Private Sector Risk Management in the Construction Industry: A Study on Contractor Selection and Risk Allocation

MSc Thesis

E.H.S. Bokdam

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Author	*E.H.S. Bokdam*
Institution	*University of Twente*
Faculty	*Behavioural, Management and Social sciences*
Department	*Business Administration*
1st Supervisor UT	*P. Hoffmann* *University of Twente* *Faculty of Behavioural, Management and Social sciences*
2nd Supervisor UT	*V.F. Delke & J. Sieber* *University of Twente* *Faculty of Behavioural, Management and Social sciences*
External supervisor	[redacted]

Abstract

The construction sector is a project-driven and complex sector. There are many different parties involved with a high level of interdependence. Therefore, construction projects face many risks such as quality problems or cost overruns. In order to minimise the risks, risk management is applied by clients. Risk management of clients consists of both contractor selection and risk allocation. Especially in the private sector, the process of contractor selection and risk allocation is barely regulated or legally defined, leading to little knowledge about this sector. This research assesses the risk management practices of clients in the private sector construction industry. Therefore, the following research question was formulated:

"What strategies do clients in the construction industry use to manage project risks, particularly focusing on contractor selection and risk allocation in the private sector?"

In order to answer this research question a qualitative study has been conducted consisting of three different phases. First, a literature review has been conducted to gain knowledge about procurement in the construction industry and to develop a theoretical framework about main project risks in the construction sector, contractor selection criteria, and risk allocation practices. The second and third phase of this research consist of a multiple case study which is conducted at a contractor specialised in the building of company premises, analysing five projects. The second phase is a contract analysis in order to know how project risks are contractually defined. In the third phase, interviews have been conducted with both the contractor and the client of the different projects, offering a deeper understanding about the contractual provisions and about contractor selection criteria and the opinion of both parties on risk allocation. Using the interviews, the theoretical framework was empirically tested.

The results of this research show that clients perform risk management by both carefully selecting a contractor and through risk allocation. Clients aim to mitigate risks by focusing on core criteria such as financial strength, technical ability, management capability, health and safety standards and reputation when selecting a contractor. Financial strength is assessed based on annual reports and other financial documents. Technical and management capability is evaluated during discussions and by reviewing previous projects of the contractors. Health and safety, however, turns out the be hard to assess as the health and safety plan is developed after the project has been awarded. Therefore, this criterion is also mainly evaluated based on rules and regulations the contractor needs to comply with and based on previous projects. Reputation is one of the most important criteria because client attach value to relationships and prefer selecting contractors that have already proven themselves and they have worked with before. They prefer this to ensure reliability and good collaboration and therefore minimise risks. Some clients even mostly work with a fixed pool of contractors. However, most often, more contractors meet all these criteria, leading to clients selecting mainly based on price. An important note is that developers focus more on the lowest price whereas clients who build for their own use rather focus on technical ability. By selecting the right contractor in advance, clients try to minimise conflicts, delays and quality issues.

Another way clients mitigate risks is by contractually allocating the risks to the contractor. This often involves shifting environmental risks, political risks, economic risks, design risks, technical risks, construction risks, management risks, contractual risks and financial risks to the contractor. The level of detail varies per client. However, developers define all risks contractually. To ensure compliance with agreements, contractual securities are also built into the contract, such as penalties for late completion, withholding of the final payment and bank guarantees. Finally, standard insurances are required to keep the risks controllable. However, despite the extensive contractual agreements, both contractors and clients prefer collaboration and jointly resolving issues rather than taking legal action.

This research contributes to the existing knowledge on risk management in the construction industry by providing an in-depth qualitative analysis of how private sector clients manage risks. Given the limited research in this area, this study offers an exploratory insight and provides a more in-depth understanding about the perspectives and the motives of private sector clients regarding their risk management based on contractor selection criteria and risk allocation. Both parties acknowledge the value of collaboration, long-term relationships and contractually defining risks to achieve effective risk management. For contractors, this study contributes to a better understanding of the main considerations and thoughts of the clients for contractor selection. This knowledge helps contractors to develop better tender strategies and the insights about risk allocation helps them to better negotiate about contractual provisions.

Table of Contents

List of Figures

List of Tables

1. Introduction

The construction sector is characterised as a project-driven and complex sector (Segerstedt & Olofsson, 2010). Therefore, many constructive projects do not achieve the predefined goals due to project delays, cost overruns and poor quality (Nasirzadeh et al., 2016). The complexity of the construction industry also stems from the fragmented structure of the supply chain, short-term/contradictory trade relationships, poor information flows and a high degree of interdependence between tasks and activities (Fearne & Fowler, 2006). This complexity results in high uncertainty and high risks (Mhetre et al., 2016).

Since the circumstances and the environment in the construction industry are not stable, risk management is important (Abderisak & Lindahl, 2015). Risk management involves identifying risks and implementing strategies to minimise, share, transfer, or accept the risks (Jergeas & Put, 2001). Therefore the client needs to handle the risks or transfer them to another party (Abderisak & Lindahl, 2015). This decision is based on whether the client can properly asses, minimise or control the risks (Abderisak & Lindahl, 2015). Whether the client or the contractor handles the risks, is called risk allocation (Abderisak & Lindahl, 2015).

The complexity of the construction industry, due to involvement of various contracting parties and challenging working conditions, results in many risks that can occur. Therefore, both clients and contractors attempt to shift these risks to the other party as much as possible. What often happens is that the risks are shifted by the client to the contractor, who then shift the risks in turn to subcontractors. In this way, they want to put their liability somewhere else (Jergeas & Hartman, 1996). Risk allocation takes place through the negotiation of contract clauses (Hanna et al., 2013). Research shows that formal contracts ensure proper alignment of the interests of the parties involved and control of behaviour (Dekker et al., 2013).

However, it is also important to choose the right partner, when there is a good relationship the reliability and competence of this partner will be improved which can contribute to reducing risks. Thereby, it contributes to a better contract and control design (Dekker et al., 2013; Dekker & Van den Abbeele, 2010). Selecting the right contractor is therefore a crucial aspect of risk management. Nevertheless, clients often select contractors primarily based on the most competitive bid price (Xiaohong, 2011; Zavadskas et al., 2008). This method is called cost-based selection (Olaniran, 2015). It is found that many construction contractors keep their bid price low on purpose in order to win a contract (May et al., 2001). This is caused by the open market and competition that often forces contractors to keep the price low because otherwise they will be defeated by the competition (Olaniran, 2015). However, this method has some disadvantages. Sometimes contractors bid a lower price than possible which can lead to losses for the contractor (Olaniran, 2015). The method of cost-based selection assumes that the decision makers are able to achieve the most optimal results through rational processes and objective criteria (Pesämaa et al., 2009).

In contrary, research shows that selecting on the lowest price carries risks to the project outcome, primarily in the areas of cost, quality and time (Holt et al., 1994a). According to a research of Assaf & Al-Hejji (2006) is cost-based selection one of the main factors that causes project-delays (Assaf & Al-Hejji, 2006). Choosing contractors based on the wrong criteria may cause poor project performance (Zavadskas et al., 2014). In modern, mainly complex situations, the products or services often have characteristics that cannot be judged by objective criteria only (Pesämaa et al., 2009). As a result, subjective criteria such as familiarity, reputation, legitimacy, compliance with quality and quality standards or other standards also need to be included in the consideration to avoid risks (Pesämaa et al., 2009).

In the construction industry there are different main parties; the client, the contractor, the subcontractors, sometimes architects or even engineers (Martin & Benson, 2021; Nasirzadeh et al., 2016; Vee & Skitmore, 2003). The client is the one who commissions the construction of the building and hires the contractor (Maqsoom et al., 2019). The contractor is hired to arrange and coordinate the construction of the building (Laryea & Lubbock, 2014). The subcontractor provides labour and/or materials (Segerstedt & Olofsson, 2010). This party is hired by the contractor to carry out most of the actual work. Delivering complex projects to clients means for contractors they need to plan purchases, find and select relevant suppliers, arrange and negotiate appropriate contracts, and manage and closing them (Martinsuo & Ahola, 2010). In addition to the duties listed above, working with suppliers include several day-to-day tasks to ensure that scheduled work is executed as agreed (Martinsuo & Ahola, 2010). To manage the

risks associated with the project it is important to select the right contractor (Segerstedt & Olofsson, 2010; Vee & Skitmore, 2003).

In the Dutch construction industry, two types of clients can be distinguished: the government and private clients (Hatmoko & Khasani, 2016). Government projects are projects that are funded by the government to build public facilities such as roads and public buildings etc. (Hatmoko & Khasani, 2016). When dealing with governmental clients, there are numerous rules and guidelines regarding procurement (Hatmoko & Khasani, 2016). There is a strict tender process (Hatmoko & Khasani, 2016). In a public tender there are all kinds of mandatory rules on, for example, the publication of the tender, the way of tendering, the way of granting the project and the formation of the contract[1]. However, with private clients, there are less rules and everything is more flexible (Hatmoko & Khasani, 2016). Unlike public parties, private parties do not have to comply with all these rules[1]. So in principle, the client may choose which contractor they want to work with[1]. In doing so, the client is allowed to talk or negotiate with one party without the other party knowing about it. However, the client must comply with the rules they have formulated themselves. So, if they say in advance that they will select on the basis of the lowest price, then they must comply with this[1]. If they do not stipulate this in advance, they do not have an obligation to do so[1]. Research confirms that there is often more bureaucracy with governmental clients than with private clients (Liu et al., 2006).

In most cases, public clients use Design-Bid-Build contracts (Hatmoko & Khasani, 2016). In this type of contract, the design and execution are carried out by separate parties. In contrary, private clients often use contracts such as Design-Build and Engineer and Construct (Hatmoko & Khasani, 2016). In these projects, design and execution are performed by the same party. The definitions of the types of contracts will be elaborated on in chapter 2.1.3.

This research focuses on the construction industry in the Dutch private sector. Most of the research is conducted in foreign countries. Therefore, this study focuses on the Dutch construction industry. Furthermore, most research is conducted about the public sector, while the private sector is an important sector in the construction industry as well. As stated above there are many more rules and guidelines in the public sector which makes this more tangible. Because these rules do not apply for the private sector this is an interesting sector to investigate how tenders go there and what clients' considerations are regarding risk management, contractor selection and risk allocation. Since little has been researched about risk management in the private construction industry, this research aims to explore this more in-depth.

1.1 Research questions

As mentioned in the introduction, risk management in the private sector consist of both risk allocation and contractor selection. Regarding contractor selection it is indicated that clients mainly choose based on the lowest price, but the main considerations are still discussed (Olaniran, 2015). According to Olaniran (2015) contractors project performance is traditionally measured by cost, time and quality. However, multiple studies have argued that those are not the only aspects to measure project performance. For instance, Muller and Turner (2007) stated that project characteristics and objectives need to be taken into consideration as well (Müller & Turner, 2007). Furthermore, Swan et al. (2007) say that stakeholder satisfaction is mainly based on trust and communication (Swan et al., 2007). Finally, environmental impact, work environment and innovation are sometimes considered important for the project performance as well (Olaniran, 2015).

As improper selection of contractors negatively affects a project, it is crucial for clients to pay attention to the selection of a contractor (Mousakhani et al., 2018). However, little research has been conducted on the link between the criteria clients use for choosing a contractor and how they try to mitigate risks associated with the decision. Even while this is important because multiple sources show that choosing the right contractor affects the project outcome and therefore risks. The literature primarily focuses on the conceptual and descriptive level, but empirical tests of the relationships between stakeholder characteristics and risk criticality in projects are lacking (Xia et al., 2021).

Regarding the second aspect; risk allocation, many research is conducted leading to the conclusion that risks are often as much as possible allocated to the contractor (Lam et al., 2007). However, if a contractor does not manage risks properly, there will be consequences for the client, especially

[1] https://www.dommerholt.nl/nieuws/welke-regels-gelden-bij-private-aanbestedingen/

regarding delays in and impact on third-party property (Mousakhani et al., 2018). It is therefore important to understand the perspectives on risk allocation from both the contractor and the client to know how this is connected to risk management. Moreover, according to Jin et al. (2017), further analysis into key participants in the construction industry and their core characteristics and approach to risk management could contribute to a better understanding of project management (Jin et al., 2017). In this research, the focus is on the characteristics and approach to risk management specifically from the client's perspective.

This research is therefore aimed to get an in-dept understanding of the risk management approach of clients in the construction industry. In order to investigate how clients manage their risks by assessing the type of criteria clients use to choose their contractors and why and how they allocate risks, the following research question will be answered:

"What strategies do clients in the construction industry use to manage project risks, particularly focusing on contractor selection and risk allocation in the private sector?"

To provide an answer on this main research question, the following sub-questions have been formulated:

1. *What is procurement in the construction industry?* The purpose of this sub-question is to understand procurement in the construction industry and all the process steps that are part of it.

2. *What criteria do clients use for selecting contractors and what do they consider the most important?* Based on this sub-question, the main criteria will be identified to understand what clients consider the most important criteria for choosing a contractor and what connection this has with their risk management.

3. *What risks do clients consider when selecting contractors in the construction industry, and what strategies and contractual provisions do they use to manage these risks?* This sub-question focuses on the core of this research examining what risks clients identify in projects and how they take these into account when making decisions about contractors, and how they seek to mitigate or manage those risks.

4. *How do the clients and contractors perceive the risk management strategies in the construction industry and what factors influence the allocation of risks between clients and contractors in construction projects*? This sub-question aims to understand whether clients and contractors believe that risks are well managed and whether they find risk allocation effective and fair. It seeks to uncover the challenges they face in this regard and their preferred approaches to addressing them.

These sub-questions and ultimately the main question is answered through qualitative research consisting of literature research, a contract analysis and interviews with both the clients and the contractor.

1.2 Practical and academic relevance

This research has both practical and academic contributions. According to literature, clients often select contractors primarily based on the most competitive bid price (Xiaohong, 2011). However, choosing contractors based on the wrong criteria may cause poor project performance (Zavadskas et al., 2014). In modern, mainly complex situations, the products or services often have characteristics that cannot be judged by objective criteria only (Pesämaa et al., 2009) . As a result, subjective criteria such as familiarity, reputation, legitimacy, compliance with quality and quality standards or other standards also need to be included in the consideration to avoid risks (Pesämaa et al., 2009). This study examines the criteria used to select contractors in order to understand whether contractors are indeed often selected based on the lowest price or whether other risk criteria also play a role.

Moreover, there is not much research conducted on how clients implement risk management in relation to selecting a contractor. In addition, after reading a lot of literature, it appears that most of the already conducted studies were quantitative. To get a more in-depth understanding, this study will be a qualitative study. With a qualitative study, it is possible to get an in-depth understanding about the

perspectives and the motives of the clients regarding their supplier selection criteria and their risk management (Mey, 2022).

This research is practically relevant because it provides insight into the criteria clients use for selecting contractors regarding risk management. For contractors this can be interesting and helpful to know because they can use this knowledge when applying for a new project. Moreover, it is also important to understand which risks clients identify, which they consider the most significant, and how they anticipate on these risks by allocating risks to the contractor. Having this knowledge will lead to a better understanding of the contractors which may result in better collaboration. When it is clear how and why clients do this, the risk management of the client can perhaps be better aligned with that of the contractor and vice versa. This could contribute to a more efficient collaboration and mitigation of the risks.

1.3 Outline of the thesis

This research proposal is divided into several chapters. In chapter two, the theoretical framework is presented. This framework provides background information that helps comparing the empirical findings with the theoretical findings, to eventually answer the research questions. The first part of the theoretical framework will serve as a basis for procurement in the construction industry, based on this part the first research question is answered. The second part provides an overview of the main contractor selection criteria clients use and the main risks they consider in a project. The overview of these two aspects are used as a basis for the contract analysis and the interviews.

Chapter 3 describes the methodology that is used for this research including the research design. In chapter 4 the results from both the interviews as the contract analysis are shown per project. Chapter 5 shows the cross-case analysis, chapter 6 the conclusion and chapter 7 the discussion.

2. Theoretical framework

This chapter first explains procurement in the construction industry as background information to further understand this research. It then looks at the main risks that clients foresee in projects from a theoretical point of view and identifies the criteria that clients mainly use in contractor selection. These two aspects are important to understand because this information will be later used for the contract analyses and interviews.

2.1 Procurement in the construction industry

This chapter first provides a general description of procurement in the construction industry. This is the answer to sub-question 1; *"What is procurement in the construction industry?"* and acts purely as background information to better understand the rest of the thesis.

2.1.1 Definition of procurement

Given that the main topic of this research is procurement, it is essential to clearly define the concept. There are various definitions for procurement. One definition states that procurement is a framework in which construction is established, acquired or obtained (London, 2007). An older definition of procurement is provided by Moshini and Davidson (1989), who defined it as the acquisition of new buildings and the spaces within those buildings.

However, the definition of procurement has changed over time because the activities involved in procurement have become increasingly linked to a company's success (Rahmani et al., 2017). Nowadays, procurement is also associated with organisational strategic goals, as confirmed by many academics and industry professionals (Ruparathna & Hewage, 2015). Procurement encompasses all activities involved in obtaining goods, products, or services for an organisation (Ruparathna & Hewage, 2015). This field goes beyond merely purchasing at the right terms and prices to meet the organisation's goals. It also includes broader functions such as material requirements planning, inventory management, and transportation (Ruparathna & Hewage, 2015). Procurement can now be broadly defined as the process of creating and managing contracts (Ruparathna & Hewage, 2015). Often, the term 'purchasing' is used, but this specifically refers to the actual buying process, which involves acquiring goods and services. Procurement, on the other hand, is a broader concept that includes strategic planning and the management of the entire supply chain (Ruparathna & Hewage, 2015). Since this research is based on the broader concept of purchasing, the term procurement will be used.

