rd.3.	Increase the involvement of municipalities to accelerate procedures and improve coordination.	X	
Ch.1. + Ch.2.	Include quantity discounts based on collectively achieved volumes. These are particularly effective when applied to standardized products.		X
Ca.1.	Implement Turnkey Project-Based Contract (PBC) schedules to unburden housing associations with limited internal capacity, while allowing contractors flexibility to apply their own housing concepts.	(X)	(X)
Ce.2.	Retain delivery penalties to safeguard housing associations, which often have binding rental agreements with tenants.	(X)	(X)

Ra.1.	Develop an online dashboard for knowledge sharing and continuous learning of program and project related topics. It can include, next to regular prices of standardized products, customization prices of additional options to improve price transparency upfront.	(X)	(X)
Rg.1.	Keep continuously evaluating and consulting with other projects, government bodies, and possibly other Bouwstroom initiatives.	(X)	(X)
Cd.3.	Design a 'werkgroep' for collaborative purchasing, particularly for major subcontractors and material suppliers, to achieve economies of scale.	(X)	
Ce.3.	Formal rewards, taking the start date of the rental agreements into account, are not appropriate, as early delivery does not result in tenants moving in earlier.	(X)	
Rc.1. + Re.1.	Include a representative delegation of participants within the executive organization to maintain efficiency. Additionally, strong and authoritative leadership by CEOs and aldermen at the top of the organizational structure is crucial for faster decision-making processes.		(X)

Cx.1.=contractual governance elements; Rx.1.=relational governance element; X=correlation with objective based on findings; (X)=correlation with objective that cannot be completely explained by the findings

Table 7.3 highlights that close collaboration, for example through an online dashboard, combined with active involvement of municipalities to accelerate procedures, and the use of highly standardized products within a Turnkey PBC schedule, which gives contractors flexibility and reduces the burden on housing associations, are key enablers of lower costs and shorter lead times.

Although Bouwstroom initiatives often emphasize the importance of soft relational aspects, which is also reflected in their events, this study shows that the most significant optimizations related to cost and lead time are primarily found in contractual governance elements.

In conclusion, this study identifies optimizations that support the achievement of objectives within Bouwstroom initiatives. However, it remains essential to acknowledge that each initiative is unique and requires tailor-made solutions.

7.6 Stakeholder-specific recommendations

From the previous sections can be learned that this research helps to improve Bouwstroom initiatives, but should not be interpreted as a universal conclusion applicable to all Bouwstroom initiatives or uniformly relevant to every stakeholder involved. The following sections include stakeholder-specific recommendations:

Housing associations and contractors

A Bouwstroom initiative is an unique program designed to create closer collaboration between housing associations and contractors. Therefore, the stakeholder-specific recommendations in this section are directed toward contracted participants within Bouwstroom initiatives as a whole rather than housing associations and contractors as individual entities. An important finding of this research is that contractual governance elements have a significantly greater impact on costs and lead time than relational governance elements. This is remarkable, given that Bouwstroom initiatives, through activities such as NH Bouwstroom Eendaagse and Verlovingsmarkten, are designed to emphasize relational dynamics and suggest that success is primarily driven by strong collaboration. However, the findings challenge this assumption. The following recommendations focus specifically on contractual governance elements and outline how participants can strengthen these aspects to better achieve their objectives within Bouwstroom initiatives:

- Include Turnkey PBC schedules to relieve housing associations of joint and several liability, while providing contractors with greater freedom to implement innovative solutions.
- Involve contractors earlier in the process to optimize the project scope based on their expertise. With the potential addition of other advisors, contractors can contribute valuable insights into cost and lead time considerations during the design phase. On a larger scale, this might include determining the ideal number of building levels, while on a smaller scale, it may concern the selection of window frame types.
- Maximize the use of standardized products. Customization features are still possible but should be kept to a minimum. A high level of standardization allows contractors to benefit from economies of scale and reduces both design and failure costs. It also leads to a more streamlined process, resulting in shorter lead times. For housing associations, standardization brings greater price certainty, especially if customization options are priced in advance as well. An important consideration is the indexation of these standardized prices, which must be mutually agreed upon by contractors and housing associations to ensure fairness.
- The contractor's building completion date is aligned with the start date of rental agreements between tenants and the housing association. This alignment implies the need of maintaining delivery penalties. However, there are many uncertainties that could delay the building completion date beyond the contractor's control. For this reason, to unburden the contractor and keep costs related to delivery penalty risks low, flexible terms considering the entering date of the rental agreement between tenants and housing associations must be included. Another way to mitigate this burden is to shift penalty responsibilities to the municipality. For instance, in Veldhoven, the municipality aims for a 100-day permit process. When a late building delivery occurs due to the permit process that takes longer than 100 days, a municipality could be held accountable in case that is agreed upfront. It should be noted, however, that this situation is rare, as rental agreements and delivery dates are often confirmed before or during the permitting process.
- Purchasing and capacity guarantees will ensure lower costs. These guarantees allow contractors to negotiate framework agreements with subcontractors and material suppliers at discounted rates. They also help to ensure shorter lead times through greater predictability, enabling production slot reservations and 'Just-in-Time' (JIT) delivery. While construction volume predictions, based on other ongoing Bouwstroom initiatives rather than their own, often serve as a valid assumption for contractors within their own Bouwstroom initiative, a mix between this 'informal', and besides that, 'formal' purchasing agreements would fit the best for Bouwstroom initiatives. Housing associations are often hesitant to provide formal guarantees due to high levels of uncertainty. A feasible solution could be to create Bouwstroom initiatives involving multiple housing associations and a limited number of contractors to distribute formal purchasing risk more evenly.
- Although evaluation and consultation already play an important role within Bouwstroom initiatives, the output of these sessions is often not captured or structured clearly. An online dashboard could significantly improve knowledge sharing and enhance continuous learning. This platform would facilitate the exchange of program- and project-related decisions and insights. Additionally, it could include not only the standard prices of products but also 'Project Specific Adaptation' (PSA) prices for customized options. Currently, detailed data of each single project within a Bouwstroom initiative is available for the contracted housing association and contractor. A centralized dashboard would enable broader data sharing, create 'fair' benchmark prices, and better align products of contractors with the specific needs of individual projects.

Municipalities and other governmental bodies

Both WoonST 2.0, with contractually involved municipalities, and NH Bouwstroom, with dedicated civil service support for projects like Brasa Village, show that active government involvement reduces procedural costs and shortens lead times. These examples highlight the importance of ensuring that municipalities, and where relevant other governmental bodies, are closely and actively engaged in Bouwstroom initiatives. The following points outline more detailed recommendations:

- Reduce the influence of individual stakeholders. Under the current Environment and Planning Act, individual civil servants and local residents can exert significant influence, often resulting in delays to construction projects. Incorporating multiple official perspectives in decision-making, or prioritizing only well-substantiated objections of locals, could significantly accelerate development processes.
- Implement a more active land policy. A more active approach to land policy would allow public authorities to have greater control over housing development. This recommendation is relevant not only to Bouwstroom initiatives but to broader housing development efforts as well.
- Promote Bouwstroom solutions to developers facing financial feasibility challenges by struggles to meet the 30% social housing requirement could consider adopting Bouwstroom dwellings, which may offer lower costs per unit, potentially leading to a financial feasible plan.
- Stimulate Bouwstroom initiatives through targeted monetary subsidies. Given the potential for shorter lead times, subsidies could be used to pre-finance standardized housing concepts during the permit phase. It is essential that these standardized concepts remain broadly applicable, for example including common floorplan measurements without fixed façade cladding, so that pre-financed dwellings do not become overly customized. Highly finished units may not align with the preferences of future clients, making them difficult to market. A relevant example is the case of the 2.000 dwellings initiated by Hugo de Jonge, some of which have remained in the temporary storage for over two years due to a mismatch between product and client (RTL, 2023). From a cost perspective, subsidies aimed at supporting innovation within housing production, such as for factory innovation equipment, can reduce the costs per unit in the long-term without increasing the upfront investment burden on housing associations. In terms of sustainability, additional subsidies could be made available to offset the additional costs associated with using biobased materials beyond standard construction costs.

Future researchers on this topic

This chapter discussed the results of this research. The following points may serve as a starting point for future researchers to build upon and further develop the findings of this study:

- Conduct extensive preliminary field research, because limited information is available through desk research, resulting in a more targeted search strategy and more effective data collection.
- Include more academically validated sources or governance elements proven effective in construction projects on topics which are not mentioned within the theoretical framework.
- Broaden the current objectives by incorporating the initiative phase for ‘lead time’ and adopting a TCO approach for ‘costs’. Additionally, expand the focus to include other key objectives within Bouwstroom initiatives, such as ‘sustainability’ and ‘innovation’, rather than solely on ‘lead time’ and ‘costs’.
- Implement current optimizations in ongoing Bouwstroom initiatives, such as a pilot project, to evaluate their impact. This can be done by comparing field research based on the current methodology with field research conducted on the pilot project.
- Make optimizations measurable by defining measurable outputs, for example, specifying an exact reduction in lead time or exact amount of costs.

- Broaden the sample size, for instance by including other Bouwstroom initiatives, different positions within affiliated organizations, government bodies, or external advisors.
- Conduct the research with multiple researchers to minimize tunnel vision and reduce bias.
- Base the research entirely on empirical results and academic literature, rather than (partly) on the logical reasoning of the researcher(s).

General public

Most people recognize the (affordable) housing shortage in the Netherlands. When laypersons are firstly introduced to Bouwstroom initiatives, they would often be positively surprised and may view these initiatives as a promising solution to the housing crisis. Based on the findings of this research, Bouwstroom initiatives indeed have the potential to contribute meaningfully to resolving the housing shortage. However, for these initiatives to succeed, it is important that the general public keeps the following guidelines in mind:

- Considering product factors, standardize to optimize efficiency. Develop a high level of standardization in floorplans, materials, and construction components to reduce consumer-specific preferences and limit the uniqueness of individual dwellings. This also applies to façade cladding: instead of defaulting to the traditional brick façades common in rural areas, standardized cladding should be applied consistently across neighborhoods. Additionally, standardized Bouwstroom dwellings typically offer a smaller gross floor area per person compared to traditional housing. While customization remains possible, it should be noted that any deviation from 'the standard' increases costs, lead times, or both.

Considering behavioral factors, encourage a cultural shift that discourages objection to new housing developments, such as objections based on the 'Not In My Backyard' (NIMBY) principle, to streamline the permitting process and minimize procedural delays.

References

Abdullah AL-Rabea, M. A. H., Javadi, M. H., & Jafarzadeh, S. (2024). The penalty for delay in the construction contract. *Linguistic and Philosophical Investigations, 23*(1), 1372-1379. https://philolinginvestigations.com/index.php/journal/article/view/255

Ahmed, R., & Jawad, M. (2022). Avoiding or disregarding: Exploring the relationship between scope creep, project complexity, and the success of construction projects. *Project Leadership and Society*, *3*, 100064. https://doi.org/10.1016/j.plas.2022.100064

Besluit bouwwerken leefomgeving (BBL). (2025). *Artikel 4.159 (milieuprestatie)*. Retrieved May 11, 2025, from https://www.bblonline.nl/docs/wet/bbl/hfd4/afd4.4/par4.4.2/art4.159?q=milieuprestatie

Bresnen, M., & Marshall, N. (2000). Partnering in construction: a critical review of issues, problems, and dilemmas. *Construction Management and Economics, 18*(2), 229-237. https://doi.org/10.1080/014461900370852

Bidgoli, M. M. (2023). Developing an All-Unit Quantity Discount Model with Complete and Incomplete Information: A Bertrand Competition Framework. *Interdisciplinary Journal of Management Studies, 16*(2), 355-373. https://doi.org/10.22059/ijms.2022.319955.674458

Brink. (2023). *Evaluatie WoonST 1.0: Stedelijk Gebied Eindhoven* [Internal report].

Brink. (2024). *Selectieleidraad: Grondgebonden Woningen Bouwstroom Limburg* [Internal report].

Brink. (2025). Procurement agreed planning contractor WoonST 2.0 [Internal presentation]. Brink.

CBS. (2024). *Voorraad woningen; eigendom, type verhuurder, bewoning, regio.* Retrieved January 13, 2025, from https://opendata.cbs.nl/#/CBS/nl/dataset/82900NED/table

Chammout, B., El-adaway, I. H., Abdul Nabi, M., & Assaad, R. H. (2024). Price escalation in construction projects: Examining national and international contracts. *Journal of Construction Engineering and Management, 150*(9). https://doi.org/10.1061/JCEMD4.COENG-13918

Chappell, D. (2021). *Construction Contracts : Questions and Answers (4th ed.)*. CRC Press LLC. https://ebookcentral-proquest-com.tudelft.idm.oclc.org/lib/delft/detail.action?docID=6371937

Chow, P. T., Cheung, S. O., & Chan, K. Y. (2012). Trust-building in construction contracting: Mechanism and expectation. *International Journal of Project Management, 30,* 927-937. https://doi.org/10.1016/j.ijproman.2012.03.002

Crone, J., Cüsters, J., SEV Realisatie, Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, & Ministerie van Economische Zaken (1946-2010). (2007). *Leren door demonstreren : de oogst van zeven jaar industrieel, flexibel en demontabel bouwen*. SEV realisatie.

De Schepper, S., Dooms, M., & Haezendonck, E. (2014). Stakeholder dynamics and responsibilities in Public-Private Partnerships: A mixed experience. *International Journal of Project Management, 32*(7), 1210-1222. https://doi.org/10.1016/j.ijproman.2014.01.006

Delta Advocaten. (2025). *Bouwcontracten*. Retrieved May 11, 2025, from https://delta-advocaten.nl/modellen/bouw/

Dutch Green Building Council (DGBC). (2021). *Whole life carbon: Position paper (*Version 1.1*).*

Fagerhaug, A. N., Andersen, B. S., Memić, N., & Tadayon, A. (2024). Exploring the use of incentive mechanisms in designer contracts within the construction industry. *Procedia Computer Science, 239*, 962-973. https://doi.org/10.1016/j.procs.2024.06.258

Flux Partners. (2025). *Turnkey*. Retrieved May 11, 2025, from https://flux.partners/kennisbank/contractvormen/turnkey/

Gerth, R., Boqvist, A., & Bjelkemyr, M., & Lindberg, B. (2013). Design for construction: utilizing production experiences in development. *Construction Management and Economics, 31*(2), 135-150. https://doi.org/10.1080/01446193.2012.756142

Güler, T. (2022). *Program management in regional social housing construction programs: An*

explorative research to the application of program management in the 'Bouwstroom' programs (Master's thesis, TU Delft). TU Delft Repository. https://resolver.tudelft.nl/uuid:e3f49294-a3fa-459b-a90c-9241a5e5a6bb

Guo, F., Y. Chang-Richards, S. Wilkinson, & T. C. Li. (2014). Effects of Project Governance Structures on the Management of Risks in Major Infrastructure Projects: A Comparative Analysis. *International Journal of Project Management, 32*(5), 815-826. https://doi.org/10.1016/j.ijproman.2013.10.001.

Han, H., J. Shen, B. Liu, & H. Han. (2022). Dynamic Incentive Mechanism for Large-Scale Projects Based on the Reputation Effects. *SAGE Open*, *12*(4). https://doi.org/10.1177/21582440221133280.