2.1.2 Complexity of the construction industry

As mentioned in the introduction, the construction industry is a project driven and complex sector (Segerstedt & Olofsson, 2010). This is mainly due to the high degree of interdependence between tasks and activities (Fearne & Fowler, 2006). Because the construction industry operates with projects, there are many different stakeholders involved in the projects, such as contractors, sub-contractors and sometimes architects (Jin et al., 2017). Project management plays a crucial role and involves coordinating different tasks with of a cross-functional team (Pesämaa et al., 2009). Procurement is a big part of the planning and coordination process of projects. Proper planning and coordination are required due to the great complexity, time constraints and customization in construction projects (Pesämaa et al., 2009). Because construction projects are often only lasting for a certain period and each project is different, stakeholders are often mutually dependent on each other (Morledge et al., 2021). This necessitates all stakeholders such as the client, contractor but also subcontractors such as, for example, suppliers of steel or soil treatment to collaborate together. In this way they can quickly anticipate on unforeseen challenges that could not be planned beforehand. This collaborative approach also helps to anticipate on changing customer demands (Pesämaa et al., 2009).

Because of the number and diversity of participants and stakeholders involved in a project, the relationships between clients, contractors, design teams and project managers can be conflicting (Chan et al., 2011). This can lead to an increased risk of conflict, loss of support and a reduced likelihood of successful project completion (Jin et al., 2017).

In the construction industry both products and services are bought. However, a big part of the construction industry is buying a capacity to produce, a big part of the construction industry can therefore be called a service industry (Morledge et al., 2021). In the construction industry, the interaction with the stakeholders is way more intense than for instance in the manufacturing industry (Morledge et al., 2021).

Moreover, there is an increasing demand from clients within the construction industry for improvements in the predictability of construction projects in terms of time, cost, quality and fitness for purpose (Morledge et al., 2021). There is also an increasing demand in value for money, this means that projects must become cheaper in terms of capital costs and revenue expenditure (Morledge et al., 2021). Moreover, the development time and construction periods must also be reduced. In parallel with all these savings, the quality must increase or at least remain the same (Morledge et al., 2021). Another challenge that has emerged in recent years is the increased focus on sustainability and environmental impact in society (Morledge et al., 2021). All these factors combined make the construction industry a complex sector that entails many risks (Mhetre et al., 2016).

2.1.3 Contract forms

In order to understand tender procedures and contracts in the construction industry, this paragraph will elaborate on these aspects.

In the Dutch construction industry, there are three main types of tender procedures (Bremer & Kok, 2000):

- Open tender – this means that every contractor can apply for the tender, if they meet the capability criteria.
- Selective tender – this means that a few contractors are selected by the client which can apply.
- Direct invitation – this means that the client chooses a contractor directly.

Regardless of the type of tender, contractors submit a proposal. In this proposal, they calculate all costs based on quotes they have received from subcontractors[2]. Based on the proposals, the client chooses a contractor[2]. Often based on the lowest or most competitive price[2]. Appendix I contains a detailed explanation of the process for the building of company premises.

When the client has chosen the contractor, a contract is made. There are three contract forms that are most common in the Netherlands. These are the traditional contract form, the construction team model, and the integrated contract forms[3]. These contract forms are all explained below.

The traditional contract form

In the traditional contract form, the contractor is responsible for the execution of the project only. This means that the client handles the initiative, design, and pricing, encompassing the entire planning phase (Synquis, 2020). The design responsibility lies with the client, while the contractor is responsible for the execution[3]. Contractors are often contracted based on specifications (STABU or RAW), and the contract conditions are typically based on the UAV 2012 (Synquis, 2020). The UAV stands for Uniform Administrative Conditions (Uniforme administratieve voorwaarden in Dutch). These are the conditions for the contracting of the work and where the execution of the intby the client is regulated[4]. With the traditional contract form, the responsibilities are clearly defined and the risks are balanced and calculable for both parties[4]. This makes it clear who is responsible or liable for what[4].

The construction team form

The construction team model is a partnership between the client, architect and contractor. Right from the design phase, the contractor brings in his specific expertise on the feasibility of the design and the construction costs[4]. The architect also remains involved in the execution phase, here the contractor is thus involved from the design phase which ensures substantive expertise from the beginning of the project[4]. Also, in this model the design and execution responsibility are split, but the contractor's input is used in the design phase[4]. Sometimes the contractor gets the design responsibility, so who is responsible varies per project and therefore needs to be discussed at the beginning of the project (Synquis, 2020). In the construction team model the UAV 2012 or the construction team agreement 1992 is most often used[5].

Integrated contract form

With the integrated contract form, both design and construction are completely outsourced to a contractor (Synquis, 2020). The client's influence is limited, and the contractor is responsible for design and construction errors[3]. The integrated form consists of many different forms.

[2] https://www.procore.com/en-ca/library/construction-tendering-process
[3] https://www.laride.nl/contractmanagement/contractvormen
[4] https://ap.lc/jwVsT

In Figure 1 an overview of all the contract forms is shown. With the integrated contract forms, often the UAV GC 2005 is used as basis contract[5].

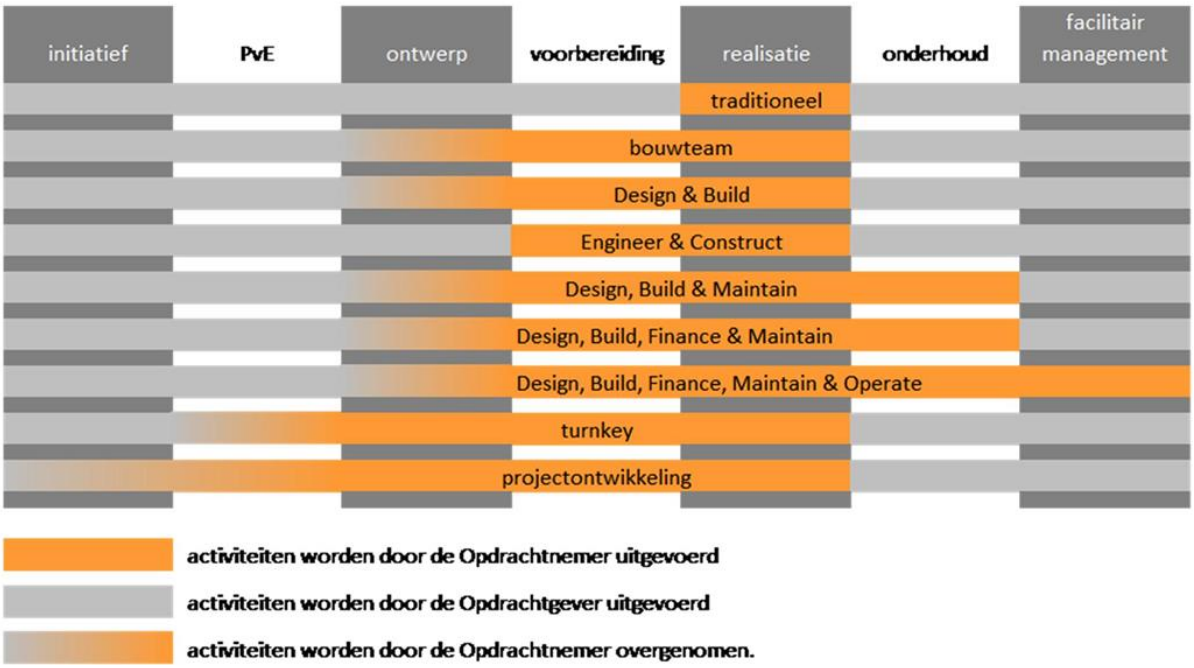

Figure 1: Overview of contract forms in the construction industry retrieved from Synquis (2020)

Below is a description of the different types of the integrated contract forms.

Design & Build
In a Design & Build contract, part or all of the design and execution is done by one contractor (Chan & Yu, 2005). The client either only has a programme of requirements or sometimes already has a sketch design or a preliminary design. The contractor bears responsibility for the design and realisation from there (Synquis, 2020).

Engineer & Construct
The Engineer & Construct is almost the same as the Design & Build but the difference is that at the Engineer & Construct contract, the client already made the design. Therefore, a larger design responsibility lies with the client (Synquis, 2020).

Design, Build & Maintain
In a Design, Build & Maintain contract, a 'long-term maintenance' contract can be linked. The advantage of this contract structure is that the client is familiar with the building and can therefore align maintenance efforts effectively (Synquis, 2020). Additionally, the maintenance contract ensures that the contractor focuses more on quality during design and construction phases, with early consideration to the maintenance plan (Synquis, 2020).

Design, Build, Finance, Maintain (& operate)
In this type of contract, the financing component is added, meaning the contractor is also responsible for arranging financing (Synquis, 2020). Ultimately, the client often pays based on one of the following structures (Synquis, 2020):

- Multiple payments at predetermined intervals;
- A single payment upon completion of the work;
- Payments in the form of rent during the operational phase over a specified period;
- Payments upon achieving or delivering predetermined milestones.

[5] https://yspeert.nl/yspeert-learning/kennisbank/contracteren-in-de-bouw-deel-1-een-beknopt-overzicht/

When 'operate' is added to the contract, it means that the contractor will also carry out operations such as reception, catering, cleaning, green maintenance, energy supply and provisioning (Synquis, 2020).

Turnkey
In a Turnkey contract form, the contractor is responsible for both the design and the construction (Synquis, 2020). Often, the client is only involved in the initial stages (Synquis, 2020). The contractor is thus accountable for the entire design, which they develop based on the specified requirements and conditions from the client (Synquis, 2020). The difference with a Design & Build contract is that with the Turnkey contract form, the completed work is immediately usable upon completion (Synquis, 2020). This includes an interior package where the contractor also handles the layout and furnishing etc. (Synquis, 2020).

Project development
Project development is not a construction contract form since there is no client-contractor relationship (Synquis, 2020). Sometimes, the entire initiative lies with a developer who completes the project and then sells it (Synquis, 2020). This is common among project developers. The difference from Design & Build is that the project becomes the property of the developer, who can subsequently sell or lease it, among other options (Synquis, 2020).

As mentioned above, there are a few common construction contracts that are often used for building projects, namely UAV (Uniform Administrative Conditions) and UAV-GC (Uniform Administrative Conditions for Integrated Contracts)[6]. These conditions must be declared applicable by both parties; otherwise, they do not apply[6]. Additionally, deviations from these general conditions can occur. Many contractors often have their own general terms, and clients also frequently have their own conditions [6]. All of these details must be discussed before the contracts are signed.

[6] https://www.lxa.nl/nl/bouwcontracten/

2.2 Risk management of clients

In order to understand risk management in the construction industry. In this chapter first the main construction risks are identified which will serve as a framework for the contract analysis and the interviews. After that, the two main risk management practices of clients are elaborated on; criteria for selecting contractors and risk allocation. This theoretical framework will be tested in the practical research through the contract analyses and interviews.

2.2.1 Construction risks

A risk can be described as the possibility of complications and problems related to a project and the goal of the project (Rezakhani, 2012). Risks are factors that could potentially negatively affect the project, such as cost, schedule or quality (Tessema et al., 2022). There are several risks associated with a construction project. There are so many risks that they can be categorised in different ways. To make it more comprehensive the risks are first categorised on the source of the risk, which can be internal and external risks (Tessema et al., 2022; Yembi Renault & Agumba, 2016). External risks can be described as risks that occur beyond the projects team's control (Tessema et al., 2022). These risks involve risks as environmental risks, political risks, economic risks, and social risks (Nagalla et al., 2018; Sharma & Gupta, 2021; Tessema et al., 2022). Internal risks in contrary are risks that arise from the project events and within the control of the project team (Tessema et al., 2022). These risks involve design risks, technical risks, construction risks, management risks, contractual risks and financial risks (Dekker et al., 2013; Kamane & Mahadik, 2013; Nagalla et al., 2018; Sharma & Gupta, 2021; Tessema et al., 2022).

The external risks can be further specified. Environmental risks are for instance bad weather conditions, climate change and the environmental impact of the project such as loss of flora and fauna (Kamane & Mahadik, 2013; Nagalla et al., 2018; Tessema et al., 2022; Yembi Renault & Agumba, 2016). It can occur that certain materials are not resistant to the changing climate, therefore it is important to select the right materials (Tessema et al., 2022). Political risks can be described as risks concerned with change in rules and regulations (Nagalla et al., 2018; Tessema et al., 2022; Yembi Renault & Agumba, 2016). Economic risks can be currency fluctuations and inflation (Tessema et al., 2022; Yembi Renault & Agumba, 2016). Because this research is focused on the Netherlands and the contracts are only between Dutch companies, currency fluctuations are not applicable in this study. However, inflation is a risk that can occur. Social risks can be cultural differences (Nagalla et al., 2018). In addition to the currency fluctuations, social risks are also not included in this research because they are not applicable for this study only conducted in the Netherlands.

The internal risks are also further specified. Design risks have to do with errors in the design that result in the object being built, but not meeting the specified standards or legal requirements, as well as any other constraints (Tessema et al., 2022). An example are inaccurate quantities (Yembi Renault & Agumba, 2016). Technical risks are related to the risks that cause the product to not meet the client's requirements. For example, the site may not be properly assessed, there may be a shortage of materials, or the quality of the materials may be poor (Kamane & Mahadik, 2013; Tessema et al., 2022). Construction risks are related to all risks related to the execution of the project, these are mainly time, money and quality problems (Kamane & Mahadik, 2013; Tessema et al., 2022). Examples include availability and productivity of labor, material shortages, site conditions and safety conditions (Kamane & Mahadik, 2013). It is also about the link between the specifications and the actual execution, this can go wrong due to miscommunication (Yembi Renault & Agumba, 2016).

Construction management can lead to management risks, such as poor communication, the lack of a proper project manual, lack of procedures, inability to take corrective actions quickly, poor quality control, poor control of status assessments, lack of an experienced person in the project team, and an inadequate communication infrastructure (Tessema et al., 2022; Yembi Renault & Agumba, 2016). Additionally, a short tender period, incorrect feasibility study of the project, time pressure, and lack of experience with similar projects in the past are also some of the management risks (Tessema et al., 2022). Contractual risks are risks related to errors in contract documents, inappropriate documents or inappropriate contractual relationships (Akintoye & MacLeod, 1997). Risks of these errors can include claims and disputes, disruption of work, work stoppages, lack of coordination, delays and additional costs (Akintoye & MacLeod, 1997). The financial risks are about whether the client has enough money to complete the project but also about the financial situation of contractors and subcontractors (Akintoye & MacLeod, 1997; Tessema et al., 2022). It can be about delayed payments (Yembi Renault & Agumba, 2016).

According to Zou et al. (2006) risks can be divided into cost-related risks, time-related risks, quality-related risks, environment-related risks, and safety-related risks (Zou et al., 2006). These risks are all covered under the other categories.

To get a comprehensive view on the risk categories included in this research and the specific risks in Table 1 an overview is shown of the risks categories, the risks and their explanation.

Table 1: Risks in the construction industry

Risk Category	Description	Source
External risks		
Environmental risks	Bad weather conditions, climate change and the environmental impact of the project such as loss of flora and fauna.	(Kamane & Mahadik, 2013; Nagalla et al., 2018; Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Political risks	Change in laws and regulations	(Nagalla et al., 2018; Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Economic risks	Inflation	(Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Internal risks		
Design risks	Errors in the design, inaccurate quantities	(Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Technical risks	The site may not be properly assessed, there may be a shortage of materials, or the quality of the materials may be poor.	(Kamane & Mahadik, 2013; Tessema et al., 2022)
Construction risks	Risks related to the execution of the project, these are mainly time, money and quality problems. Examples include availability and productivity of labor, material shortages, site conditions and safety conditions. Gap between specifications an actual execution.	(Kamane & Mahadik, 2013; Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Management risks	The lack of a proper project manual, poor communication, lack of procedures, inability to take corrective actions quickly, poor quality control, poor control of status assessments, lack of an experienced person in the project team, and an inadequate communication infrastructure Additionally, a short tender period, incorrect feasibility study of the project, time pressure, and lack of experience with similar projects in the past are also some of the management risks.	(Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Contractual risks	Risks related to errors in contract documents, inappropriate documents or inappropriate contractual relationships.	(Akintoye & MacLeod, 1997)
Financial risks	The client has not enough money to complete the project, also about the financial situation of contractors and subcontractors.	(Akintoye & MacLeod, 1997; Tessema et al., 2022; Yembi Renault & Agumba, 2016)

2.2.2 Criteria for selecting contractors

The choice of a contractor impacts the efficiency of a project (Zavadskas et al., 2008). Often the contractor who bids the lowest price is chosen when selecting a contractor (Xiaohong, 2011; Zavadskas et al., 2008). This method is called cost-based selection (Olaniran, 2015). The method of cost-based selection assumes that the decision makers can achieve the most optimal results through rational processes and objective criteria (Pesämaa et al., 2009). In modern, mainly complex situations, the products or services often have characteristics that cannot be judged by objective criteria only (Pesämaa et al., 2009) . As a result, subjective criteria such as familiarity, reputation, legitimacy, compliance with quality and quality standards or other standards also need to be included in the consideration to avoid risks (Pesämaa et al., 2009).