Hart, J., D'Amico, B., & Pomponi, F. (2021). Whole-life embodied carbon in multistory buildings: steel, concrete and timber structures. *Journal of Industrial Ecology, 25*(2), 403-418. https://doi.org/10.1111/jiec.13139

Hofer, K., Wicki, M., & Kaufmann, D. (2024). Public support for participation in local development. *World Development, 178,* 106569. https://doi.org/10.1016/j.worlddev.2024.106569

Jacomit, A. M., Granja, A. D., & Picchi, F. A. (2008). Target costing research analysis: Reflections for construction industry implementation. *16th Annual Conference of the International Group for Lean Construction,* 601-612. https://www.iglc.net/papers/details/576

Kadefors, A. (2004). Trust in project relationships—inside the black box. *International Journal of Project Management, 22*(3), 175-182. https://doi.org/10.1016/S0263-7863(03)00031-0

Khadim, N., Thaheem, M. J., Ullah, F., & Mahmood, M. N. (2023). Quantifying the cost of quality in construction projects: an insight into the base of the iceberg. *Quality & Quantity, 57,* 5403-5429. https://doi.org/10.1007/s11135-022-01574-8

KOMO. (2024). *Zes fabrikanten ontvangen eerste KOMO-certificaat typegoedkeuring modulaire woningen*. Retrieved March 10, 2025, from https://www.komo.nl/blog/zes-fabrikanten-ontvangen-eerste-komo-certificaat-typegoedkeuring-modulaire-woningen/

Koolwijk, J. S. J., & Warmelink, J. W. F. (2023). *Het juiste woningconcept voor ieder project Versnelling van de bouwproductie en kwaliteit door inzicht in woningconcepten.* Delft University of Technology

Kramer, R. M. (1999). Trust and distrust in organizations: emerging perspectives, enduring questions. *Annual Review of Psychology, 50*, 569-598. https://doi.org/10.1146/annurev.psych.50.1.569

Kurup, P., Pless, S., & Grosskopf, K.. (2024). *Understanding the Challenges of Financing Modular Construction: A Case Study for Prospective Multifamily Units.* National Renewable Energy Laboratory. https://www.nrel.gov/docs/fy24osti/89296.pdf

Langston, C. (2013). Development of generic key performance indicators for PMBOK using a 3D project integration model. *Australasian Journal of Construction Economics and Building, 13*(4), 78-91. https://doi.org/10.5130/ajceb.v13i4.3658

Lau, E., & Rowlinson, S. (2010). Interpersonal trust and inter-firm trust in construction projects. *Construction Management and Economics, 27*(6), 539-554. https://doi.org/10.1080/01446190903003886

Lente-Akkoord 2.0. (2022). *Bouwstromen: bundeling van vraag essentieel.* Retrieved November 8, 2024, from https://www.lente-akkoord.nl/nieuws/bouwstromen-bundeling-van-vraag-essentieel

Li, J., Luo, X., Wang, Q., & Zhou, W. (2021). Supply chain coordination through capacity reservation contract and quantity flexibility contract. *Omega, 99*, 102195. https://doi.org/10.1016/j.omega.2020.102195

Li, L., Yi, Z., Zhang, S., & Shao, Z. (2023). Competitive threat or win-win cooperation? Evolutionary analysis of digital alliances in construction. *Developments in the Built Environment, 15,* 100182. https://doi.org/10.1016/j.dibe.2023.100182

Liu, T., Chong, H.Y., Zhang, W., Lee, C.Y., & Tang, X. (2022). Effects of contractual and relational governances on BIM collaboration and implementation for project performance improvement. *Journal of Construction Engineering and Management, 148*(6). https://doi.org/10.1061/(ASCE)CO.1943-7862.0002285

Loo, A. (2025). *Economies of Scale.* Corporate Finance Institute (CFI). Retrieved June 19, 2025, from https://corporatefinanceinstitute.com/resources/economics/economies-of-scale/

Lui, S. S., Y. Y. Wong, & W. Liu. (2009). Asset Specificity Roles in Interfirm Cooperation: Reducing Opportunistic Behavior or Increasing Cooperative Behavior? *Journal of Business Research, 62*(11), 1214-1219. https://doi.org/10.1016/j.jbusres.2008.08.003

Manders, B. (2025). Pricing schedule scope optimization [Internal information]. Brink.

Meng, X. (2012). The effect of relationship management on project performance in construction. *International Journal of Project Management, 30*(2), 188-198. https://doi.org/10.1016/j.ijproman.2011.04.002

Munson, C. L., & Hu, J. (2010). Incorporating quantity discounts and their inventory impacts into the centralized purchasing decision. *European Journal of Operational Research, 201*(2), 581-592. https://doi.org/10.1016/j.ejor.2009.03.043

NCB. (n.d.). *Programma De Bouwstroom.* Retrieved January 7, 2025, from https://www.conceptueelbouwen.nl/debouwstroom?

Netwerk Conceptueel Bouwen (NCB). (2022). *Twee-fasen-overeenkomst voor conceptueel bouwen*.

NH Bouwstroom. (2025). *Nieuws*. Retrieved March 11, 2025, from https://www.nhbouwstroom.nl/nieuws/

NOS. (2023). *Nog veel geplande flexwoningen ongebouwd, buurt maakt vaak bezwaar*. Retrieved February 25, 2025, from https://nos.nl/artikel/2474580-nog-veel-geplande-flexwoningen-ongebouwd-buurt-maakt-vaak-bezwaar

Ortiz-Gonzalez, J. I., Duran-Heras, A., & Castilla-Alcala, G. (2022). Why Do Traditional Project Management Methods Hinder the Competitiveness of the Construction Industry? In *Ensuring Sustainability (*pp. 225-232). Springer. https://doi.org/10.1007/978-3-030-95967-8_20

Parteon. (2024). *Versnellen woningbouw: hoe doen we dat?* Retrieved April 2, 2025, from https://vtw.nl/data/media/VTW%20Betaalbaar%20Bouwen%20NH%20Bouwstroom%2020240606.pdf

Ponte, J. (2024). *Bouwstromen: schaalvergroting als wapen in de strijd tegen stijgende kosten en vertraging*. Retrieved November 29, 2024, from https://www.service-studievereniging.nl/magazine/artikel/bouwstromen-schaalvergroting-als-wapen-in-de-strijd-tegen-stijgende-kosten-en-vertraging/

Rahman, M. M., & Kumaraswamy, M. M. (2002). Joint risk management through transactionally efficient relational contracting. *Construction Management and Economics, 20*(1), 45-54. https://doi.org/10.1080/01446190110089682

Rahman, M. M., & Kumaraswamy, M. M. (2008). Relational contracting and teambuilding: Assessing potential contractual and noncontractual incentives. *Journal of Management in Engineering, 24*(1), 48-63. https://doi.org/10.1061/(ASCE)0742-597X(2008)24:1(48)

Rönndahl, C., Bosch-Sijtsema, P., Rempling, R., & Karlsson, M. (2025). Making sense of collaboration in major infrastructure construction projects. *Project Leadership and Society, 6,* 100178. https://doi.org/10.1016/j.plas.2025.100178

RTL. (2023). *Nog Voor 190 miljoen aan flexwoningen in opslag ministerie*. Retrieved June 17, 2025, from https://www.rtl.nl/rtl-nieuws/rtl-z/artikel/5400583/er-staan-voor-190-miljoen-aan-flexwoningen-opslag-ministerie

Siddiquei, A. N., Ahmad, S., & Asmi, F. (2025). Fostering team resilience with servant leadership: A multi- level study of the construction industry. *Acta Psychologica, 253,* 104732. https://doi.org/10.1016/j.actpsy.2025.104732

Stein, A. (2016). *Disruptive Development: Modular Manufacturing in Multifamily Housing*. Terner Center for Housing Innovation, University of California, Berkeley. https://ternercenter.berkeley.edu/wp-content/uploads/pdfs/A.Stein_PR_Disruptive_Development_-_Modular_Manufacturing_in_Multifamily_Housing.pdf

Suprapto, M., Bakker, H. L. M., & Mooi, H. G. (2015). Relational factors in owner–contractor

collaboration: The mediating role of teamworking. *International Journal of Project Management, 33*(6), 1347-1363. https://doi.org/10.1016/j.ijproman.2015.03.015

Tadelis, S. (2012). Public Procurement Design: Lessons from the Private Sector. *International Journal of Industrial Organization, 30*(3), 297-302. https://doi.org/10.1016/j.ijindorg.2012.02.002

TenderNed. (2025). *Raamovereenkomst voor de nieuwbouw van gestandaardiseerde legeringsgebouwen voor Defensie*. Retrieved May 20, 2025, from https://www.tenderned.nl/aankondigingen/overzicht/375977

Tulokas, M., Haapasalo, H., & Tampio, K. P. (2024). Formation and maintenance of organizational culture in collaborative hospital construction projects. *Project Leadership and Society, 5,* 100125. https://doi.org/10.1016/j.plas.2024.100125

TwynstraGudde. (2024). *De Bouwstromen: Onderzoek naar het succes, de lessen en de toekomst van de Bouwstromen* (Version 1.3). In opdracht van Aedes, in samenwerking met Netwerk Conceptueel Bouwen, De Bouwcampus en het Ministerie van Binnenlandse Zaken en Koninkrijksrelaties.

Valstar, D. (2025). *Plan voor flexwoningen in Den Hoorn vlakbij A4 stuit op weerstand: 'Recept voor gettovorming'. Algemeen Dagblad.* Received on 25 February 2025 from, https://www.ad.nl/midden-delfland/plan-voor-flexwoningen-in-den-hoorn-vlakbij-a4-stuit-op-weerstand-recept-voor-gettovorming~a9f1f6d8/

Winch, G. (2010). *Managing construction projects: an information processing approach (2nd ed.).* Wiley- Blackwell. https://www.wiley.com/en-us/Managing%2BConstruction%2BProjects%2C%2B2nd %2BEdition-p-9781405184571

Wong, P. S. P., & Cheung, S. O. (2004). Trust in construction partnering: views from parties of partnering dance. *International Journal of Project Management, 22*(6), 437-446. https://doi.org/10.1016/j.ijproman.2004.01.001

Wong, P. S. P., Cheung, S. O., & Ho, P. K. M. (2008). Governance and trust in project delivery. *International Journal of Project Management, 26*(8), 821-829. https://doi.org/10.1016/j.ijproman.2007.11.004

Wu, A., Z. Wang, & S. Chen. (2017). Impact of Specific Investments, Governance Mechanisms and Behaviors on the Performance of Cooperative Innovation Projects. *International Journal of Project Management, 35*(3), 504-515. https://doi.org/10.1016/j.ijproman.2016.12.005

Yang, L. R., Huang, C. F., & Wu, K. S. (2011). The association among project manager's leadership style, teamwork and project success. *International Journal of Project management, 29,* 258-267. https://doi.org/10.1016/j.ijproman.2010.03.006

Yeung, J. F. Y., Chan, A. P. C., & Chan, D. W. M. (2012). Defining relational contracting from the Wittgenstein family-resemblance philosophy. *International Journal of Project Management, 30*(2), 225-239. https://doi.org/10.1016/j.ijproman.2011.06.002

Zheng, J., Roehrich, J. K., & Lewis, M. A. (2008). The dynamics of contractual and relational governance: Evidence from long-term public-private procurement arrangement. *Journal of Purchasing and Supply Management, 14*(1), 43-54. https://doi.org/10.1016/j.pursup.2008.01.004

Zheng, Z., Lu, Y., & Wang, Z. (2024). Effects of Contractual and Relational Governance on Project Performance: Evidence from Construction Projects. *Buildings, 14*(10), 3185. https://doi.org/10.3390/buildings14103185

Zhou, X.Y., Zhu, Q.H., & Xu, Z.D. (2023). The role of contractual and relational governance for the success of digital traceability: Evidence from Chinese food producers. *International Journal of Production Economics,* 255. https://doi.org/10.1016/j.ijpe.2022.108659

Zidane, Y. J. T., Andersen, B., Johansen, A., & Ahmad, S. (2016). 'Need for Speed': Framework for Measuring Construction Project Pace – Case of Road Project. *Procedia - Social and Behavioral Sciences*, 226, 12-19. https://doi.org/10.1016/j.sbspro.2016.06.156

Appendices

Appendix A – Interview questions data collection chapter

A.1 WoonST 2.0 - Woningcorporatie

Relationele aspecten:

1. Uit mijn analyse van de documenten blijkt dat aannemers zijn geselecteerd o.b.v. productkenmerken. Waarom worden in een raamcontract partners niet meer geselecteerd o.b.v. relationele aspecten zoals samenwerking, vertrouwen en DNA? Hoe denk jij hier over?
2. In WoonST werk je met meerdere woningcorporaties, aannemers en gemeentes. Daarnaast zitten binnen deze organisaties ook nog eens verschillende mensen. Werk je (dit mag ook breder dan de WoonST):
    a. Liever met bepaalde organisaties;
    b. Liever met bepaalde mensen binnen organisaties?
    c. Merk je dat je stiekem toch wel eens de voorkeur geeft aan een aannemer, gemeente, of adviseur o.b.v. eerdere samenwerkingen of ga je er elke keer geheel blanco in?

    Denk je dat dit nog beter binnen de WoonST georganiseerd kan worden?
3. Dit (schema laten zien) is het organisatieschema van WoonST. Denk je dat deze werkwijze goed is?
    a. Denk je dat er nog meer ruimte is voor samenwerking en afstemming tussen bepaalde groepen en overleggen?
    b. Merk je dat er bepaalde belangen van posities binnen bedrijven zwaarder of lichter wegen (bijvoorbeeld bestuurder vs. projectmanager)?
4. WoonST is een raamovereenkomst waarbij 'intentie' een grote rol speelt. Hoe wordt er binnen de organisatie gezorgd voor genoeg aandacht over dit onderwerp?
    a. Is dit wel eens een punt van aandacht en wordt dit wel een besproken?
    b. Wordt de gehele organisatie betrokken of een deel, wat zijn de verhoudingen?
5. Omgevingsvergunningen zijn een grotere onzekerheid. Binnen WoonST zijn gemeentes betrokken.
    a. Hoe zien jullie de rol van gemeentes hierin?
    b. Wat doen jullie om bezwaren van de omgeving te voorkomen?
6. WoonST is een innovatief partnerschap.
    a. Worden jullie gesubsidieerd, en zo ja/nee hoe denk je hier over?

Contractuele aspecten:

1. Uit WoonST komt naar voren dat jullie een gezamenlijk doel hebben, zoals betaalbare woningen. Dit doel is eigenlijk vooral bedoeld, waarbij aannemers waarschijnlijk, als marktpartij, op winstmaximalisatie doelen. Hoe gaan jullie hier mee om?
2. Er wordt nu gebruik gemaakt van prijsaanbieding o.b.v. een open begroting. Hoe kijk je aan tegen het delen van winsten en verliezen voor de inkoop van materialen, onderaannemers en onderhoud? Willen jullie liever prijsvastheid of een eerlijkere prijs?
3. De WoonST werkt met 'vaste' concepten. Hoe vaak zijn project specifieke aanpassingen (PSA's) benodigd?
    a. Hoe kijken jullie naar de betrouwbaarheid van de prijs van deze PSA's?
    b. Hoe kijken jullie tegen indexering/PSA's aan?
    c. Zijn ondanks de PSA's toch de vaste concepten sneller i.v.t. traditionele bouw?

4. Hoe kijken jullie tegen een 2 fasen model aan waarbij de aannemer verantwoordelijk is voor oplevering van ontwerp tot vergunning en uitvoering, maar geen verantwoordelijkheden heeft tijdens het vergunningstraject m.b.t. tijd?
5. Er zijn nu boetes opgenomen in het contract voor late oplevering. Hoe kijken jullie anderzijds tegen bonussen aan, bijvoorbeeld voor snellere oplevering of een kostenefficiënte oplossing voor het onderhoud?
6. Aannemers geven een capaciteitsgarantie af, maar woningcorporaties geen afnamegarantie. Vinden jullie dit eerlijk?
    a. Hoe gaan jullie om met het reserveren van productieruimte voor prefabriceerde elementen tijdens de uitvoering, bijvoorbeeld stel bepaalde elementen kunnen niet tijdig worden geleverd door onzekerheid in de vergunningsfase; wanneer wordt er gestart met bouwen?
7. Gezien er een 'gestandaardiseerd' concept is. Hoe denken jullie over een stimulans voor afname per project, bijvoorbeeld 5% korting bij 50 woningen en 10% korting bij 100 woningen?