Every contractor has their own strengths and weaknesses, and it is important to assess this in advance (ng et al., 1999). Evaluating contractors is a complex task due to ambiguity and its difficulty to formalise, therefore it is often based on intuition and past experience (Luu & Sher, 2012).

However, this leads to higher exposure for the client (Zavadskas et al., 2008). According to Hatush & Skitmore (1998), the needs and goals of the client of a particular project must be determined in order to establish appropriate contractor evaluation attributes. This includes consideration of price, time, quality parameters, level of uncertainty, flexibility to make changes, management of risk and a contractor's ability to deal with complexity (Hatush & Skitmore, 1998).

There are often five main criteria used to assess the likely performance of contractors. These are: financial strength, technical ability, safety performance, management capability and reputation (Hatush & Skitmore, 1997). Also, contractors' organisation, experience, past performance and past relationship can be distinguished (Choi et al., 2006; Holt et al., 1994b; Nieto Morote & Ruz-Vila, 2012). According to a quantitative study conducted by Taylan et al. (2018), the same criteria as the criteria stated by Hatush & Skitmore (1997) are most used for contractor selection (Taylan et al., 2018). This study also shows some sub-criteria in which the aspects experience and past performance can be seen. Using the main criteria and considering the sub-criteria are therefore sufficient for assessing the capabilities of the contractor. In Figure 2 an overview of the criteria, including the sub-criteria, is shown. Retrieved from the study of Taylan et al. (2018).

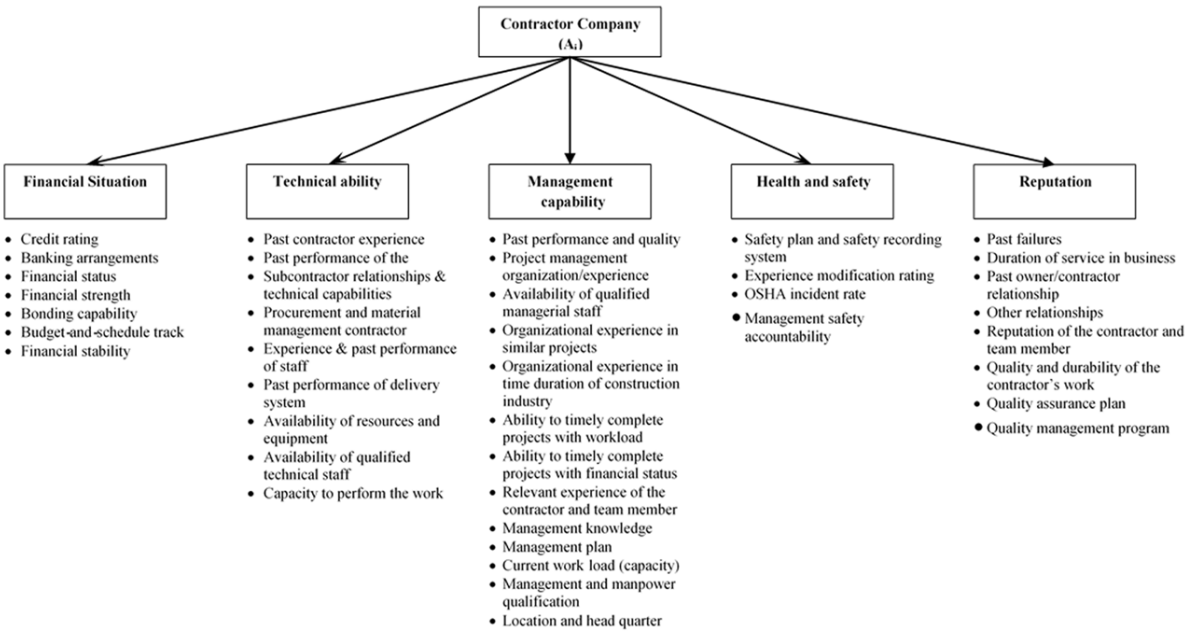

Figure 2: Overview of contractor selection criteria according to Taylan et al. (2018)

Besides the fact that these criteria are often used to assess the capability of contractors, it is not yet clear on what criteria contractors are selected and to which aspects clients attach the most value (Hatush & Skitmore, 1997). The main contractor ensures that the tasks and activities are carried out and, in doing so, coordinates and manages the suppliers (Pesämaa et al., 2009). As a result, the customer has the general contractor as a point of contact and ensures that contractual agreements and requirements are met (Pesämaa et al., 2009). Therefore, the relationship with the contractor is important (Dekker & Van den Abbeele, 2010). According to a study of Doloi (2009), relationship is also a criterion considered when assessing a contractor's performance (Doloi, 2009). To reach more efficiency and manage risks, clients and prime contractors are increasingly coordinating their activities and often developing close cooperative relationships (Pesämaa et al., 2009).

It can be concluded that not enough is known about the actual use of these concepts in practise, especially in the private sector. After many enquiries, it appears that there is still no agreement on the criteria for the selection of contractors (Hatush & Skitmore, 1997). However, there are a few factors that keep recurring. The lowest bid emerges most often because it is the most objective criteria. Furthermore, financial and technical aspects also often come back as important aspects (Hatush & Skitmore, 1997). In Table 2 the few main criteria that are used for selecting contractors according to literature are viewed.

To understand if the criteria in Tabel 2 really apply in practice in the private sector, interviews will be held. The aim is to explore to which aspects clients attach the most value, on which aspects they choose the contractor and whether they try to reach cooperative relationships.

Table 2: Contractor selection criteria

Selection criteria	Description
Lowest bid	Hereby the client chooses their contractor based on the lowest bid of executing the project.
Financial strength	This entails the financial status, strength and stability of the contractor.
Technical ability	This entails the technical competence of the contractor which also consist of their experience and availability of resources and technical qualified staff.
Management capability	This entails the project management performance of the company and whether they have managerial qualified staff. Management experience is also part of this.
Health and safety	Health and safety are about health and safety management and whether the contractor complies with rules and regulations.
Reputation	Reputation is about the experience with the contractor and whether things have gone wrong in previous projects. It is also about the business relationship the client has with the contractor. This is tested against the three characteristics of a business relationship, as described in the theory above. These are: trust, commitment and satisfaction.

2.2.3 Risk allocation

Because the circumstances and the environment in the construction industry are not stable, risk management is important (Abderisak & Lindahl, 2015). Besides contractor selection criteria, another way of risk management is risk allocation. Risk management involves identifying risks and implementing strategies to minimise, share, transfer, or accept the risks (Jergeas & Put, 2001). Therefore, the client needs to handle the risks or transfer them to another party (Abderisak & Lindahl, 2015). This decision is based on whether the client can properly assess, minimise or control the risks or not (Abderisak & Lindahl, 2015). Whether the client or the contractor handles the risks, is called risk allocation (Abderisak & Lindahl, 2015). Risk allocation takes place through the negotiation of contract clauses. Research shows that formal contracts ensure proper alignment of the interests of the parties involved and control of behaviour (Dekker et al., 2013).

Contracts are designed to establish the arrangements that have been mutually agreed upon (Loosemore & McCarthy, 2008). Effective negotiation involves effective communication of potential risks, which is important because otherwise conflicts of interest between the client and contractor arise from procurement and contractual practices (Loosemore & McCarthy, 2008). Risks should ideally be allocated to the party that can best handle and manage them. However, in practice, risks often do not lie with the most suitable party (Perez et al., 2017). Usually, the contract is prepared by the client. In many cases most of the responsibilities are passed to the contractor (Jergeas & Hartman, 1996; Lam et al., 2007). In the private sector, there are concerns about dealing with inexperienced clients, shifting priorities, inadequate briefs, and incomplete designs and service level agreements (Loosemore & McCarthy, 2008). When the contractor signs the contract, they accept the risks for both the controllable and uncontrollable risks (Lam et al., 2007). The response to the contract is influenced by the extent to which the contractor can and is willing to bear the risk. When the risk is unfairly assigned to the contractor, they may increase the price or sometimes deliver lower quality (Lam et al., 2007). Disputes over the work can escalate to the point where legal action is taken. When this happens, the costs of paying for the incurred damages and legal fees are substantial (Lam et al., 2007). Therefore, the allocation of risks is a very important issue.

There are standard sets of general contract terms and conditions that can be used, but the principles behind them are not always clearly stated (Lam et al., 2007; Loosemore & McCarthy, 2008). Problems may arise if additional risk clauses are applied to it (Lam et al., 2007).

3. Methodology

Within this section, the methodology of this research will be discussed. First, the research design will be explained. Second, the data collection and data analysis will be outlined, followed by the interview plan.

3.1 Research design

To gain a better understanding of how clients choose their contractor and how they integrate risk management in their decision, qualitative research is conducted. Qualitative research enables the detailed exploration of people's experiences using a specific set of research methods, for instance in-depth interviews, focus group discussions, observations and content analysis (Hennink et al., 2020). Qualitative research makes it possible to explore the 'human' side of an issue which means that feelings, opinions and views of a person can be researched (Mack et al., 2005). The advantage is that you get a deeper understanding of their view and experience (Hennink et al., 2020). This research consists of three phases; a literature review, a document analysis and interviews. Figure 3 shows the several phases of the research design.

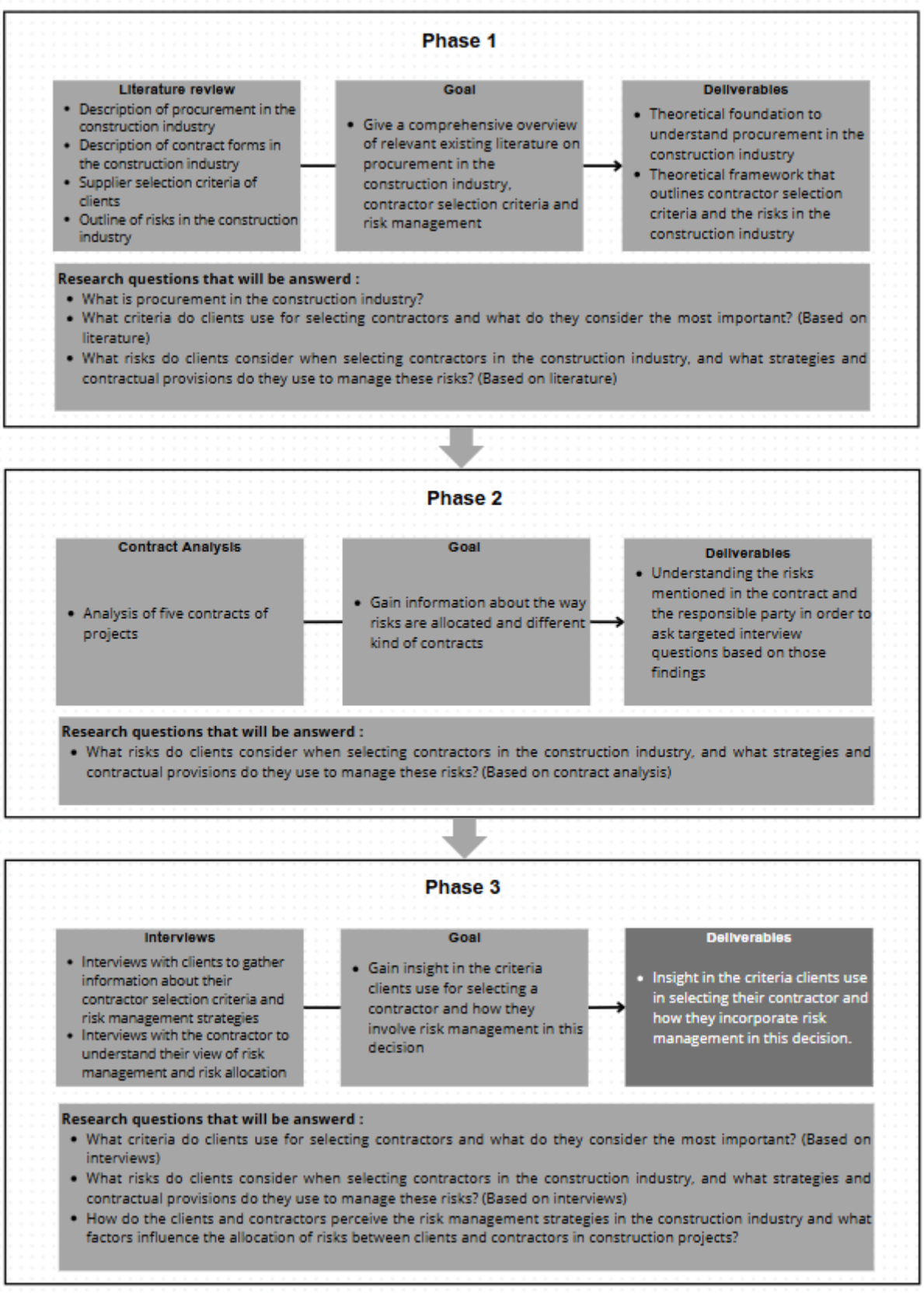

Figure 3: Overview methodology

As can be seen in Figure 3, this study consists of three phases. In this chapter the different phases will be explained.

3.1.1 Phase 1: Literature review

First, a literature review is conducted about main construction risks, criteria clients use for selecting contractors and risk allocation. Literature review is a systematic way of collecting and summarizing previous research (Snyder, 2019). The aim of this literature review was to gain an understanding of those aspects which is valuable for the rest of the research because this serves as a framework. After the literature review, the main project risks and the main criteria clients use for the selection of contractors were clear. The main overview of the main construction risks serves as framework for the contract analysis and both the construction risks, and the contractor selection criteria were used in the interviews. In this way the aspects derived from theory were tested in practice. In chapter 2.2.1 the main construction risks and in chapter 2.2.2 the main contractor selection criteria are shown. In the literature review also, research has been conducted about risk allocation, since this appeared to be a risk management strategy along the contractor selection criteria. This part is shown in chapter 2.2.3.

Multiple case study

Phase 2 and 3 of this study are part of the multiple case study. A case study is an intensive study of a person, a group or a certain unit with the goal to generalize over several units (Gustafsson, 2017). In this study, the unit of analysis are different projects from one case company. The case company is [redacted] Five different projects from this case company are analysed in which every project can be seen as a case. That is why this study is called a multiple case study (Heale & Twycross, 2018). A multiple case study provides a deeper understanding of the cases as a unit (Heale & Twycross, 2018). This is because the similarities and differences between individual cases can be compared. Often a multiple case study is stronger and more reliable than single-case research (Heale & Twycross, 2018). When conducting a multiple case study, it is important to choose a good sample. One effective way is to select different projects to allow for some degree of generalization (Seawright & Gerring, 2008). This method of case selection is suitable for both exploratory and confirmatory research (Seawright & Gerring, 2008). As this research is exploratory, this method of case selection has been used.

Case company

The multiple case study is conducted at [redacted], a Dutch construction company that focuses on the building of company premises. [redacted] has developed from a capacity provider to a full-service provider [7]. This means that [redacted] initially focused primarily on carrying out specific construction projects, with a focus on technical execution and delivering construction services [7]. Now, they not only handle the technical execution of construction projects but also provide services in design, engineering, and project management [7]. This signifies their increased involvement across the entire process. [redacted] only works with private clients, this research will therefore focus exclusively on the private sector. [redacted] is a suitable company for the research because it is a medium-sized company specialising in corporate housing. In doing so, it is a company that has been existing for more than 120 years which means they have many years of experience. They have already completed many projects for different types of clients. As a result, there is sufficient expertise and experience to carry out this research.

As mentioned, the case study consists of contract analysis and interviews. This will be further elaborated on in the next paragraphs.

3.1.2 Phase 2: Document analysis

For the document analysis, five contracts will be studied. Contracts provide a clear framework of the agreements made between the client and the contractor prior to the interview. This clarity helps ensure that the interview is conducted with greater focus, enhancing its overall quality. Moreover, contracts serve as a useful tool for validating whether the topics covered in the interview align with the original terms of the agreement.

The contracts are related to a project of the case company as part of the case study. This contract analysis is called a document analysis, a systematic procedure that can be used to review and evaluate documents (Bowen, 2009). The purpose of this document analysis was to gain knowledge and understanding of the contracts that are analysed (Corbin & Strauss, 2008).

[7] [redacted]

Within the document analysis, the focus was on identifying ways in which suppliers mitigate risks and examining the consequences for contractors if they fail to meet their obligations. Based on this data, a preliminary understanding of how suppliers mitigate risks was formed prior to the interviews, allowing for more in-depth questions during the interviews. The document analysis is structured based on the main risk management factors that were derived from the literature. These are: environmental-, political-, economic-, design-, technical-, construction-, management-, contractual- and financial risks.

The advantages of document analysis are that the data is very exact because the events, data and details are clear (Bowen, 2009). The document analysis is conducted based on the READ method; this is a systematic procedure for collecting documents to gain information at any level (Dalglish et al., 2020). The READ method follows the following steps; 1. read the materials, 2. extract data, 3. analyse data, 4. distil the findings (Dalglish et al., 2020).

3.1.3 Phase 3: Interviews

In the third phase, interviews are held to ask in-depth questions and further explanations and arguments (Mey, 2022). With interviews it is easy to ask for people their opinions and experiences (Moriarty, 2011). These interviews are held in addition to the contract analyses to ask for explanations and discuss the important things derived from the contracts. The interviews are also used to gain information about the contractor selection criteria of clients and the importance they attach to each of the criteria.