Overige aspecten (indien tijd over):

1. Hoe kijken jullie naar scope optimalisatie, bijvoorbeeld voor een 3 laags gebouw is minder fundering en dak benodigd in vergelijking tot een 1 laags gebouw. Bekijken jullie dit grondig van te voren?
2. Hoe betrouwbaar is de onderhoudsprijs van de onderhoudsperiode van de aannemer? Zij zitten ten slotte 1 op 1 aan tafel? Kan dit wellicht ook een extern bedrijf doen?
3. Er zijn verschillende overleggen en groepen binnen WoonST, is Brink degene die de overkoepelende proces manager is?
    a. Zit hier nog ruimte voor verbetering in?

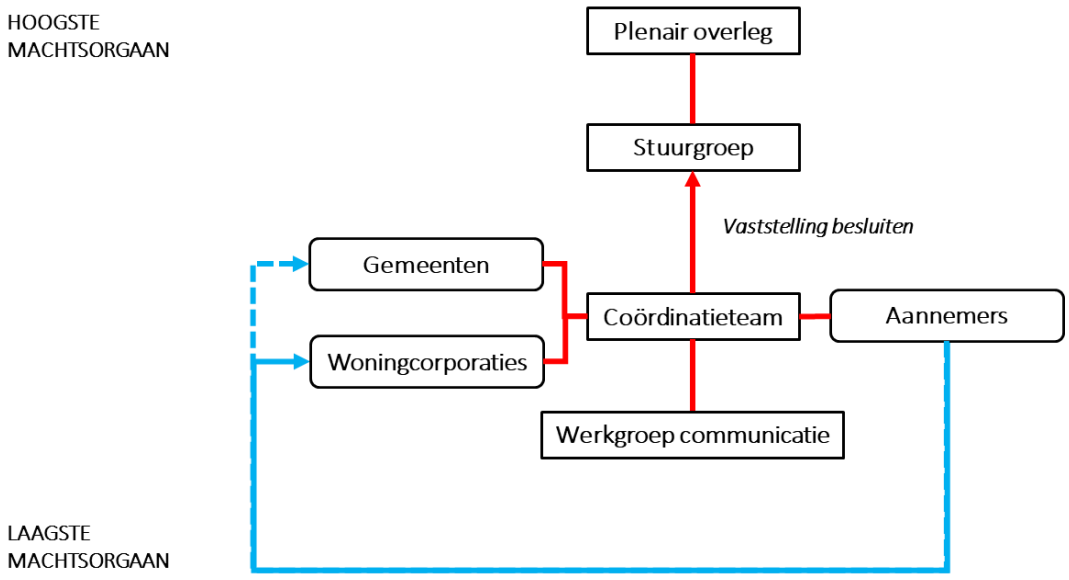


Figure 3.1: Organization structure WoonST 2.0 (Brink, 2023; Own work, 2025)

A.2 WoonST 2.0 - Aannemer

Relationele aspecten:

1. In WoonST werk je met meerdere woningcorporaties, aannemers en gemeentes. Daarnaast zitten binnen deze organisaties ook nog eens verschillende mensen. Werk je (dit mag ook breder dan de WoonST):
    a. Liever met bepaalde organisaties;
    b. Liever met bepaalde mensen binnen organisaties?
    c. Merk je dat je stiekem toch wel eens de voorkeur geeft aan een opdrachtgever, gemeente, of adviseur o.b.v. eerdere samenwerkingen of ga je er elke keer geheel blanco in?

    Denk je dat dit nog beter binnen de WoonST georganiseerd kan worden?
2. Dit (schema laten zien) is het organisatieschema van WoonST. Denk je dat deze werkwijze goed is?
    a. Denk je dat er nog meer ruimte is voor samenwerking en afstemming tussen bepaalde groepen en overleggen?
    b. Merk je dat er bepaalde belangen van posities binnen bedrijven zwaarder of lichter wegen (bijvoorbeeld directeur vs. projectmanager)?
3. WoonST is een raamovereenkomst waarbij 'intentie' een grote rol speelt. Hoe wordt er binnen de organisatie gezorgd voor genoeg aandacht over dit onderwerp?
    a. Is dit wel eens een punt van aandacht en wordt dit wel een besproken?
    b. Wordt de gehele organisatie betrokken of een deel, wat zijn de verhoudingen?
4. Omgevingsvergunningen zijn een grotere onzekerheid. Binnen WoonST zijn gemeentes betrokken.
    a. Hoe zien jullie de rol van gemeentes hierin?
    b. Wat doen jullie om bezwaren van de omgeving te voorkomen?
5. WoonST is een innovatief partnerschap.
    a. Worden jullie gesubsidieerd, en zo ja/nee hoe denk je hier over?

Contractuele aspecten:

1. Uit WoonST komt naar voren dat jullie een gezamenlijk doel hebben, zoals betaalbare woningen. Hoe denken jullie als marktpartij over zo goedkoop mogelijke woningen aanbieden vs. winstmaximalisatie? Speelt continuïteit een rol?
2. Er wordt nu gebruik gemaakt van prijsaanbieding o.b.v. een open begroting. Hoe kijk je aan tegen het delen van winsten en verliezen voor de inkoop van materialen, onderaannemers en onderhoud?
3. De WoonST werkt met 'vaste' concepten. Hoe vaak zijn project specifieke aanpassingen (PSA's) benodigd?
    a. Hoe kijken jullie tegen indexering/PSA's aan?
    b. Zijn ondanks de PSA's toch de vaste concepten sneller i.v.t. traditionele bouw?
4. Hoe kijken jullie tegen een 2 fasen model aan waarbij de aannemer verantwoordelijk is voor oplevering van ontwerp tot vergunning en uitvoering, maar geen verantwoordelijkheden heeft tijdens het vergunningstraject m.b.t. tijd?
5. Er zijn nu boetes opgenomen in het contract voor late oplevering. Hoe kijken jullie anderzijds tegen bonussen aan, bijvoorbeeld voor snellere oplevering of een kostenefficiënte oplossing voor het onderhoud?
6. Aannemers geven een capaciteitsgarantie af, maar woningcorporaties geen afnamegarantie. Vinden jullie dit eerlijk?

    a. Hoe gaan jullie om met het reserveren van productieruimte voor prefabriceerde elementen tijdens de uitvoering, bijvoorbeeld stel bepaalde elementen kunnen niet tijdig worden geleverd door onzekerheid in de vergunningsfase; wanneer wordt er gestart met bouwen?
7. Gezien er een 'gestandaardiseerd' concept is. Hoe denken jullie over een stimulans voor afname per project, bijvoorbeeld 5% korting bij 50 woningen en 10% korting bij 100 woningen?

Overige aspecten (indien tijd over):

1. Hoe kijken jullie er als aannemer tegenaan om eerder in het traject betrokken te zijn m.b.t. scope optimalisatie? Bijvoorbeeld voor een 3 laags gebouw is minder fundering en dak benodigd in vergelijking tot een 1 laags gebouw. Als aannemer kunnen jullie wellicht de woningcorporatie hierin met eerste ramingen en advies ondersteunen.
2. Hoe organiseren jullie de onderhoudsperiode, doen jullie dit zelf of besteden jullie dit uit? Kan dit wellicht efficiënter?
3. Er zijn verschillende overleggen en groepen binnen WoonST, is Brink degene die de overkoepelende proces manager is?
    a. Zit hier nog ruimte voor verbetering in?