Four projects are analysed for which an interview is held both with the contractor as well as the client. In this way, the view of both parties will be analysed. This is important because in this way the story is told from two sides which gives a more reliable view. For one project that is analysed, only the contractor is interviewed. There were discussions in the contracting phase. Because of these discussions it is not possible to have a conversation with the client. However, this case is still important and useful because in the contract analysis and the interview with the contractor, knowledge can be gathered about risks and the way these risks were managed in that project. Specifically, because of the discussions about risk allocation, this is useful. The five projects are the case study projects were also the contracts are analysed from.

The interviews were semi-structured which means that the interviews were held based on predetermined open-ended questions with the opportunity to add other questions that emerge from the dialog between the interviewer and the interviewee (DiCicco-Bloom & Crabtree, 2006). It therefore allows space for natural flow to gain insights about the participants unique perspective (Adeoye-Olatunde & Olenik, 2021). This flexible type of interviewing enables the interviewer to ask deeper questions and gain deeper insights (DiCicco-Bloom & Crabtree, 2006).

The purpose of those interviews was to understand what criteria clients consider when choosing a contractor, which risks they take in account and in what way those risks influence the decision for a certain contractor. Examples of questions are for instance: What criteria do you consider when selection a contractor and why? Do you take risks into account when selecting/choosing a contractor, in what way? Are all contracts the same or does it vary for each contractor, and why? Since it is recommended to develop an interview guide beforehand for semi-structured interviews an interview guide is developed before the interviews (Mashuri et al., 2022). The interview guide is shown in Appendix III and IV. Based on this interview guide, the interviews are conducted systematically to ensure the correct information is gathered, while still allowing for additional input from the interviewee (Mashuri et al., 2022). The interview guide was established based on input from the literature review and the contract analysis. Table 3 shows an overview of the data collection.

Table 3: Data collection

Number	Project number	Client & Contractor	Interview	Contract analysis	Description
1.	1	Client & Contractor	Yes	Yes	Understanding contractor selection criteria and risk management
2.	2	Client & Contractor	Yes	Yes	Understanding contractor selection criteria and risk management
3.	3	Client & Contractor	Yes	Yes	Understanding contractor selection criteria and risk management
4.	4	Client & Contractor	Yes	Yes	Understanding contractor selection criteria and risk management
5.	5	Contractor	Yes	Yes	Understanding contractor selection criteria and risk management

To analyse the data, the data from the interviews were coded. Abductive coding is used, which consists of a combination of inductive and deductive coding (Vila-Henninger et al., 2022). Deduction involves testing a theory and examining whether it holds true in practice (Thompson, 2022). In contrast, inductive research involves forming a theoretical understanding based on observations or assumptions (Thompson, 2022). This means that questions or categories are prepared in advance of the interviews based on theory from the literature review (Thompson, 2022). This ensures that the researcher does not enter the interviews with an open mind but can ensure that the right questions can be asked so as not to deviate too far from the subject. Because it is impossible to have all the theory completely thought out in advance and there are always additional aspects in practice, this theory will therefore be supplemented with the interviews (Thompson, 2022).

The interviews were transcribed with Turboscribe. The coding is done with Altas.ti. This software makes it possible to create a systematic and structured analysis of the transcriptions.

Eventually based on the contract analysis and the interviews, a comprehensive overview is created which shows the relationship between the main criteria for choosing a contractor, the way risks are allocated, and what the relationship is between those two aspects for risk management. Different qualitative research methods are combined to assess the same phenomenon, this is called triangulation (Triangulation, 2014). Triangulation ensures that the findings are viewed from different perspectives which ensures that there is more confidence in the outcome, it gives a more comprehensive outcome (Heale & Forbes, 2013). This is reached by conducting a contract analysis and interviewing both the contractor as well as the client.

3.2 Data analysis

The overall data analysis is conducted based on the thematic analysis. Thematic analysis is a method of identifying, analysing and reporting patterns, also called themes, within data (Castleberry & Nolen, 2018). It is a method for analysing qualitative data, it is flexible and can be applied to different types of qualitative data (Kiger & Varpio, 2020). The analysis consists of six phases: familiarizing yourself with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report (Kiger & Varpio, 2020).

4. Results

This chapter provides a detailed description of the five analysed projects, examining the risk management practices. First, the view on risk allocation of both the client and the contractor is explained for each project. Second, contractor selection aspects are explored in the interviews based on the following aspects derived from literature: lowest bid, financial strength, technical ability, management capability, health and safety and reputation. For each project, a table outlines the criteria used by the client to select contractors and the methods applied.

Thirdly, the literature identified the most common project risks as: environmental, political, economic, design, technical, construction, management, contractual, and financial. The contract analysis examined whether these aspects were contractually addressed and in what manner. Based on the interviews, it was also assessed whether contractors and clients take these factors into account and how they manage the risks. For each project, a table is included that first outlines the contractual aspects, followed by the aspects identified in the interviews.

4.1 Case description and analysis Project A

Client A is a leading investor, developer and operator in the logistics real estate sector. The distribution centre involves a total of 38,246 m2. The construction project complies with BREAAM-NL and Casco + Excellent certification. The interviews were conducted with the contractors' chief operations, who was also the project manager for this project and the technical developer of client A who managed this project.

4.1.1 Vision on risk allocation

Client

The client indicates that they are both an investor and a developer, and that the parties investing with them want as little risk as possible. Since construction inherently involves risks, the client tries to allocate as many risks as possible in the contract to the contractor. The contractor must then assess whether the risks are acceptable. However, the client emphasizes that they are not simply shifting risks without reason; the contractor is given space to indicate what is feasible and what is not. A factor that influences the strictness of the contractual approach is whether a tenant has already been identified. If no tenant is known yet, there is more flexibility regarding the completion date. Ultimately, the client states that the contract is the contact and if the project is completed late, the penalty amount specified in the contract will be discussed and maybe used.

The client mentions that many risks lie contractually with the contractor, but he also acknowledged that the contractor has legal rights. They cannot override all legal provisions and aim to be reasonable, especially when there is a good working relationship. If issues are properly discussed and explained with supporting documentation, the client believes a solution can always be found. Ideally, the client does not need the contract but if there are disagreements, the contract will be looked at.

The client emphasizes that they do not take on much risk contractually. If the contract is well-prepared, most risks lie with the contractor. The contractor is responsible for managing the project and choosing which parties to work with. Therefore, according to the client it is logical that the contractor is responsible and has to bear these risks. This also applies to the project schedule. In cases of unforeseen circumstances, such as component shortages caused by the war in Ukraine, the client understands that those are force majeure circumstances and then the client is willing to work together to find a solution.

Open communication and transparency foster a good working relationship according to the client. They value being able to access all relevant information and attend meetings. They want to be actively involved in the project to build mutual trust. By addressing issues promptly and providing the client with insight into the documents, they believe risks can be better mitigated.

Contractor

According to the contractor, clients assign all risks to the contractor. He acknowledges that they as contractor are ultimately a kind of management company, and it is therefore right for them to be responsible. However, he does indicate that the thinks it is important for them to be open if the contractor faces some challenges. Regarding client A as a client, he indicates that they think along well, for example in the preliminary project they thought about fall protection themselves.

The contractor states that it is good to work together with the client. Sometimes there are disagreements, but these should be resolved collectively. He explains that it's a matter of give-and-take: sometimes they accommodate to the client and other times the client accommodates to them. He notes that contracts with new clients are often tighter looked at. Moreover, he said that contracts are usually handled with more flexibility than the contracts suggest. The contractor believes it is important to deliver on time if that is the agreement. If the client treats them respectfully, they will treat the client the same. Ultimately, the contractor's goal is to establish a long-term relationship with the client. The interview revealed that the contractor does not think the type of relationship with the client affects the risk degree. However, having a good relationship makes collaboration and the work environment on the site much more pleasant.

Conclusion
The client and contractor have both different and similar approaches to risk allocation and management in the construction industry. As investor and developer, the client wants to contractually allocate most of the risks to the contractor. However, he does emphasize that the contractor also has legal rights and that there is still a degree of reasonableness. Especially in cases with unforeseen circumstances such as supply shortages due to war, he wants to look for solutions together. Open communication and transparency are important to the client to foster trust and cooperation and to effectively resolve challenges.

The contractor recognizes that they are responsible for many risks and agrees that this makes sense given their role as a management agency. They value good collaboration with the client, where there is flexibility in dealing with challenges. The contract often stands as a strong foundation, but the contractor indicates that in practice this is acted upon a bit more flexibly. A good relationship with the client, based on trust and cooperation, improves the overall atmosphere of the project.

4.1.2 Contractor selection criteria

In a tender, sometimes the client approaches two or three parties from a previous collaboration, or contractors approach the client to participate. Beforehand, client A assesses the reliability of contractors using an extensive questionnaire. In doing so, they try to get clarity on aspects such as stability, finances, reference projects and project organisation. Based on this preselection, about three parties are chosen to submit a price proposal.

The client indicates that they think along with the contractors' bids, so if there is a big outlier somewhere, they mention it to avoid mistakes in the calculation. All parts of the contractors' quotations are discussed with them to detect outliers and reduce risks. In addition, the client asks questions about the quote itself to mitigate their risks. Once the contractor is chosen, a contract is made. This is a blank contract with no names, no prices and no further specifications. It contains only all the preconditions and the price. The specifications in this contract are often discussed and negotiated. Table 4 shows the results from the interviews on contractor selection criteria.

Table 4: Results contractor selection project A

Selection criteria	Interview results
Lowest bid	The contractor experiences that price is often the deciding factor when selecting a contractor. The client indicates that a preselection is made so that contractors can be compared based on other criteria. Ultimately the lowest price is the determining factor.
Financial strength	Contractors are pre-assessed by the client to ensure they are financially strong and stable enough to manage and construct the project.
Technical ability	The contractor's technical ability is evaluated based on the experience of the contractor such as, projects they have completed, the clients they have worked for, and whether they have proven their capability in the past.
Management capability	The ability of the project team is assessed by requesting CVs in advance and obtaining information about the qualifications and completed courses of the project team members. However, the client mentions that this is challenging to evaluate and is largely based on trust.
Health and safety	Some aspects are defined in the contract, but the client admits that these are difficult to assess. In practice, it is ultimately a matter of experience. Each contractor is required to have a safety plan, but as a selection criterion, this is hard to assess and incorporate.
Reputation	Contractors are also selected on their name and reputation in the market. Some companies are known as specialists in their field. Additionally, the client selects parties they want to work with. Often, parties with whom they have collaborated before and had a good working relationship are invited again.

A factor that can influence the contractor selection is the influence of the market situation. Sometimes there is plenty of work and other times it is hard to find enough projects. Both the contractor and the client mentioned this fluctuation.

Conclusion
Before the tender, there is a pre-selection process where the goal is to select parties that are capable and strong enough to execute the work. The contractors are being screened on stability, financial stability, reference projects and project organisation. Also experience with and the reputation of contractors, health and safety practices and reliability are taken into consideration. Once the qualified parties are selected, price can be the deciding factor in the tender. While price is a key factor, the client makes sure to discuss bids with contractors to ensure a fair comparison. Moreover, other factors can come into light such as availability or specific situation related to the tender which can influence the decision.

4.1.3 Project risks and risk management

In this contract, the Uniform Administrative Terms and Conditions for the Execution of Works 2012 (UAV) are applicable. In Table 5 the project risks are explained based on the agreements stated in the contract and the results from the interviews.

Table 5: Results risk management project A

Risk category derived from literature	Contract results	Interview results	Covered by client

Environmental	- Contractor is responsible for assessing site, ground and weather conditions, except for unassessable conditions.
	- Building must meet BREEAM Excellent and MIA tax benefit criteria.
	  - Documentation for MIA tax benefit to be provided within five months of contract signing.
	  - Contractor liable for non-compliance with certifications.
	- Only clean sand or rubble aggregate allowed for site foundations.
	- Contractor guarantees no use of immobilized materials or similar substances.
		- Delay due to unworkable days is at contractor's risk. There is a strict end date in the contract.
		- BREAAM is a risk because not everyone has this knowledge and expertise, so it is important to have a party that is skilled in this.
		- Contractor says he must plan and coordinate well with subcontractors to avoid delay due to unworkable days.
		- Unworkable days are solved by continuing work on weekends or holidays, or by adjusting schedules to ensure the building is, for example, water and windproof before winter starts.
			✓

Political	- Contractor must comply with all laws and regulations effective at the signing date. - Works must be completed within the agreed timeframe.	Nothing mentioned.	✓
Economic	- GMP (Guaranteed Maximum Price) is fixed and not subject to indexation or inflation. - No additional fees allowed unless a change order is issued.	- Contractor and client state that there is a fixed price, and the contractor is responsible for price fluctuations. When a change in the work is requested, the price does get adjusted. - The client says that the contractor must decide for himself whether the risk is acceptable or not. - The contractor says this is seen over the longer term, sometimes the economy is favourable and sometimes unfavourable.	✓
Design	- Contractor responsible for: Execution design completeness and feasibility. Compliance with all agreement conditions and laws. - No extra payments for unspecified materials or work. - Client approval does not transfer responsibility to the client.	- The contractor is responsible for the design. The contractor designs the construction with the architect as basis. - Model is drawn in 3D and there are engineers' consultations with clash sessions where the little mistakes are removed.	✓
Technical	- Work to be carried out by qualified employees or subcontractors. - High-quality materials must be used, with regular inspections.	- Contractor depends on installer due to his expertise, it is important to secure a good installer. - The contractor says it is important to look for subcontractors who are flexible so that some changes can be made in the schedule if a material is not delivered or something similar. They look for	✓

		reliable, flexible and recurring subcontractors as much as possible.	

Construction	- Contractor bears site and building risks from start to completion.
	- Construction safety:
	  - Supervised on-site safety measures.
	  - Quality and inspection plan required before execution.
	- Construction guarantees must be issued by completion.
	- Contractor liable for:
	  - Injuries or deaths during construction (except due to client negligence).
	  - Loss or damage to property during construction.
		- There is a maintenance and warranty contract where the contractor is still obliged to repair defects after completion for a certain period.
		- In the specifications and contracts, there is a focus on safety. However, the client does indicate that this is interpreted differently by everyone and that in practice it is often a matter of experience.
		- According to the client, screening H&S is one of the most difficult disciplines.
			✓

Management	- Client can approve or reject subcontractors within 10 working days. - Contractor responsible for achieving agreed results without claiming additional compensation.	- A risk is that the schedule may not be met. - Regular meetings are held in the construction site office with all parties present. These meetings are used to discuss what everyone is facing to react quickly in case of problems. - The client says they pre-assess the contractor based on whether there have been incidents in the past, bad publications, records and annual reports. This is repeated annually.	✓
Contractual	- Contractor cannot transfer or assign rights without client's consent. - Client may terminate the contract if commencement is delayed. - Contractor waives retention rights unless the client defaults on payments. - Contrary to Section 49 UAV 2012, the parties shall submit all disputes arising between them from the Agreement to the competent court in the district of [redacted]	Nothing mentioned.	✓

Financial	- [redacted] withheld until BREEAM certification is delivered.
	- Late completion penalty: [redacted] per day (capped at 5% of GMP).
	- Bank guarantee required.
	- Contractor must maintain:
	  - Construction All Risks (CAR) insurance covering at least the GMP.
	  - Professional liability insurance with coverage as per contract.
	  - Client to be named as co-insured on policies.
		- The bank guarantee is applicable. The contractor states that he provided the bank guarantee on his own accord in the 4th meeting because the client had forgotten. This shows that in practice things are often more flexible than formal.
		- Both interviews mentioned that there is a payment penalty for late delivery. When there is no tenant yet, there is slightly more leniency than when the tenant is known.
		- Contractors are pre-assessed for financial capacity and stability.
		- The client indicates that the contractor should obtain CAR insurance and professional liability insurance.
		- The combination of the bank guarantee, insurance and G-account provide assurance. Which of these are used can vary also depending on the contractor's preferences.
			✓

Conclusion

What is noticeable when looking at the contracts and interviews is that the risks are assigned to the contractor. In this project, all the risks that came out of the theory are covered by the contract. There is a strict deadline where the contractor is responsible for meeting it despite weather conditions, for example. The contractor is also responsible for complying with all rules and regulations and for achieving BREEAM certification, this is written in the contract and confirmed in the interviews. According to the contract, the contractor is responsible for complying with laws and regulations. This was not discussed in the interviews.

Furthermore, a fixed price is agreed in advance, which cannot be adjusted later due to factors such as indexation or inflation. The client says that it is the contractor's responsibility to see whether they can bear these risks or not. In this regard, the contractor says they are considering this over the long term where prices are sometimes with and sometimes against. The contractor is also fully responsible for the execution design, the deployment of qualified workers and subcontractors and for safety on the construction site. To ensure that good subcontractors are chosen, the client can approve or reject them. The contractor tries to work with regular and recurring subcontractors, especially for crucial elements such as installers, to ensure high quality.

The client builds in a few more securities for itself in addition to contractually assigning the risks to the contractor. For example, the contractor and subcontractors must waive its retention rights. However, this only applies if the principal is paying on time. Hence, this also provides some security for the contractor. There is also a penalty if BREAAM certification is not achieved and another penalty per day for late completion. Furthermore, a bank guarantee is required and the contractor needs Construction All Risk (CAR) insurance and professional liability insurance. The client must be included as a co-insured.

It became clear from the interviews that the contract was not as strictly adhered to as it was claimed. The contractor later provided the bank guarantee itself because the client forgot to ask for it. It was also indicated that they are somewhat more lenient with the penalty for late completion if a tenant has not yet been identified. It can therefore be concluded that while everything is firmly established in the contract with all risks on the contractor, there is a bit more flexibility in practice. Should there really be any disputes, the contract describes that the parties shall submit all disputes arising between them from the Agreement to the competent court.

4.2 Case description and analysis Project B

Client B is a company that develops logistics real estate and then rents it out. Sometimes they buy and rent it, and other times they build and rent it. This project was a fully automated distribution centre with a built-up area of 13,062 m2. Besides the automated areas, there are also a number of traditional storage areas, a PGS area (for flammable products) and cold storage. The interviews were conducted with the contractor's head of site operations, who was also the project manager for this project and the project leader of client B.

4.2.1 Vision on risk allocation

Client

The client states that, as both a developer and client, they believe most risks should lie with the contractor. They aim to transfer all terms and conditions made in the agreement with the tenant into the agreement with the contractor. This includes as example delay penalties. They do this to avoid commercial risks by legally shifting the risks. In principle, the client focuses on good collaboration and rarely refers to the contract. However, in this project the contractor arranged a certificate for the groundwork too late which resulted in the case that the groundwork needed to be replaced. In situations like this, the legal team of the client examines the potential worst-case scenarios. In this case with the fault in the groundwork, the contractor was responsible, but the client acknowledges that the contractor handled the situation more than appropriately. The client notes that if they had worked with a partner, they knew less well, the risk might have been higher. As a publicly traded company, client B is highly sensitive to media perception. Any negative press could cause significant problems.

The client emphasizes the importance of the relationship with the contractor regarding risk management. They value the relationship because, when things go well, it is positive for everyone, but if things go wrong, it is crucial to have mutual support. The client assumes that the contractor is the specialist and therefore it is logical for them to bear the risks. However, the client is more flexible with the contract if there is a good relationship, then there is more trust and solution-oriented thinking. Conversely, in case of a less good relationship, the client indicates that taking legal action is more likely.

Contractor

The contractor states that they have paid for the mistake made with the groundwork. The reason they took responsibility for this is because this is a developer where they do many work for. They want to avoid arguments with regular and long-term clients. In this case, the contractor solved it before discussing who would end up paying for it, because the contractor would rather solve it quickly and have a discussion afterwards than be delayed and fail to meet the schedule. Not meeting the schedule also costs money.

Conclusion

The client states that they believe most risks should lie with the contractor. In principle, they focus on good collaboration and rarely rely on the contract. However, in case a problem arises, the legal department does review the contract and considers the worst-case scenario. The client is more flexible with the contract if they have a good relationship with the contractor compared to when this is not the case. Because client B is a publicly traded company, they are sensitive to media perception, meaning that negative press could cause significant problems. For this reason, they aim to shift risks to the contractor.

The contractor states that they want to avoid disputes with regular and long-term clients. They prefer to resolve the problem quickly and discuss it afterwards, rather than risks delays which would lead to high costs.

4.2.2 Contractor selection criteria

The contractor had built phase 1 for this project and then continued with phase 2. Client B often chooses familiar partners. Due to good collaboration in both the present and the past, they came to the contractor. Client B approached three out of four parties to request a price quote. The description in the price request is very brief, more like a program of requirements. The reason for this brief request is that they build tailored to the client, and they want to build quickly. If they are more specific themselves, it takes a lot of time. This results in them choosing familiar partners, as they know what to expect. Table 6 shows the results from the interviews on contractor selection criteria.

Table 6: Results contractor selection project B

Selection criteria	Interview results
Lowest bid	The contractor states that he believes the final selection is usually based on price. The client states that they issue a price request to four or five fixed parties and assumes that the prices are in line with the market. Eventually the final choice is based on the lowest price. However, the client mentions that the prices are often very close to each other after the negotiations.
Financial strength	The financial situation is being checked based on reports and annual reports etc.
Technical ability	The contractor states that they had a preferred position because they already completed phase 1 of the project, which means they have already proven themselves. The client states that it is a specific sector with not many parties who can do it well, so they prefer to choose from four or five parties they know can do it well. The client also mentions that they spread risks, so if one contractor is already doing multiple projects for client B, they are more likely to assign a new project to another contractor.
Management capability	The client states that at the operational level, management capacity is not considered. However, whether they enjoy working with a company is considered. He mentions that when compared to the price, the price is still more important.
Health and safety	Safety is taken into consideration, but it is not a criterion for assigning the contract. If they know they cannot do it properly, they will not take the risk. The client states that this is often similar among the parties they work with.
Reputation	They contractor mentions that he believes they are chosen based on reliability because they keep their commitments, and if something is not possible, they communicate it immediately. The client states that they seek reliable partners and that they have had a good collaboration with the contractor in both the past and the present. They want to build quickly with minimal risks and conflicts, which is why they choose reliable partners. When the financial situation of the company is stable, they prioritize experience with the contractor. According to the client, new parties are not easily added.

Conclusion

Client B prefers to select contractors they regularly work with and trust, so they know what to expect. They therefore always select a few parties they know, which means they are equal in all aspects. Ultimately, they can therefore choose on the lowest price.

4.2.3 Project risks and risk management

In this contract, the Uniform Administrative Terms and Conditions for the Execution of Works 2012 (UAV) are applicable. In Table 7 the project risks are explained based on the agreements stated in the contract and the results from the interviews.

Table 7: Results risk management project B

Risk category	Contract results	Interview results	Covered by client
Environmental risks	- In case of force majeure, agreement must be reached on the number of unworkable days, and a solution should be discussed for the prevention of delay. - Contractor is responsible for realising the BENG requirements. - If not obtained, the contractor performs additional work to meet the required score. - If the certificate is not provided in time, the client may assign other parties to carry out this work and have it carried out at the contractor's expense and risk.	- The client states that the contractor is entitled to weather-related delays. He understands these are complicated circumstances and addresses that this can be discussed. However, the tenant does not understand this, so the risk essentially lies with the contractor.	✓
Political risks	- Contractor undertakes, at his own expense and risk, to carry out all necessary work to carry out the work within all legal requirements imposed on the work and governmental regulations. - No additional charges for changes due to government decisions unless the client agrees in writing.	- According to the contractor, a risk was that a certificate for the groundwork had been provided late. They were responsible for this. - The client indicated that the contractor is responsible for complying with laws and regulations.	✓
Economic risks	- Nothing is explicitly mentioned about indexation but in the contract is stated that	- According to the client, there is no possibility of indexation of prices. This is incorporated in the fixed contract price.	✓

	the Contract Sum covers all costs, risks and profit of the contractor.		
Design risks	- Contractor has the design responsibility for the construction. The client's approval does not mean that the client is responsible and/or liable for their accuracy and completeness.	- The design responsibility lies with the contractor.	✓
Technical risks	- Client obtained the environmental permit. - Contractor guarantees that the work will be performed in accordance with the requirements of good and sound work and that he has the required employees and resources to complete the work on time.		✓

Construction risks	- Contractor is responsible for the order and cleanliness on-site.
	  - Contractor indemnifies the client against claims by third parties who believe that the client should have carried part of the obligations.
	- There is a maintenance period of 12 months after full completion of the work.
	- Additional work only qualifies for settlement if this additional work has been commissioned in writing by the client before execution and the price for the additional work has been agreed in writing.
	  - In deviation from Section 36(3) UAV 2012, the principal always has the right to change the scope of the work, to any extent, provided that the total additional payments or deductions do not exceed (20%) of the contract sum.
		- Contractor indicated that a product was used for the foundation of the building which later turned out not to be sustainable enough. The required certificate was too late, resulting in the entire foundation having to be removed. This was the contractor's risk, and they were held responsible for it and paid the costs. However, it can partly be seen as the subcontractor's fault. According to the client, this was the subcontractor's fault.
		- According to the contractor, they are responsible for safety, but this is difficult because there are also dependent on how subcontractors act.
		- Contractor stated that a significant amount of additional work was submitted due to changing tenant requirements, which is paid for by the client. The client agrees but states it is up to the contractor to determine whether the timeline can still be met.
		- In phase 1, the tenant did not sufficiently consider their needs in advance, resulting in many adjustments. In phase 2, they took more time to define their requirements. They did this with steering groups within the organisation, which resulted in the additional work lists were shortened.
			✓

Management risks	- Contractor is obliged, at his own expense and risk, to perform all necessary work required to complete the construction, within the schedule. - Contractor must notify the client in writing of the details of the subcontractors to be contracted by him at least one week before the start of the work. - Client has the right to refuse these subcontractors on reasonable grounds. - If there is a delay or damage in the execution of the work, the contractor is obliged to compensate all damage suffered by the client as a result, without prejudice to the client's right to deduct discounts from the contract price on account of a delay in delivery.	- The client requests specific individuals from certain companies to ensure the work is carried out properly. At the contractor, no distinction is made in this regard because he believes everyone has their own style but shares the same mindset of working well with the client. The biggest risk for the client is meeting the schedule, along with the availability of materials.	✓
Contractual risks	- Client can terminate the agreement without judicial intervention in the event of serious situations, such as the withdrawal of permits, cessation of the contractor's business activities, or the loss of assets by the contractor. - To the date of completion, neither the contractor nor subcontractors have retention rights unless the client defaults on instalment payments.		✓
Financial risks	- The Contract Sum covers all costs, risks and profit of the contractor.	- Both interviews indicate that a bank guarantee has been provided. The client	✓

	- Last 5% of the contract sum will be paid when the building is completed. - If there are delays, the contractor shall notify the client immediately. The parties shall consult on the consequences. - If no agreement is reached, penalty of [redacted] euro per calendar day. - Contractor needs to pay subcontractors and suppliers through G-accounts or directly to the tax authorities. - The project and the work are insured under the client's project-provided CAR insurance policy. Contractor needs liability insurance with coverage of [redacted] per event. Client will be co-insured. - Bank guarantee of [redacted] - Reduced to [redacted] when the 18-month maintenance period commences.	states that it is usually a fixed percentage of the contract sum. - The client mentions that they withhold 5% until the project is fully completed. - The contractor states that there is a penalty for late completion, often linked to the amount the client must pay to the tenant in case of late completion. - The client assesses the contractor in advance to ensure they are financially strong enough to complete the project.	

Conclusion

What stands out in this contract is that all risks are placed on the contractor and that all criteria from the literature are covered by the contract. In doing so, almost everything said in the interviews matches what is described in the contract. The only aspect that does not completely correspond is that in the contract, if there are unforeseen circumstances, it must be discussed who is responsible. However, the interview shows that this is often still the responsibility of the contractor as the tenant is often not flexible about this.

What does align is that the contractor is contractually responsible for meeting the BENG requirements and if they do not meet them, they still have to ensure they meet them at their own expense. Additionally, they are contractually responsible for complying with laws and regulations, which was also confirmed in the interviews. For instance, the contractor had arranged a certificate too late, requiring the groundwork to be adjusted. The contractor had actually paid the costs for this as well. According to the contract and interviews, the contract sum is a fixed price so again, meaning it is not adjusted for inflation or indexation. Furthermore, the contractor is responsible for the design. The problem with the groundwork was a fault of the subcontractor. The contractor was responsible for this and paid for it. This is in accordance with the contract, which states that the contractor must have the necessary resources and employees to complete the work on time and according to the requirements. Furthermore, the interviews also showed that there was a lot of extra work due to the tenant's requests, but that this was indeed properly paid for by the client, exactly as described in the contract.

The clients' risk management consists of contractually assigning the risks to the contractor. In doing so, they build in some securities for themselves through a deduction from the last payment of the contract sum until the building is fully completed, a payment via G-accounts, asking for the standard insurances, a bank guarantee and a fine per day of late completion. In addition, they are also demanding that the contractor and subcontractors waive their retention rights.

4.3 Case description and analysis Project C

On behalf client C, the contractor carried out an expansion of a new Food distribution centre. The current location was expanded by 10,000 m2, which is double the existing capacity. The current docks were also expanded by 33 docks. The building is equipped with solar panels and many windows. The interviews were conducted with the head of corporate office and project leader of the contractor and the chief general officer of client C who was responsible for the construction and management of this project.

4.3.1 Vision on risk allocation

Client

The client indicates that they prefer concise contracts. They mention that only if something goes wrong and you cannot resolve it together, you might end up referring to the contract. When the contract is not very detailed, certain aspects could fall into a grey area. According to the client this only becomes an issue in case they are going to court, but this is not preferred because in their opinion the problems need to be resolved without court. Going to court costs more time and money then solving the problem. In the opinion of the client there is no need for extensive contracts if you already agree on not going to court. Then the focus is more towards collaboration. They emphasize that when dealing with an honest and transparent party who is not trying to take advantage but instead operates fairly, they are more flexible. It must come from both sides.

In this project, there was a discussion about the groundwater level. The client stated that they deliberately left this out of the contractor because they knew the groundwater level at the construction site is very high and he did not want to be responsible for this. The client did inform the contractor that they should be mindful on this, and they both agreed to leave it out of the contract. However, during the project, the groundwater level did turn out to be higher than the contractor had thought. They ended up having discussions about whether the client should contribute to paying for the mistake. The client indicated that it was not chic and therefore would be less likely to work with the contractor again.

Contractor

The contractor states that they operate based on trust and appreciate that contracts are not too rigid or unnecessary complicated. They mention that a contract is only needed if something goes wrong, and even then, they rely on trust. The contractor explains that their company is quite flexible, so when problems arise, they aim to resolve it quickly without discussing who is the responsible party beforehand. They note that complaining to much often costs more money than solving the problem itself. Their goal is to ensure client satisfaction, and by focusing on action rather than complaints, they can build trust and achieve satisfaction. The contractor also mentions that, as part of the client's risk management approach, they prefer openness and transparency. They understand that most of the risks lie with the contractor. However, he points out that the balance between the risks contractors bear and the costs charged for those risks is often disproportionate. The price charged for taking the risks is low which ensures that the contractor cannot make many mistakes. Regarding the discussion about the groundwater level, the contractor felt it was right that they both paid for the solution.

Conclusion

Both the contractor and the client prefer short contracts without laying down to many details in advance, they rather focus on collaboration and trust. The client highlights that going to court is not beneficial for either party so since they do not want to go to court anyway, there is also no point in contractually defining everything. He prefers to solve and address problems as they arise. The contractor states that if a problem arises it should be solved first to prevent the completion date being delayed. After that, they can discuss who is responsible for the problem and who has to pay for it. The contractor agrees that they should bear most of the risks, however, they believe that the price charged to bear these risks is too low in comparison to the number of risks.

4.3.2 Contractor selection criteria

According to the contractor, it was a normal tender in which they were eventually chosen based on planning and price. The contractor says that they also participated in the tender for a subsequent project in Breda but here they were slightly more cautious because of the long distance. They therefore made a less sharp offer. The client indicates that they often issue a request to two parties. In this case, the contractor was a candidate partly because they are located near Apeldoorn. A contractor located close to the project site is preferred by the client. When considering a new contractor, they assess whether someone not only understands the theory but also has practical experience.

This is evaluated mostly based on feeling. If the initial feeling is good, the contractor may make a calculation. Critical questions are then asked to assess the contractor's knowledge and experience. Table 8 shows the results from the interviews on contractor selection criteria.

Table 8: Results contractor selection project C

Selection criteria	Interview results
Lowest bid	The client indicates that he is not necessarily looking for the lowest price but wants to buy the right thing for a market-based price. He indicates that if a party can build the same but for a few percent less that is interesting, but it is more important that the party knows exactly what he is building.
Financial strength	Beforehand, parties are screened to see if they are financially stable. However, the client does indicate that he does not find this very critical as they always pay only after the work is done. In this way, they have a buffer in case of problems. He indicates that he also sometimes works with contractors who are not very financially solid but have good expertise and are skilled. That is worth more to the client than the financial risks. They cover this by a bank guarantee or something similar.
Technical ability	The technical ability is assessed by providing only a technical description and evaluating the contractor's knowledge based on their ideas and responses. The client indicates that they observe whether the contractor asks questions about the assignment and proactively offers solutions, improvements, or sustainability recommendations. This is primarily evaluated based on intuition during the preliminary discussions.
Management capability	Nothing mentioned.
Health and safety	Nothing mentioned.
Reputation	The client says he tries to get a feeling for how the contractor reacts the moment something goes wrong. For instance, if there is a period of bad weather, they want to know if the contractor tries to still meet the schedule or requests for a delay. In doing so, he also tries to gauge whether the contractor wants to save money on all small details or whether they want to build high quality. Ultimately, intuition is the deciding factor in selecting a contractor. An estimation is made on how the contractor responds when issues arise and their reliability concerning additional costs. Specifically, whether the contractor requests extra payment for every bit of additional work or changes.

The client indicates that the speed at which the construction can take place is important to him. He also said that the location of the contractor is very important so that if something goes wrong, they are close by.

Conclusion

The client primarily selects a contractor based on intuition. Two criteria that are important for the client are; the speed of the construction and the contractor's location. If something goes wrong, the client values having a contractor situated nearby so that he can react quickly. He indicates that he finds quality more important than price. However, prices must be in line with the market and are still considered. The client always looks for a contractor who is reliable and has a lot of knowledge and expertise. This is assessed by providing only a technical description and observing whether the contractor proactively offers recommendations and asks questions about the project. He also tries to assess how the contractor handles situations where things go wrong. He values good cooperation in which the contractor takes responsibility.