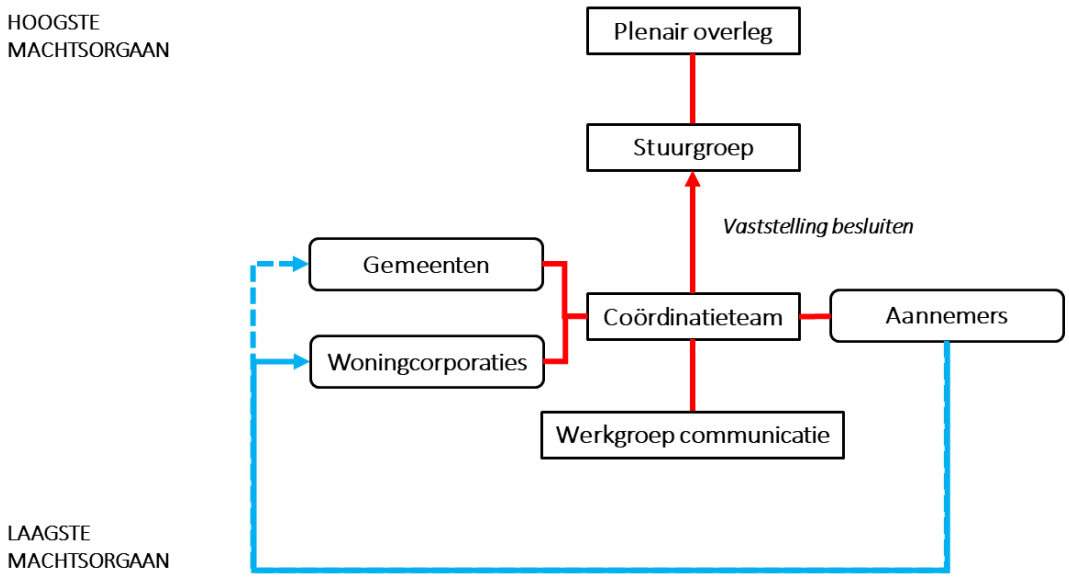


Figure 3.1: Organization structure WoonST 2.0 (Brink, 2023; Own work, 2025)

A.3 NH Bouwstroom - Woningcorporatie

Relationele aspecten:

1. Uit mijn analyse van de documenten blijkt dat aannemers voornamelijk zijn geselecteerd o.b.v. productkenmerken. Waarom worden in een raamcontract partners niet meer geselecteerd o.b.v. relationele aspecten zoals samenwerking, vertrouwen en DNA? Hoe denk jij hier over?
2. In NH Bouwstroom werk je met meerdere woningcorporaties en aannemers. Daarnaast zitten binnen deze organisaties ook nog eens verschillende mensen. Werk je (dit mag ook breder dan de NH Bouwstroom):
    a. Liever met bepaalde organisaties;
    b. Liever met bepaalde mensen binnen organisaties?
    c. Merk je dat je stiekem toch wel eens de voorkeur geeft aan een aannemer, gemeente, of adviseur o.b.v. eerdere samenwerkingen of ga je er elke keer geheel blanco in?

    Denk je dat dit nog beter binnen de NH Bouwstroom georganiseerd kan worden?
3. Dit (schema laten zien) is het organisatieschema van NH Bouwstroom. Denk je dat deze werkwijze goed is?
    a. Denk je dat er nog meer ruimte is voor samenwerking en afstemming tussen bepaalde groepen en overleggen (bijvoorbeeld door sessies als de Bouwstroom Eendaagse)?
    b. Merk je dat er bepaalde belangen van posities binnen bedrijven zwaarder of lichter wegen (bijvoorbeeld bestuurder vs. projectmanager)?
4. NH Bouwstroom is een raamovereenkomst waarbij ‘intentie’ een grote rol speelt zonder afname- en capaciteitsgaranties. Hoe wordt er binnen de organisatie gezorgd voor genoeg aandacht over dit onderwerp?
    a. Is dit wel eens een punt van aandacht en wordt dit wel een besproken?
    b. Wordt de gehele organisatie betrokken of een deel, wat zijn de verhoudingen?
5. Omgevingsvergunningen zijn een grotere onzekerheid. Binnen NH Bouwstroom zijn gemeentes niet contractueel betrokken.
    a. Hoe zien jullie de rol van gemeentes hierin?
    b. Wat doen jullie om bezwaren van de omgeving te voorkomen?
6. NH Bouwstroom is een innovatief partnerschap.
    a. Worden jullie gesubsidieerd, en zo ja/nee hoe denk je hier over?

Contractuele aspecten:

1. Uit NH Bouwstroom komt naar voren dat jullie een gezamenlijk doel hebben, zoals betaalbare woningen. Dit doel is eigenlijk vooral bedoeld, waarbij aannemers waarschijnlijk, als marktpartij, op winstmaximalisatie doelen. Hoe gaan jullie hier mee om?
2. Aannemers stellen in fase 2 een prijs op, op basis van een taakstellend budget. Zien jullie dit als pre i.v.t. prijsconcurrentie?
    a. Hoe kijk je aan tegen het delen van winsten en verliezen voor de inkoop van materialen, onderaannemers en onderhoud? Willen jullie liever prijsvastheid (taakstellend budget) of een eerlijkere prijs?
3. De NH Bouwstroom werkt met ‘vaste’ concepten. Hoe vaak zijn project specifieke aanpassingen (PSA’s) benodigd t.o.v. het ‘vaste’ concept?
    a. Hoe vaak komen deze PSA’s voor en is er nog efficiëntie te winnen door meer het ‘vaste’ concept toe te passen?
    b. Zijn ondanks de PSA’s toch de vaste concepten sneller i.v.t. traditionele bouw?
4. Op dit moment passen jullie (meestal) een 2 fasen contract op met weinig verantwoordelijkheden m.b.t. het vergunningstraject. Denken jullie dat het traject sneller

doorlopen zal worden als je voor een 1 fase contractvorm kiest waarbij de aannemer (gedeeltelijk) verantwoordelijk is voor het vergunningstraject?

5. Er zijn nu boetes opgenomen in het contract voor late oplevering van werkzaamheden. Hoe kijken jullie anderzijds tegen bonussen aan, bijvoorbeeld voor snellere oplevering of een kostenefficiënte oplossing voor het onderhoud?
6. Aannemers geven geen capaciteitsgarantie af en woningcorporaties geven geen afnamegarantie af, zou dit organisaties meer motiveren?
    a. Hoe gaan jullie om met het reserveren van productieruimte voor prefabriceerde elementen/modules tijdens de uitvoering, bijvoorbeeld stel bepaalde elementen/modules kunnen niet tijdig worden geleverd door onzekerheid in de vergunningsfase; wanneer wordt er gestart met bouwen?
7. Gezien er een 'gestandaardiseerd' concept is. Hoe denken jullie over een stimulans voor afname per project, bijvoorbeeld 5% korting bij 50 woningen en 10% korting bij 100 woningen?

Overige aspecten (indien tijd over):

1. Hoe kijken jullie naar scope optimalisatie, bijvoorbeeld voor een 3 laags gebouw is minder fundering en dak benodigd in vergelijking tot een 1 laags gebouw. Bekijken jullie dit grondig van te voren?
2. Hoe betrouwbaar is de onderhoudsprijs van de onderhoudsperiode van de aannemer? Zij zitten ten slotte in fase 2, 1 op 1 aan tafel? Kan dit wellicht ook een extern bedrijf doen?
3. Er zijn verschillende overleggen en groepen binnen NH Bouwstroom, wie is de overkoepelende proces manager?
    a. Zit hier nog ruimte voor verbetering in?