4.3.3 Project risks and risk management

The contract of project C is a contract used by the contractor as a basic contract. This contract is relatively short and rarely repeats aspects of the UAV. In this contract, the Uniform Administrative Terms and Conditions for the Execution of Works 2012 (UAV) are applicable. In Table 9 the project risks are explained based on the agreements stated in the contract and the results from the interviews.

Table 9: Results risk management project C

Risk category	Contract result	Interview results	Covered by client
Environmental risks	Nothing mentioned	- According to the contractor, there is often a strict deadline these days and they must keep working in case of bad weather. In this case, the client worked with its own ground worker, so the contract had stated as a settlement item that the client was responsible for all more work in that area. - According to the client, there was a fixed deadline in the contract whereby the	☒

		contractor must therefore ensure that they do not delay due to unworkable days. However, in doing so, he does say that they try to be reasonable and fair if the bad weather is really unreasonable and long lasting. Here, it also depends on whether the contractor does its best to meet the schedule or not.	
Political risks	Nothing mentioned	- According to the contractor, as contractors, they are responsible for changing laws and regulations. The projects often do not run for more than a year so if they stay informed, it is not a huge risk.	✗
Economic risks	Nothing explicitly mentioned, however there is a fixed price.	- The contractor is responsible for price changes or inflation. - The contractor incorporates this risk into the contract price and looks at it over the long term, sometimes favourably and sometimes unfavourably. In doing so, they purchase quickly after getting the project to stay as close as possible to the calculated price and quickly shift the risks to the subcontractors.	✗
Design risks	- The contractor guarantees that in constructive consultation with its subcontractors, a structurally complete building will be delivered that meets the requirements of good sound work, measured according to the current state of the art.	- The contractor is responsible for the constructive design as they revise it based on their own knowledge and expertise.	✓
Technical risks	Nothing mentioned.		✗
Construction risks	- The contractor guarantees that for the agreed price, a structurally complete building will be delivered. - The contractor and the client guarantee that third parties contracted directly by the Client will comply with the Contractor's Health and Safety Plan and schedule. - If the contractor identifies more or less work, the contractor must immediately report this to the client. Changes to the work can only be further agreed at the Client's written request or instruction. The contractor shall propose changes to the contract price.	- Safety is a risk. There are all safety rules but the contractor says this does not always go quite as planned in practice. - The contractor says that as a project manager, you are a risk manager where you have to make trade-offs between who is the most suitable subcontractor. You want to do it right for the client but also save some money somewhere. - The client says they try to select a contractor who has high expertise and does not save on the small details. They want a high-quality building because they are building for themselves. - The client prefers to select contractors who are situated close to the construction site so that they can respond quickly if something goes wrong.	✓
Management risks	- In case the client plans the start date before the environmental permit has become irrevocable, the contractor will start work but any consequences will be at the client's expense and risk. - If one or more parts of the work is/are performed on a subcontract basis, the contracted party will remain fully liable to the client for that part of the work, regarding the contract work and the Wet Ketenaansprakelijkheid. - Until the date of completion, the work and everything present at or in the work or the building site, all insofar as this is within the scope of the Agreement, is at the expense and risk of the contracted party. - Any claims which the client may have against third parties shall, on first request, be submitted to the contractor or to its insurer.	- A risk was that the business had to remain in use during the construction work, requiring good management to meet schedule. - The contractor is trying to find suitable subcontractors. - In selecting contractors, the client tries to sense whether the contractors can manage the project and how they handle problems.	✓
Contractual risks	- All disagreements between the parties in connection with this agreement or obligations arising therefrom, shall be submitted to the competent court of Council of Arbitration in construction disputes.	- Both the client and the contractor indicate that they prefer not to go to court. This is also the reason the client wants a short contract because they want to resolve it among themselves.	✓

Financial risks	- 95% of the payment in proportion to work and 5% on completion. - The completion instalment amounts to [redacted] (5% of total) and will be made payable as soon as the completion items, which have been observed during completion, have been dealt with. - Contractor's Construction All-Risk Insurance (CAR insurance, general corporate liability insurance (AVB insurance) and construction design insurance (BOV insurance) are needed. The Client will, upon request, receive a copy of the relevant policies.	- The client looks at the financial stability of the contractor beforehand. Since they always pay after delivering the products or service, he does not find this very critical. - The client requested CAR insurance. For construction, they have additional construction insurance. - As there was no bank guarantee, the contractor indicates that this was based on trust. There was also no penalty for late completion. According to the UAV, this is 60 euros per day.	✓

One way the contractor manages risks from a fluctuating market is by employing few people directly and hiring workers for the projects. In the case of a tight market, there do not have to many employees and if there is a lot of work, they hire people. This makes them flexible.

Conclusion

This project involved a very small contract. This contract is the contractors' basic contract, which means that the client did not use its own contract. As a result, significantly fewer aspects were contractually defined, placing much less risks on the contractor. For instance, no contractual provisions were made regarding environmental, political, economic and technical risks. However, the contract is based on the UAV, which includes many stipulations that are not explicitly mentioned.

The contract does not specify responsibility for non-working days due to weather conditions or meeting certain sustainability requirements. However, according to both the contractor and the client, there is a fixed project deadline, which makes the contractor responsible for ensuring the schedule is met, even in the case of non-working days. The client tries to be reasonable in cases of exceptionally bad weather, but this depends on whether the contractor makes and effort or gives up too quickly.

In addition, the contract says nothing about laws and regulations and inflation or price changes. The contractor indicates that they are responsible for changing laws and regulations and the interviews also show that the contractor is responsible for inflation and indexation. This is because there is a fixed contract sum and therefore inflation is automatically covered under this aspect. The contractor tries to manage this risk by looking over the long term and buying quickly after they get the contract to be as close to the calculated price as possible.

The contract and the interviews show that the contractor is responsible for delivering a high-quality building and ensuring safety during construction. The client values having a high-quality building, as they are building for themselves. To manage risks during construction, they prefer a contractor who is located nearby, enabling them to quickly respond if something goes wrong. Regarding management risks, the contractor is responsible, also for the subcontractors. The client tries to assess in advance how a contractor operates and how they would react if something went wrong.

In term of the additional securities the client builds in, this is minimal compared to the other clients. For example, they do not ask for a penalty for late completion. According to the UAV is typically 60 euro per day. This is quite low compared to the penalties which are usually requested. Additionally, there is no bank guarantee asked, the client mentions that they prefer to work based on trust. However, the usual insurance requirements are requested. What stands out with this client is that much is based on trust, prior assessment, and ongoing discussion.

4.4 Case description and analysis Project D

Project D is a distribution centre commissioned by an international developing company. It involved designing and developing a high-quality, sustainable and state-of-the-art distribution centre. The distribution centre consists of two linked units of 18,136 m² and 15,206 m² including office and mezzanine. The total plot size is 4.3 h. The distribution centre is BREAAM certified. The interviews were conducted with the project leader of the contractor and two employees of client D who were responsible for the construction and management of this project.

4.4.1 Vision on risk allocation

Client

The client indicates that they try to eliminate as many risks as possible by assigning them to the contractor. This applies from the start of construction until the building is completed. In their opinion this is justified. However, they also state that if a schedule cannot be met due to, for example, delays in construction materials, delivery times, or bad weather conditions, it is important that this communicated in a timely manner so it can be discussed how to take care of the situation. The client indicated that if there is a good relationship, the risk sometimes is shared. He also states that it was good to be truly part of the team by being present once or twice a week at project meetings. Even though the responsibility lies with the contractor, the client is still part of the construction team. This is important because in case the project is delayed, they also need to explain themselves by the tenant.

The contract is very comprehensive with many aspects of the uav being repeated. The client indicated that this is because the contract was copied from the format they always use in Germany. Thereby, the contracts are in English. According to the client this leads to misunderstandings and obscurity. For this reason, they want to make the contracts shorter and based on the UAV and write them in Dutch.

In this project, there were issues with the environmental permit because residents had filled objections regarding noise. As a result, a noise barrier had to be installed. The client covered the costs for this noise barrier as additional work. However, during the construction of this noise barrier, some problems arose with the groundwork which was carried out by a subcontractor. The contractor took responsibility for these costs because they were also responsible for the work of the subcontractor. The client was very satisfied with how the contractor took care of this situation.

Contractor

The contractor acknowledges that it is fair for the client to assign risks to them, as this is simply how the market works. They, in turn, shift these risks to the subcontractors. Nevertheless, if a subcontractor delivers late or something similar occurs, the contractor ultimately remains responsible. Furthermore, he mentions that the client was very cooperative regarding the additional noise barrier that needed to be built. According to him, this is due to the type of client, some clients are more flexible in such matters than others. Contractually, the contractor could have been held fully responsible, but in this case he did not. The contractor says that this is an interplay in which the client is more flexible and thinks along if the contractor is also flexible and vice versa. In the end, they try to solve it best together.

Conclusion

Both the client and the contractor agree that the contractor should bear most of the risks. In their opinion this is justified. However, they also state that if a schedule cannot be met due to, for example, delays in construction materials, delivery times, or bad weather conditions, it is important that this communicated in a timely manner so it can be discussed how to take care of the situation. The client indicated that if there is a good relationship, the risk sometimes is shared. The client values attending project meetings since it allows him to be kept aware of any delays.

The contractor manages the risks by partially shifting them to subcontractors. However, they are still responsible. The problem that arose due to the objection of the residents which meant that a noise barrier had to be built is an example of good cooperation between the client and contractor. In their opinion the client was very cooperative.

4.4.2 Contractor selection criteria

Normally, about six major contractors are invited to participate in the tender. They receive all the drawings and documents required for the building. The offers of those six parties are reviewed and consequently three parties are invited to discuss the offer in person.

In the case of this project, client D established contact with the contractor through mutual connection, rather than through the normal process of asking around six parties. Table 10 shows the results from the interviews on contractor selection criteria.

Table 10: Results contractor selection project D

Selection criteria	Interview results
Lowest bid	If all contractors are equal, the choice is made based on the lowest price. The client indicates that, in a second project where the contractor participated in the tender, they did not choose the contractor because they did not have the lowest price. In doing so, he did admit that in terms of sustainability, this contractor would have been the best party.
Financial strength	Nothing mentioned.
Technical ability	The contractors that are selected are always familiar with building distribution centres. In addition, the client only has a technical description, and the contractor draws up specifications, which must be fully incorporated in the price. The client indicates that it is difficult to compare the contractors because each company offers its own bid with its own construction methods. However, they do find it important criteria whereby they therefore look at the contractor's method of construction and cleverness in building.
Management capability	The client considers the degree of flexibility in the contractor's thinking along with solutions.
Health and safety	The client wants to know in advance whether the contractor meets safety requirements, but an H&S plan must be provided only once the contractor has been chosen. So, the H&S plan does not apply to contractor selection.
Reputation	Contractors who have already proven to be good contractors are invited back in subsequent tenders. Client D works with a fixed core group of contractors. They had not worked with this contractor before, but they took the risk of working with them because they are known as a proper and solid contractor.

One aspect that does not came from theory but is considered important by the client is; sustainability. However, the price is often more important.

Conclusion

The client aims to select contractors who are all equal and then choose on the lowest price. In practice, it is difficult to compare all offers with each other as each contractor has its own construction technique. Financial strength is not explicitly discussed. They do consider the knowledge and skills of the contractor and mostly choose from a group of regular contractors. Sustainability is also an important aspect, but in practice, the lowest price is still chosen over sustainability.

4.4.3 Project risks and risk management

In this contract, the Uniform Administrative Terms and Conditions for the Execution of Works 2012 (UAV) are applicable. In Table 11 the project risks are explained based on the agreements stated in the contract and the results from the interviews.

Table 11: Results risk management project D

Risk category	Contract result	Interview results	Covered by client
Environmental risks	- Contractor is responsible that the building qualifies for the BREEAM- nl certificate. - Unworkable days will be at expense and risks for the contractor.	- In the case of adverse weather conditions, the contractor notes that clients often assess the situation based on reasonableness and fairness when determining how strictly they hold on to the contractor responsible.	✓
Political risks	- Contractor is responsible for the consequences of complying with statutory regulations or government orders, which come into force after the date of submission of the environmental permit.	- The client was contractually responsible for the environmental permit which also resulted in them paying for the noise barrier that had to be built to obtain the permit.	✓
Economic risks	- The contract price includes the buyout payment for the risk of increase in prices, costs, wages, taxes and duties and other cost-increasing circumstances in the broadest sense.	- The contractor says they mitigate the risks of changing prices by looking over the long term. Sometimes prices are favourable, sometimes they are unfavourable. That is part of entrepreneurship. - In case prices really increase disproportionately due to war or something similar, the contractor will start a discussion with the client about this. Sometimes it is then considered force majeure.	✓

Design risks	- The contractor is responsible for the design, construction or technical aspects. - The approval does not affect the full liability and responsibility of the contractor for the relevant design under this agreement. - The contractor guarantees to the client that the drawings are a faithful elaboration of the technical description and that the specifications also meet the requirements of the agreement.	- The contractor indicates that they are responsible for the construction design. In this process, they were given a lot of freedom by the client in term of construction. The client simply wanted a good building, and the contractor was allowed to shape it himself.	✓
Technical risks	- The contractor accepts the plot in the physical state in which it will be when it is legally delivered to the client. Any costs of soil, ground, and/or site improvement shall be the responsibility of the contractor. - The environmental permit is at the contractor's expense and risk.	- The contractor indicates that there were residents who objected to the plan after the contract had already been signed. Contractually, it could possibly have been the responsibility of the contractor, but the contractor says the client handled and helped very well. According to him, this depends on the type of client. - During the groundwork, they came across some bombs. This did not cause any delay. - To deal with the local residents' objection, a noise barrier was built. This was paid by the client as additional work. The mistake that was made with the groundwork by the subcontractor was fully paid for by the contractor. The client was very satisfied with this.	✓
Construction risks	- The contractor shall construct the distribution centre in accordance with the specifications and designs. - If the modification of the distribution centre requires adjustment of the contract price because the client requests a substantial change to the specifications, the contractor will be allowed to propose an adjustment to the contract price (‘the additional work proposal’). - The contractor is responsible for the additional and reduced costs related to the design and realisation of the distribution centre in turnkey condition. - The numbers or quantities stated in the contract documents or design documents to be drawn up at a later date are not calculable. Errors are at the contractor's risk. - If any design accepted or approved by the client fails to comply, this shall constitute an attributable shortcoming on the part of the contractor. - The contractor is fully responsible for the property from the start of construction until completion and will -among other things- ensure proper closing, monitoring and access control of the plot to prevent unauthorised access. - There is a maintenance period. - Contractor must apply the Working Conditions Act and resulting regulations and rules such as the Working Conditions Decree. In doing so, the contractor must prepare a construction safety plan and site accessibility prior to the start of construction. These measures will be at the contractor's expense and risk.	- The client says that when selecting contractors, they already try to select contractors who have proven to be capable of making distribution centres and where everything is included in their specifications. - Contractors are asked to provide an H&S plan.	✓
Management risks	- The contractor ensures that all specifications meet high design standards, and that chosen methods and solutions are suitable for delivering the turnkey distribution centre on time and with the required quality. - The contractor shall not be entitled to claim compensation or any other right against the client on account of delay or change in work	- Because a noise barrier suddenly had to be built in addition, this created tension to still meet the schedule. - The contractor says there was no fixed start date in the contract. As a result, the end date remains open to discuss.	✓

	because of dispute between the contractor and claimants of offending plots or land, unless the contractor demonstrates that the client has acted seriously culpable in this regard. - This work is subject to the legal provisions on chain liability. Subcontractors of the contractor must also comply with these provisions. - The client is entitled to pay up to a percentage of 18% of the instalment due directly into a G account of the contractor to be designated by the contractor, or a similar arrangement (deposit system) to replace the G account.	- The client states that the risk of delays lies with the contractor, but they also mitigate this for themselves in case a tenant is already known. They do this by planning some extra time between the completion date and the date the tenant moves in the building. - The client states that if the project is completed late, it depends on whether the contractor has a valid reason, whether the tenant is already known, and the relationship between the parties as to whether they will enforce the penalty for late delivery. If the contractor makes a genuine effort and remains flexible, the client indicates that they are also willing to be more flexible in return.	
Contractual risks	- Contractor is responsible for any inconsistencies or errors in documents. Clients' approval does not affect this responsibility. - The client has the right, without notice of default or judicial intervention being required, to dissolve this agreement in whole or in part by means of a registered letter addressed to the contractor if certain situations occur. - The parties shall endeavour to resolve disputes in connection with the agreement or agreements arising from it in good mutual consultation, if necessary, through the intervention of their management boards. If still not possible, the parties shall do so by arbitration in accordance with the Arbitration Rules of the Council of Arbitrators for the Construction Industry. - The contractor (and subcontractors) unconditionally waives its right to invoke a right of retention or any other right to suspend its obligations, including completion, or to retain possession of all or part of the distribution centre after completion, unless it has been established that the client is in default of payment of the contract price in accordance with the payment schedule.	- The contractor says he did not need the contract during construction. - The contractor says there was no fixed start date in the contract. He therefore says the final completion date can still be discussed.	✓
Financial risks	- All work and deliveries necessary to achieve completion must be included in the contract price. - The contract price includes the buy-off payment for the risk of increases in prices, costs, wages, taxes and duties and other cost-increasing circumstances in the widest sense of the word. - If completion does not take place on the planned date, a discount of [redacted] per calendar day will be imposed. Without prejudice to the client's right to claim performance and/or additional compensation, if and in so far as the actual damage exceeds the amount of the discount. - The client is entitled to pay up to a percentage of 18% of the instalment due directly into a G account of the contractor to be designated by the contractor, or a similar arrangement (deposit system) to replace the G account. - The client asks for a national surety in the amount of [redacted] The guarantee will be provided to the client no later than 2 weeks before the start of construction.	**Risk management** - The contractor says there was a penalty of [redacted] day of late completion. Thereby, a G-account is used. - According to the client, the amount of this penalty depends on the contract sum. - The client indicates that they sometimes require a bank guarantee or a national surety bond. Which one does not matter if the project is fully covered. - The client prefers to use a G account.	✓

Conclusion

This project contained a long contract, in which all the risks from theory were contractually covered. The contract clearly specifies that the contractor is responsible for almost all risks. The contractor is responsible for environmental risks i.e. unworkable days and achieving the BREAAM certificate. The client was contractually responsible for the environmental permit which also resulted in them paying for the noise barrier that had to be built to obtain the permit. This was settled as additional work which shows that they adhered to the contract. The contract does however, still state that the contractor is responsible for complying with all other laws and regulations.