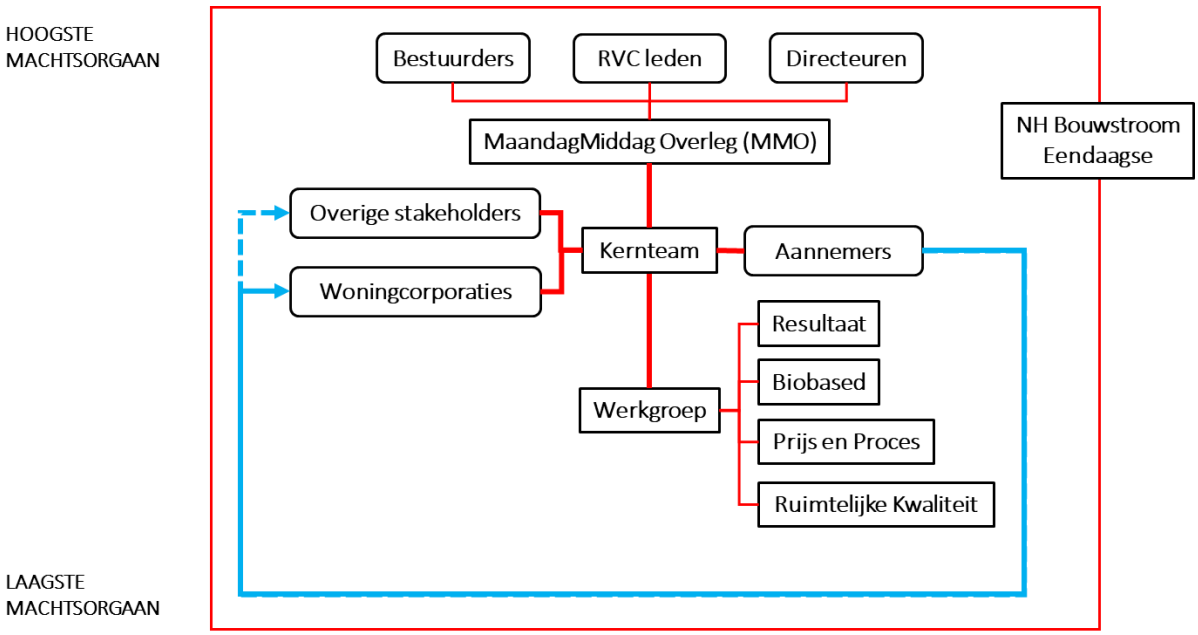


Figure 3.5: Organization structure NH Bouwstroom (Parteon, 2024; Own work, 2025)

A.4 NH Bouwstroom - Aannemer

Relationele aspecten:

1. In NH Bouwstroom werk je met meerdere woningcorporaties, aannemers en gemeentes. Daarnaast zitten binnen deze organisaties ook nog eens verschillende mensen. Werk je (dit mag ook breder dan de NH Bouwstroom):
    b. Liever met bepaalde organisaties;
    c. Liever met bepaalde mensen binnen organisaties?
    d. Merk je dat je stiekem toch wel eens de voorkeur geeft aan een opdrachtgever, gemeente, of adviseur o.b.v. eerdere samenwerkingen of ga je er elke keer geheel blanco in?

    Denk je dat dit nog beter binnen de NH Bouwstroom georganiseerd kan worden?
2. Dit (schema laten zien) is het organisatieschema van NH Bouwstroom. Denk je dat deze werkwijze goed is?
    a. Denk je dat er nog meer ruimte is voor samenwerking en afstemming tussen bepaalde groepen en overleggen (bijvoorbeeld door sessies als de Bouwstroom Eendaagse)?
    b. Merk je dat er bepaalde belangen van posities binnen bedrijven zwaarder of lichter wegen (bijvoorbeeld directeur vs. projectmanager)?
3. NH Bouwstroom is een raamovereenkomst waarbij 'intentie' een grote rol speelt zonder afname- en capaciteitsgaranties. Hoe wordt er binnen de organisatie gezorgd voor genoeg aandacht over dit onderwerp?
    a. Is dit wel eens een punt van aandacht en wordt dit wel een besproken?
    b. Wordt de gehele organisatie betrokken of een deel, wat zijn de verhoudingen?
4. Omgevingsvergunningen zijn een grotere onzekerheid. Binnen NH Bouwstroom zijn gemeentes niet contractueel betrokken.
    a. Hoe zien jullie de rol van gemeentes hierin?
    b. Wat doen jullie om bezwaren van de omgeving te voorkomen?
5. NH Bouwstroom is een innovatief partnerschap.
    a. Worden jullie gesubsidieerd, en zo ja/nee hoe denk je hier over?

Contractuele aspecten:

1. Uit NH Bouwstroom komt naar voren dat jullie een gezamenlijk doel hebben, zoals betaalbare woningen. Hoe denken jullie als marktpartij over zo goedkoop mogelijke woningen aanbieden vs. winstmaximalisatie? Speelt continuïteit een rol?
2. Aannemers stellen in fase 2 een prijs op, op basis van een taakstellend budget. Zien jullie dit als pre i.v.t. prijsconcurrentie?
    a. Hoe kijk je aan tegen het delen van winsten en verliezen voor de inkoop van materialen, onderaannemers en onderhoud?
3. De NH Bouwstroom werkt met 'vaste' concepten. Hoe vaak zijn project specifieke aanpassingen (PSA's) benodigd t.o.v. het 'vaste' concept?
    a. Hoe vaak komen deze PSA's voor en is er nog efficiëntie te winnen door meer het 'vaste' concept toe te passen?
    b. Zijn ondanks de PSA's toch de vaste concepten sneller i.v.t. traditionele bouw?
4. Op dit moment passen jullie (meestal) een 2 fasen contract op met weinig verantwoordelijkheden m.b.t. het vergunningstraject. Denken jullie dat het traject sneller doorlopen zal worden als je voor een 1 fase contractvorm kiest waarbij de aannemer (gedeeltelijk) verantwoordelijk is voor het vergunningstraject?

    a. Zijn hier voor aannemers ook potentieel risico's aan verbonden die ingecalculeerd zullen worden waardoor kosten hoger zullen worden?
5. Er zijn nu boetes opgenomen in het contract voor late oplevering van werkzaamheden. Hoe kijken jullie anderzijds tegen bonussen aan, bijvoorbeeld voor snellere oplevering of een kostenefficiënte oplossing voor het onderhoud?
6. Aannemers geven geen capaciteitsgarantie af en woningcorporaties geven geen afnamegarantie af, zou dit organisaties meer motiveren?
    a. Hoe gaan jullie om met het reserveren van productieruimte voor prefabriceerde elementen/modules tijdens de uitvoering, bijvoorbeeld stel bepaalde elementen/modules kunnen niet tijdig worden geleverd door onzekerheid in de vergunningsfase; wanneer wordt er gestart met bouwen?
7. Gezien er een 'gestandaardiseerd' concept is. Hoe denken jullie over een stimulans voor afname per project, bijvoorbeeld 5% korting bij 50 woningen en 10% korting bij 100 woningen?

Overige aspecten (indien tijd over):

1. Hoe kijken jullie er als aannemer tegenaan om eerder in het traject betrokken te zijn m.b.t. scope optimalisatie? Bijvoorbeeld voor een 3 laags gebouw is minder fundering en dak benodigd in vergelijking tot een 1 laags gebouw. Als aannemer kunnen jullie wellicht de woningcorporatie hierin met eerste ramingen en advies ondersteunen.
2. Hoe betrouwbaar is de onderhoudsprijs van de onderhoudsperiode van de aannemer? Zij zitten ten slotte in fase 2, 1 op 1 aan tafel? Kan dit wellicht ook een extern bedrijf doen?
3. Er zijn verschillende overleggen en groepen binnen NH Bouwstroom, wie is de overkoepelende proces manager?
    a. Zit hier nog ruimte voor verbetering in?