It has also been specified that the economic risks are included in the contract price. The contractor indicates that they are looking at this in the long term to minimise the risks, but that, if it is disproportionate for instance in the event of war, he will enter discussions with the client. The contractor is responsible for the design and for the technical risks. On this, the contract states that the contractor is responsible for the plot and ground. This also appears to have been complied with. Indeed, the interviews revealed that the contractor also ended up paying for the mistake made in this area with the noise barrier. Furthermore, the contractor is responsible for the entire project including safety, quality and planning. What is notable is that the contract also describes that the contractor is responsible for any inconsistencies or errors in the documents.

Moreover, the client builds in some more securities such as a fine for late delivery, payment via G account, a national surety and the contractor and subcontractors must waive their retention rights. According to the client, they sometimes ask for a bank guarantee or a national surety, it does not matter which one if the project is fully covered.

4.5 Case description and analysis Project E

The contractor built the first proved circular logistics company building for client E. It is a modern multifunctional fulfilment centre with a total floor area of 45,600 m2 and a clear height of 15.2 metres. For this project, only the contractor was interviewed. As the analysis for this project mainly focused on the front-end process before actual construction, the general manager of the contractor was interviewed. He was closely involved in this.

4.5.1 Vision on risk allocation

Contractor

According to the contractor, only the risks that can be managed can be accepted. The contractor has the expertise, knowledge, and skills to control many risks. They know which risks they can bear and which they cannot and the risks that cannot be foreseen are insured. They also assess the potential worst-case scenarios for those unforeseeable risks and determine whether they can afford the consequences.

The contractor indicates that the market situation affects the extent to which they are willing to take on risks. When they need the work for the business continuity, they are willing to take more risks than when they have plenty of work and risk-taking is not necessary. This means that in difficult times, they accept lower prices and greater risks. According to the contractor, it is constantly important to weigh up how much you are willing to pay for a particular service or product. Especially the subcontractors such as a structural engineer determines the quality. This consideration also applies to clients.

Regarding the view on the type of contract, the contractor indicates that it does not matter much whether it is a very long or a short contract. The disadvantage of a long contract is that it takes a lot of time to read but in the end, what matters is what the exceptions to the UAV are and whether they add a lot of risk to the contractor. The contractor believes the UAV is a balanced contract with advantages and disadvantages for both parties. This balance should also be reflected in the contracts drawn up by clients. According to the contractor, there are many parties who draw up huge contracts but then say they are not going to do anything with it anyway. That has little added value according to the contractor. They prefer working with regular long-term clients because they know how these partners operate and how they approach projects. Ultimately, what matters most is how someone responds when things go wrong and whether they are willing to help. The contractor believes that mutual support is the best approach when issues arise, as this helps to minimise damage. Otherwise, problems can escalate to the point where they become unsolvable.

Ultimately, the contractor states that it is wise to document agreements in the contract and write down what has been agreed on. Since it is impossible to predict everything in advance, it is essential to consider what will happen if something goes wrong. However, it is also important that the contract remains balanced, ensuring that both parties have something to gain and something to lose.

In this project, the client hired a law firm to draft the contract. As a result, all kinds of risks and guarantees and securities were shifted to the contractor which subsequently caused a lot of discussion. For instance, they asked for an unconditional waiving of their retention rights, which the contractor was willing to waive but only if the client was up to date with their payments. They also asked for a bank guarantee that they could invoke at any time, the contractor is willing to provide a bank guarantee but only if the client has a good reason to claim it. That means they must get a title in court or officially declare the contractor in default or the like. These are examples of clauses that were in the contract but which the contractor could not agree to, and which were discussed during the contract formation process.

Conclusion

The contractor stresses the importance of balancing risks based on degree of controllability, the importance of balanced contracts and the importance of cooperation. If something goes wrong, it is important that the parties solve it together. However, the contractor does believe that it is good to lay things down contractually, under the condition that it is a balanced contract that contains advantages and disadvantages for both the contractor and the client.

4.5.2 Contractor selection criteria

As only the contractor was interviewed for this project, this section is not applicable for this project.

4.5.3 Project risks and risk management

In this contract, the Uniform Administrative Terms and Conditions for the Execution of Works 2012 (UAV) are applicable. In Table 12 the project risks are explained based on the agreements stated in the contract and the results from the interviews.

Table 12: Results risk management project E

Risk category	Contract result	Interview results
Environmental risks	- The project must comply with the BREAAM-NL to obtain the Very Good certificate.	- The contractor is responsible for bad weather conditions. - They manage this by continuing to work on weekends or holidays if necessary and by taking this into account in advance planning.
Political risks	- The contractor declares that no environmental permit is required for this Project. If it is required because of changing laws and regulations, the contractor will inform the client on time including possible associated project consequences (money, time, quality etc.).	- Changing laws and regulations are managed by staying up to date as this often does not change super-fast. In doing so, they make sure they are not responsible if there is a change in laws and regulations.
Economic risks	- The contract sum includes all costs (including increases in such costs).	- The contractor makes as favourable a cost calculation as possible. And then they depend on how the economy is, whether it is very busy or whether subcontractors are also eager for work. Then those subcontractors are also willing to work for less money so then the contractor can give some discount or no discount. - They view it over several years and then sometimes it favourable and sometimes unfavourable.
Design risks	- The contractor has made agreements with consultants for the production of the preliminary design phase document and the final design phase document. - The contractor indemnifies the client against all claims of these consultants on account of and/or arising from these consultant agreements and in relation to the project. - The contractor is always responsible for the correctness and feasibility of the design of the project from the structural design / preliminary design phase(s) through to the execution-ready design phase. - Approval of the specifications by the client does not affect the contractor's responsibility for the adequacy of the specifications.	- Nothing mentioned.
Technical risks	- The contractor is responsible for quality assurance of the parts of the project to be delivered and must specify the quality assurance procedures in a quality plan to be formulated by the contractor. - The client will in no manner be held responsible and/or liable for the design and/or (further) execution of the project. - The contractor declares to have examined the site specification. The soil quality and condition described in the site specification as well as the removal of soil are included in the contract sum.	- Nothing mentioned.
Construction risks	- The contractor must comply with the Quality Plan (including the H&S plan). The client is always free to carry out inspections. - Client has the right to instruct changes or additions in relation to the project. These are valid only after the change form has been signed by the contractor and client. - At its own expense, the contractor is responsible for obtaining and maintaining all required permits, exemptions, property rights, and permissions, including environmental, CHP, and discharge permits. - The client may provide instructions to the contractor regarding the project. If the contractor believes that an instruction is wrong or has consequences beyond their control, they must notify the client in writing within one week. The parties will then consider the implications. If no resolution is achieved, the disagreement will be sent to the	

	Steering Committee. If the issue remains unresolved, it may be referred to an expert under Article 27.2. - Despite the acceptance of documents, the client is not responsible and/or liable for the design and execution of the project, nor for the construction supervision, unless expressly agreed otherwise in writing. - A maintenance period is included. In addition to Article 11 UAV, during this/these maintenance period(s) the contractor is responsible and liable for guaranteed maintenance. - The contractor has obtained construction and design insurance to cover its liability under this agreement. - The contractor is responsible for finalising the entire completion, including repair of completion defects, within one month after completion or within any other reasonable period agreed between the parties in writing.	
Management risks	- The contractor may subcontract certain parts of the work, on condition that the client's written approval has been obtained. This approval may not be withheld on unreasonable grounds. The contractor shall nevertheless remain fully responsible towards the principal for those parts. - The milestones included in the Construction Schedule imply an obligation of result for the contractor and not just a guideline. Up to the completion of the project, the project will be entirely at the risk of the contractor. - For the time being, the parties will assume that the wage cost component amounts to 36% of the contract sum or contract input stated in the agreement. As a percentage to be deposited in the G account or the direct deposit referred to there, the parties will use a percentage of 40% (calculated over the labour cost component).	Nothing mentioned.
Contractual risks	- If a party fails to meet its obligations, the other party will grant a reasonable deadline via written notice. If non-compliance persists or is anticipated, the other party may suspend its obligations or terminate the agreement, without prejudice to its right to damages. - A party may suspend its obligations or terminate the agreement immediately if the other party is granted suspension of payments, goes bankrupt, has its business dissolved, or its authority to perform legal acts is restricted in any way, without prejudice to the right to compensation. - Disputes are first referred to the Project Group and Steering Committee. If the issue remains unresolved, a jointly appointed expert makes the final decision. Each party pre-selects experts for each discipline. According to the expert's binding conclusion, the party at fault bears most of the costs. The procedure is set upon appointment. - If the dispute is not resolved through the expert, it will be submitted to the competent court. - The contractor will have no right of retention in case they don't live up to arrangements. This also account for subcontractors.	- The contractor mentions that they prefer not to go to court.
Financial risks	- If the project is delivered late, there will be a discount on the Contract Sum of [redacted] exclusive of VAT, per calendar day during the first 4 calendar weeks that the project is delivered late. - After the first 4 calendar weeks, the immediately claimable discount on the Contract Sum shall be [redacted], excluding VAT, per calendar day that the project is delivered late. - If the lettable floor area measured according to the Dutch Standard NEN 2580 of the Project, excluding the bicycle parking, will not be at least [redacted] at Completion, the contractor will owe the client an immediately due discount on the contract price of [redacted]/ m2 less delivered excluding VAT. - If the project does not meet the BREEAM Very Good certificate and there is no solution and the contractor is demonstrably in default, then the client may impose an immediate demandable discount on the Contract Sum of [redacted] = excluding VAT on the contractor. - The client is liable for all other damage, by whatever name, which may arise for the client from the incorrect execution of the design and/or the incorrect execution of the project by the contractor or the person(s) they make use of, including (sub-)contractors, suppliers, architects and other	- The contractor assesses whether they can take the risk of the late completion penalty. If this is a high penalty, they will schedule broad enough in advance, so they do not exceed the completion date. - The contractor approves providing a bank guarantee only on the condition that the client must be up to date with payments and be able to prove that the contractor is in default.

	consultants, up to a maximum of EUR [redacted] being the maximum insured amount under the contractor's third-party liability insurance. - The contractor shall ensure adequate CAR insurance, construction design insurance and PPP insurance with a good party for the project during the construction and maintenance period. Tenant, investor and client as well as the property of these parties, shall be co-insured on the policy. All damages not covered by the insurance policies, including excluded items, as well as excess amounts mentioned in the policies shall be at the contractor's expense and risk. - As part of the client's approval of the specifications, the contractor shall provide a line-level specified budget, which shall include the quantities, standards and unit prices, which shall be consistent with the contract sum. Insofar as more work cannot be settled based on the standards and prices included in the (specification) budget, specified quotations from subcontractors must be submitted by the contractor in advance. - Payment of the Contract Sum shall be made in installments in proportion to materials / building materials delivered and assembled in the project. The completion payment for the project shall be 10% of the Contract Sum and shall be made payable to the contractor after completion. - The labor cost component is [redacted] of the contract sum and/or contract work specified in the agreement. A percentage of 40% will be used by the parties as the percentage to be deposited in the designated G account and/or direct deposit referred to therein, unless changes are made to the present provisions. - The contractor must provide an irrevocable, first demand guarantee in the amount of 10% of the contract sum, plus 10% of any changes, within 2 weeks of entering the contract. - After completion of the project, the guarantee can be reduced to 2.5% of the contract sum, provided there are sufficient residual items according to the client and investor.	

Conclusion

The purpose of this project was not to discuss the process of the project but rather focused on the contract and the contract formation. Notably, this contract is very detailed where everything is thoroughly outlined to fully protect the client. All risks have been transferred to the contractor. The contractor tries to mitigate the risks by ensuring they only take risks they can manage and control. Otherwise, they try to mitigate the risks by for instance adapting the planning in advance so they have enough time to complete the project.

5. Cross-case analysis

In this chapter the link between the theoretical findings and the empirical findings is described.

Based on the case analysis, it can be concluded that clients engage in risk management through contractor selection criteria and risk allocation. The interviews revealed that client try to minimise risks by carefully selecting a good contractor in advance, believing that they minimise risks in this way. It also emerged that all clients try to shift as many risks as possible to the contractor. Most clients do this by a detailed contract, while one client does not have an extensive contract but assumes that the contractor will take on the risks. In case of disagreements, they believe they won't go to court because of the high costs so they will discuss it together. The results of both risk management approaches are explained below.

Contractor selection criteria

In Table 13 an overview is shown about the criteria clients use for selecting contractors. The criteria in bold are the criteria derived from literature and the other criteria; location of the contractor, speed of construction and sustainability were only derived from the interviews. The crosses which are underlined are the most important ones the clients consider.

Table 13: Overview conclusion contractor selection criteria

Selection criteria	Project A Developer	Project B Developer	Project C Own use	Project D Developer	Project E Developer
Lowest bid	**x**	**x**	x	**x**	Not applicable
Financial strength	x	x	x	x	Not applicable
Technical ability	x	x	**x**	x	Not applicable
Management capability	x	x	x	x	Not applicable
Health and safety	x	x	x	x	Not applicable
Reputation	**x**	**x**	**x**	**x**	Not applicable
Location of contractor	-	-	x	-	Not applicable
Speed of construction	-	-	x	-	Not applicable
Sustainability	-	-	-	x	Not applicable

As highlighted in the theory, contractors often are selected by clients based on the lowest price (Xiaohong, 2011; Zavadskas et al., 2008). However, research shows that choosing based on the lowest price van lead to risks in terms of costs, quality and time (Holt et al., 1994a). The following criteria have emerged from the literature review as most used in contractor selection: lowest price, financial stability, technical capability, management capability, health and safety and reputation. The interviews revealed that all these criteria are indeed considered by clients when selecting a contractor. The extend to which they are prioritised varies per criteria. Clients often make a pre-selection based on financial situation, technical capability, management capability, health and safety and reputation. Once the contractor meets all the requirements, the final decision is primarily based on the lowest price.

How the selection process works and its relationship to risk management varies depending on the characteristics of the client. For clients who are developers, the financial stability of the contractor is an important criterion. They want to avoid financial problems during the project, as they often have contractual agreements and deadlines with their tenants. Moreover, their goal for the project is to maximise profit. However, clients who builds for their own use do not always choose the most financially stable contractor, they believe that contractors who are slightly less financially strong may possess much stronger technical capabilities. Their focus is more quality-oriented because they intend to use the building for over 30 years. They can take this risk because they secure themselves by making payments only once the work is completed, and they are financially strong by themselves.

Regarding management and technical capability, clients in general assess whether the contractor can execute the project. They evaluate this through discussions with contractors, but it is often primarily assessed based on experience and reference projects. Sometimes, contractors have different construction styles, and one style may appeal more to a client than another. However, contractors are generally given quite bit freedom in this regard. It can therefore be concluded that this is often judged based on prior experience with a contractor or their reputation in the market, rather than being something that can be measured in advance.

According to the theory, the aspect of 'health and safety' is also used in contractor selection. In practice, however, this does not appear to be explicitly the case. Clients do consider it an important criterion but find this difficult to assess beforehand. Generally, it is not assessed in advance, as a health and safety plan are only drawn op after the contractor has been awarded the project. Instead, it is often estimated based on previous experiences or projects with the contractor. Therefore, it is not much a selection criterion but rather a requirement that the contractor must meet regardless. The reason this outcome is different than the theory implicated is that after many enquiries, it appears that there is still no agreement on the criteria for the selection of contractors (Hatush & Skitmore, 1997). The criteria 'health and safety' was not much researched and empirically tested before.

The selection criteria from the theory were mainly objective factors, except for reputation. According to Hatush & Skitmore (1997) the lowest bid, financial and technical aspects emerge most often (Hatush & Skitmore, 1997). In practice, however, the criteria reputation turns out the be one of the most important factors because this criteria functions as a basis for assessing all the other criteria. The statement of Luu & Sher (2012) that contractor selection is often based on intuition and experience is true. In general, clients prefer to work with recurring contractors and try to select from a fixed pool of contractors. Some clients even rarely invite new contractors to participate in the tender. This is because clients prefer to work with reliable parties that have ideally already proven themselves through previous collaborations. Clients indicate that working with a contractor who has already successfully completed similar projects and had a good collaboration reduces risks because they then know the contractor is suitable. Based on the reputation, the criteria technical capability, management capability, health and safety are examined. The theory of Pesämaa et al. (2009) of the importance of subjective criteria such as familiarity, reputation, legitimacy, compliance with quality and quality standards or other standards to avoid risks is thereby confirmed. Ultimately, almost all clients are willing to collaborate with contractors on solutions, provided that the contractor is proactive and communicates effectively and on time.