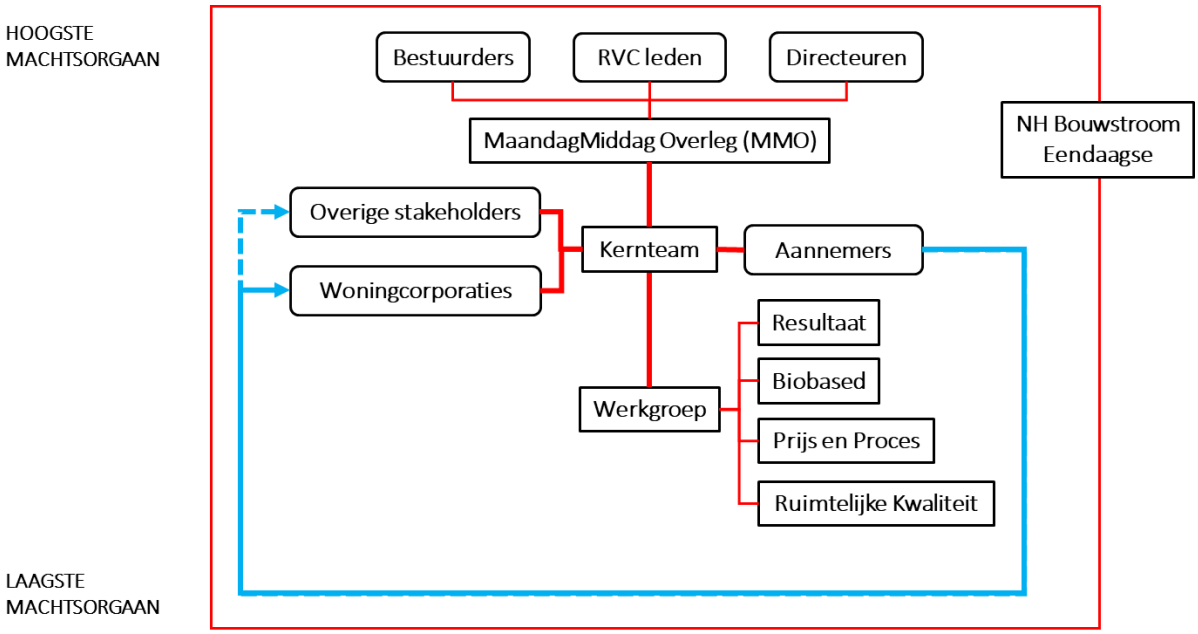


Figure 3.5: Organization structure NH Bouwstroom (Parteon, 2024; Own work, 2025)

Appendix B – Interview questions external assessment

B.1 External assessment - Brink

Relationele aspecten:

1. Partijen geven aan dat een goed ontwikkeld dashboard met data zoals kosten per m2 per project en overige informatiedeling van grote waarde kan zijn voor Bouwstroom initiatieven.
    a. Kosten en de intrinsieke motivatie om dit bij te werken kost echter wel veel moeite, hoe denk jij hierover?
2. Het selecteren van aannemers, zowel in de aanbestedingsprocedure als in de mini-competities, kan soms als subjectief worden ervaren. Denk je dat in Bouwstroom initiatieven extra aandacht geschonken dient te worden aan het 100% objectief beoordelen van aannemers bijvoorbeeld met een werkgroep?
3. Er zijn op dit moment verschillende gedachtes over de sturing en betrokkenheid van het proces. Hoe denk jij dat de optimale verhouding woningcorporatie, aannemer en gemeente er uit ziet?
4. Partijen geven aan dat de RVC's en bestuurders veel macht hebben in keuzes m.b.t. Bouwstroom initiatieven. Sommige woningcorporaties zijn erg conservatief en willen niet mee in de 'Bouwstroom gedachte' maar zijn wel een onderdeel van de raamovereenkomst. Hoe denk jij hierover en hoe dit mogelijk te veranderen?
5. De volgende vragen gaan over belangen en betrokkenheid van verschillende partijen:
    a. Er dient meer betrokkenheid van gemeentes te zijn inclusief intrinsieke motivatie, hoe denk jij hierover en hoe dit te realiseren?
    b. Woningcorporaties en aannemers geven aan dat ze graag meer intrinsieke motivatie verwachten van alle woningcorporaties, hoe denk jij hierover?
6. Partijen geven aan geholpen te worden met enkele overheidssubsidies, bijvoorbeeld voor voorfinanciering tijdens de vergunningsfase, extra biobased kwaliteit, of fabrieksinnovaties. Denk jij dat dit kan helpen en ook gerealiseerd kan worden, ook kijkende naar veranderde politieke samenstellingen.
7. Woningcorporaties geven aan gebaad te zijn bij het continue evalueren en overleggen:
    a. Intern tussen projecten, gemeentes en provincies
    b. Tussen verschillende Bouwstromen en landelijke overheden. Denk jij dat dit kan werken of vormt interne motivatie om dit op te zetten te veel moeite?

Contractuele aspecten:

1. Een een-fase contract kan als positiever worden gezien, in vergelijking tot een twee-fase contract, met betrekking tot zekerheid voor beide partijen. Ze lopen namelijk niet het risico dat de tegenpartij na de eerste (ontwerp)fase niet doorgaat met de tweede fase.
    a. Anderzijds geeft de tweede fase wel meer flexibiliteit als er een mismatch in samenwerking of productiecapaciteit is ontstaan tussen twee partijen, hoe denk je hierover?
2. Sommige Bouwstroom initiatieven spreken een vaste prijs in de aanbesteding af, andere Bouwstroom initiatieven houden steeds mini-competities. Uit mijn analyse is gebleken dat aannemers niet vroeg kunnen worden betrokken in het traject bij mini-competities met betrekking tot scope optimalisatie, hoe denk jij hierover?
3. Het zoveel mogelijk standaardiseren van concepten leidt uiteindelijk tot een sneller proces en lagere kosten blijkt uit mijn analyse.

    a. Anderzijds kunnen individuele wensen van woningcorporaties, gemeentes en welstandscommissies een blok vormen, hoe denk je dat hier binnen Bouwstromen mee omgegaan dient te worden?
4. Voor een kortere doorlooptijd, zou het goed zijn om te produceren tijdens het vergunningstraject.
    a. Aannemers en woningcorporaties willen echter vaak de risico's van voorfinanciering niet nemen. Hoe denk jij hierover?
5. Aannemers geven aan dat fabrieksgarantie en continuïteit een belangrijke rol spelen in hun bestaanszekerheid. Zij geven aan kosten te kunnen laten dalen als er productiecapaciteitsgaranties worden afgegeven.
    a. Garanties betekenen anderzijds dat woningcorporaties boetes dienen te betalen als er niet gebouwd wordt. Hoe denk je dat je hier de juiste balans vindt?
6. Aannemers, en soms ook enkele woningcorporaties geven aan dat de responsetijd en beslissingen van (bestuurders van) woningcorporaties erg traag kunnen zijn.
    a. Het uitvoeren van een informele afspraak hierover kan een oplossing zijn of een formele regel in het contract. Natuurlijk is het e.e.a. ook afhankelijk van de grootte van beslissingen. Hoe denk je hierover?
7. Een 'eerlijkere prijs' zou kunnen worden verkregen als er gezamenlijk wordt ingekocht waarbij aannemers ook akkoord zouden kunnen gaan met lagere staartkosten en binnen een Bouwstroom schaalvoordeel gecreëerd kan worden.
    a. Woningcorporaties hebben echter een risicomijdend karakter. Hoe denk je over gezamenlijk inkopen op hoofd- en gestandaardiseerde producten- en materialen zoals hout, beton, Geberit sanitair, Mosa tegels, etc…?
8. Partijen geven aan dat contractuele boetes niet passen bij een innovatief initiatief met veel onzekerheden zoals de Bouwstroom.
    a. Anderzijds kunnen partijen hier misbruik van maken, hoe denk jij hierover?
9. Partijen denken dat bonussen kunnen leiden tot snellere oplevering of hogere kwaliteit van woningen.
    a. Anderzijds kan dit ook leiden tot perverse prikkels, bijvoorbeeld als een aannemer foutieve planningen afgeeft om bonussen te behalen. Hoe denk jij hierover?
10. Met afname- en capaciteitsgaranties geven aannemers aan lagere kosten en snellere productie te kunnen garanderen, bijvoorbeeld door ook raamcontracten met onderaannemers af te geven.
    a. Anderzijds geven woningcorporaties aan dit niet te willen door geopolitieke en economische onzekerheden. Hoe denk jij hierover?
11. Bulkkortingen op gestandaardiseerde producten kunnen tot meer afnameprikkels bij woningcorporaties leiden.
    a. Anderzijds geven sommige aannemers aan dat er geen financiële ruimte is. Hoe denk je over bulkkortingen?