Finally, it is interesting to note that, in addition to the aspects from the theory, three other factors were mentioned as considerations when selecting a contractor; sustainability, construction speed, and the contractors' location. Sustainability was mentioned however, in the end the lowest price is prioritised over this criteria. Additionally, construction speed and location were mentioned but only the client who builds for own use. How sooner the store opens, the sooner revenue can be generated. The other clients are developers, so this factor does not apply to them in the same way because often they don't have a tenant yet or they already have a fixed agreement of the start hiring date. Therefore, they have less interest in earlier completion. The contractor's location is also mentioned to ensure quick action can be taken if any issues arise. These factors are not mentioned by developers so it could be that they don't attach much value to that.

Ultimately, the conclusion is that clients consider all aspects from the theory in their-decision making process but ultimately opt for the lowest price. The theory that clients often select contractors primarily based on the most competitive bid price is therefore partly true. It is not the case that other aspects are disregarded; in fact, clients actively consider risk factors and therefore engage in risk management through contractor selection. However, in practice, multiple contractors often meet the same standards, allowing to base their final decision on the lowest price. The statement from theory that subjective criteria such as reputation also plays an important role in contractor selection risk management, is underlined by this research. In practice, reputation turns out to be a highly important factor, with clients often preferring to work with recurring contractors who have demonstrated their capabilities and reliability. Relying on past experiences and carefully considering the capacities of contractors can be seen as an effective way of minimising risks and is therefore an important part of risk management of clients.

Because contractors are pre-selected based on their qualities and capabilities, clients know how to effectively manage risks upfront and have the ability to select on the basis of the lowest price without sacrificing quality or increasing risks.

Risk allocation

In addition to mitigating risks by selecting a reliable contractor, clients also attempt to further minimise risks by specifying them in contracts. According to theory, risk management involves identifying risks and implementing strategies to minimise, share, transfer, or accept the risks (Jergeas & Put, 2001). This decision is based on whether the client can properly assess, minimise or control the risks or not (Abderisak & Lindahl, 2015). Table 14 provides an overview of all projects, with a checkmark in the box indicating that the client considers this a risk, and that the category has been contractually defined.

Table 14: Overview conclusion risk management

Risk category	Project A Developer	Project B Developer	Project C Own use	Project D Developer	Project E Developer
Environmental risks	x	x	-	x	x
Political risks	x	x	-	x	x
Economic risks	x	x	-	x	x
Design risks	x	x	x	x	x
Technical risks	x	x	-	x	x
Construction risks	x	x	x	x	x
Management risks	x	x	x	x	x
Contractual risks	x	x	x	x	x
Financial risks	x	x	x	x	x

This study shows that developers try to transfer as many risks as possible to the contractor. This confirms the theory which states that in many cases, most of the responsibilities are passed to the contractor (Jergeas & Hartman, 1996; Lam et al., 2007). The reasoning behind this is that they don't want to bear risks, even if they could potentially handle some of them. Some clients indicate that they also have contractors with tenants, meaning that if the contractor is late with completing the project, the client must pay a penalty to the tenant. Another motivation for this approach is that they want to avoid negative public attention. However, theory indicates that contractors in, turn, pass on part of the risks to subcontractors (Jergeas & Hartman, 1996). This is confirmed by this study. Contractors indicated that they try to shift these risks to subcontractors to minimise their own risks.

All risks categories derived from theory; environmental risks, political risks, economic risks, design risks, technical risks, construction risks, management risks, contractual risks and financial risks are contractually defined by the developers. However, client C, which builds for his own use, does not include any provisions regarding environmental, political, economic, or technical risks. Client C's reasoning for this is that problems can be resolved jointly between the two parties as neither has an interest in going to court.

However, according to theory, effective negotiation involves effective communication of potential risks, which is important because otherwise conflicts of interest between the client and contractor arise from procurement and contractual practices (Loosemore & McCarthy, 2008). In practise, this theory turned out to be true. A dispute did arise between the contractor and the client. Client C had intentionally removed the groundwater level provisions from the contractor and explicitly informed the contractor that they would be responsible for this. Later, issues occurred due to the contractor's incorrect assessment of the groundwater level, leading the contractor to argue that the client was partially responsible. The dispute ended with both parties sharing the costs, though neither of them was satisfied with the outcome. The client even mentioned that this experience was a reason not to choose the contractor again in the future. This situation highlights how important the client considers their relationship with the contractor and the way problems are resolved. It also demonstrates that leaving contractual matters open-ended is not always beneficial, as it led to a dispute that resulted in dissatisfaction on both sides and damaged their relationship.

When all risks derived from theory are contractually defined, it turns out it has a positive influence on the completion of the project. In this way, both the contractors as the client are satisfied. Everyone acknowledges that obstacles and issues arise in every project, but ultimately, it comes down to how these problems are resolved. For example, in project B, there was an issue with the environmental permit because residents filed complaints about noise pollution. To obtain a permit, a noise barrier had to be constructed. During its construction, the subcontractor made an error with the groundwork, leading to additional costs. Since the contract stipulated that the client was responsible for the environmental permit, they covered the costs of the noise barrier. The contract also stated that the contractor was

responsible for the completing the project on time and building the noise barrier with the right quality. As a result, the contractor took responsibility for the fault with the groundwork and resolved it and still completed the project on time. This is an example of clear contractual agreements being taken seriously by both parties. Both the interviews also highlighted that they were satisfied with the collaboration and resolution of the issue, emphasising that good and transparent communication played a key role in the outcome.

The theory that if all risks are contractually defined, it has a positive influence on the completion of the project is also reflected in project D. The circumstances were nearly identical to the case of project B. Here, the contractor failed to obtain a required certificate on time, causing part of the groundwork to be redone. Since the contract clearly stated that the contractor was responsible, they covered and resolved the issue. Again, both parties were satisfied with the solution and the overall project execution.

Thus, creating clear agreements and risk allocation through contracts has proven to be an effective an efficient method of risk management. This approach helps preventing disputes and has a positive impact on the relationship between contractor and client. Also, regarding establishing a relationship, clients appear to be flexible if they are informed about any issues and the contractor adheres to the contractual agreements. Clients are willing to collaborate with contractors, provided that the contractor takes responsibility and actively works to resolve problems. This was also demonstrated in these projects.

From the contractor's perspective, they acknowledge that they are assigned risks. However, they carefully assess whether they can handle the risks before accepting them. In project E, for example, there was significant discussion during contract negotiations because the client imposed unreasonable conditions, such as a bank guarantee that could be called out at any time or requiring the contractor to waive their retention rights even if the client failed to make the payments on time. The contractor made clear that they only accept risks they can manage and negotiated extensively on these terms. This demonstrates that contractors do not blindly take on risks but instead make well-considered decisions. Moreover, in the introduction it was assumed that some contractors bid lower than what they can sustain to win the tender, leading to financial losses (Olaniran, 2015). This appears to be untrue. Contractors do charge lower profit and risk margins during unfavourable market conditions, but they make decisions carefully and make sure the risks remain manageable by only accepting risks they can oversee. They achieve this by contractually negotiating risks until they are defined in such a way that they can be effectively managed.

The conclusion is that the risks derived from theory; environmental risks, political risks, economic risks, design risks, technical risks, construction risks, management risks, contractual risks and financial risks are contractually defined by developers. This ensures that projects run smoothly and that all parties adhere to the agreements, leading to good collaborations and satisfied parties. It is proven that in this way, all timelines were met, despite some setbacks. Another conclusion is that, in general, clients are more flexible when contractors take responsibility, communicate transparently, and make efforts to resolve problems. If there are no tenants involved, clients may even be slightly more lenient with the completion date. Not contractually defining everything can lead to dissatisfied parties. This suggest that it is better to clearly define everything in the contract. Finally, contractors do not take on risks just to secure a project. They only accept risks they can manage.

6. Conclusion

Based on the analysis of al separate projects and the cross-case analysis, in this chapter the research questions will be answered. First, the sub-questions are answered based and eventually the main research question is answered. Sub question one is already answered in chapter 2 solely on literature so this question will not be answered in this chapter.

- *Sub question 2: What criteria do clients use for selecting contractors and what do they consider the most important?*

All clients try to make a preselection based on financial strength, technical ability, management ability and health and safety and reputation. They assess this by looking at previous projects and checking annual reports etc. Once all these aspects are approximately equal, all clients select mainly on the lowest price. What exactly the clients value most differs. Most clients prefer working with contractors they have already worked with before and which have already proven themselves. They prefer this order to ensure reliability and good collaboration and therefore minimise risks. Some clients even work preferably with a fixed pool of contractors. Moreover, contractor selection is mostly based on reputation which is assessed by previous projects or collaborations. There is one client who is not a developer but builds the building for their own use. This is reflected in their contractor selection criteria. They aim to assess how a contractor responds to problems and primarily focuses on evaluating the contractor's technical ability in advance through a very open description and by evaluating their questions. They state that quality is more important than price, but they also ultimately select based on price if the contractors are equally qualified.

Additionally, three other criteria are mentioned to be important for contractor selection; the contractor's location, the speed of construction and sustainability. Contractors can react quicker if something goes wrong, when they are located nearby. Also, how sooner the store opens, the sooner they can start earning revenue. That is why the speed of construction is important. Another aspect that turns out to be used for contractor selection is sustainability. The first two criteria are used by a client who builds for his own use. The third criteria only used by one client and it turned out that they chose the lowest price over sustainability, so this turns out not to be a highly used criterion.

- *Sub question 3: What risks do clients consider when selecting contractors in the construction industry, and what strategies and contractual provisions do they use to manage these risks?*

Clients attempt to manage risks in two ways. First, they try to mitigate risks by assessing contractors on specific criteria before selecting them. How they do this is described under sub-question one. The second way they manage risks is through contracts. For each project, a contract is in place that defines and assigns risks to a particular party. The structure of these contracts varies per client. In general, the majority of the risks are contractually assigned to the contractor. However, the extend and detail of the risk allocation and the extend the client uses the contract varies. Developers have a very detailed contract in which all risks are explicitly assigned to the contractor. In contrary, a client who builds for his own use has a much simpler contract which is based on the contractor's standard framework. Environmental, political, economic and technical risks are not explicitly mentioned in this contract. For every risk category the risk management strategies of the clients are elaborated on.

Environmental
In most projects, the contractor is responsible for the Beng or BREAAM certificates. Every contract has a strict deadline, so the contractor is responsible for meeting the schedule despite of bad weather conditions.

Political
In all projects of developers, the contractor responsible for complying to laws and regulations. In the contract of the client who builds for his own use, nothing is mentioned about this, however the client stated that the contractor is responsible for this.

Economic
In all projects there is a fixed price which will not be adjusted to inflation or indexation. In some projects this is more explicitly stated than in other projects.

Design
In all projects the contractor is responsible for the construction design, this is stipulated in every contract.

Technical
In the case of technical risks, what is specified for each contract varies. In some projects it is explicitly stated that the work must be carried out by qualified employees or subcontractors and that the work will be carried out in accordance with the requirements of good and sound work. In some contractors it is also defined that the contractor will accept the plot in the physical condition it will be in when it is legally handed over to the client. Any costs for soil, ground and/or site improvement will be borne by the contractor. In doing so, the contractor often must declare that they have examined the site specification and that the soil quality and soil conditions described in the specifications as well as the disposal of soil are included in the contract price.

Construction
According to all contracts and/or interviews, the contractor is responsible for the construction site from beginning to completion. The contractor is also responsible for safety on-site. Clients most commonly ask the contractor to comply to a Health & Safety (H&S) plan. Additionally, maintenance periods are often included, and construction insurances and other requirements are commonly stipulated.

Management
Management risks are mitigated by clients by including in the contract that they can approve or reject subcontractors. It is often stated that this can only be done based on justifiable reasons. However, contractors always remain liable for subcontractors. Furthermore, it is also often stipulated that the contractor must complete the building as agreed within the agreed time, without asking for additional compensation. In one contract, there is an additional requirement which describes that if there is any delay or damage in the execution of the work, the contractor is obliged to compensate all damages suffered by the client as a result, without prejudice to the client's right to deduct discounts from the contract price due to delay in delivery.

Contractual
Regarding contractual risks, the contract often stipulates that the contractor cannot assign or transfer rights without the consent of the client. Thereby, the contractor must waive their retention rights unless the principal defaults on payments. It is also often mentioned what happens if both parties have a dispute and what happens if one of the parties fails to fulfil its obligations. Here, the starting point is to resolve it together but if this fails, it also describes where they should go such as the court of Council of Arbitration in construction disputes.

Financial
Most of the contracts contain a clause if which is stated that if the deadline is not met, there is a penalty for late completion. The amount of this penalty varies from 60 euro to 15.000 euro. Furthermore, often a bank guarantee or national surety bond is required. All clients ask for the standard CAR insurance and some additional insurances. Moreover, often the contractor and subcontractors need to waive their retention rights.

- *Sub question 4: How do the clients and contractors perceive the risk management strategies in the construction industry and what factors influence the allocation of risks between clients and contractors in construction projects*?

Clients
It turns out that all clients value a collaborative approach, and a good relationship based on trust with the contractor. Most clients think that everything should be well defined contractually, but in practice they prefer to solve things among themselves outside the strict framework of the contract. Moreover, all clients indicate that they prefer to solve problems among themselves rather than taking legal action. For many clients, this is because legal action often costs more money than the problem itself. However, one client indicates that they want to avoid this to avoid negative media attention. They are a listed company, and this can lead to negative consequences. Furthermore, open communication and transparency turn out to be important for trust and cooperation. Some clients even indicate that they are somewhat more flexible with the contract when there is a good relationship.

Contractors
Contractors agree that most of the risks are shifted to the contractor. However, sometimes they do not think that the degree of risk was in proportion to the amount of money they get for it. It is also indicated that it is important that the contract is balanced in which both the client and the contractor have advantages and disadvantages. In general, contractors think it is important to work well with the client where trust and cooperation are important, to best deal with problems.

- *Main research question: "What strategies do clients in the construction industry use to manage project risks, particularly focusing on contractor selection and risk management in the private sector?"*

It comes down to the fact that clients in the construction industry indeed have two strategies to manage their risks; carefully selecting contractors and through risk allocation.

Contractor selection criteria
Clients try to mitigate their risks by focusing on core criteria such as financial strength, technical ability, management capability, health and safety standards and reputation when selecting a contractor. If several contractors meet all these criteria, selection is then mainly based on price. Many clients highly value the way a contractor solves problems and whether they are flexible and transparent in their communication. Most clients prefer selecting contractors that have already proven themselves and they have worked with before. By selecting the right contractor in advance, clients try to minimise conflicts, delays and quality issues.

Risk management through contractual allocation
Another way to limit risks is by contractually allocating the risks to the contractor. This often involves shifting environmental risks, political risks, economic risks, design risks, technical risks, construction risks, management risks, contractual risks and financial risks to the contractor. The level of detail varies from client to client, but developers in particular record almost everything contractually. To ensure compliance with agreements, contractual securities are also built into the contract, such as penalties for late delivery, withholding of the final payment and bank guarantees. Finally, standard insurances are required to keep the risks controllable.

Despite the extensive contractual agreements, both contractors and clients prefer collaboration and jointly resolving issues rather than taking legal action.

7. Discussion

This study was conducted to gain more knowledge on risk management and contractor selection in the construction industry. In paragraph 7.1, the theoretical implications are discussed, followed by paragraph 7.2 which outlines the practical implications. Finally, paragraph 7.3 addresses the limitations and directions for future research.

7.1 Theoretical implications

This research contributes to the existing knowledge on risk management in the construction industry by providing an in-depth qualitative analysis of how clients in the private sector mitigate risks. As highlighted in the introduction to this study, most of the research has been conducted on the public sector but little to no research has been conducted on these aspects in the private sector. In addition, it appeared that most of the already conducted studies were quantitative. This research theoretically contributes because it is a qualitative study which provides a more in-depth understanding about the perspectives and the motives of the risk management of private sector clients (Mey, 2022). This insight helps clients and contractors better understand and align risk management with the aim of minimising risks in the construction industry. This research especially contributes by providing knowledge about two risk management strategies from private sector clients; contractor selection criteria and risk allocation.

Contractor selection criteria

According to this research, one way of risk management of private sector clients is carefully selecting a contractor. Many studies have already identified the main contractor selection criteria, but the main considerations of risk management are still discussed (Olaniran, 2015). According to the literature, clients often select contractors primarily based on the most competitive bid price (Xiaohong, 2011; Zavadskas et al., 2008). However, choosing contractors based on the wrong criteria may cause poor project performance (Zavadskas et al., 2014). According to Pesämaa et al. (2009), in modern, mainly complex situations, the products or services often have characteristics that cannot be judged by objective criteria only (Pesämaa et al., 2009). As a result, subjective criteria such as familiarity, reputation, legitimacy, compliance with quality and quality standards or other standards also need to be included in the consideration to avoid risks (Pesämaa et al., 2009). This study tested these theoretical implications with empirical research and concludes that clients are aware of the importance of selecting a good and qualified contractor to mitigate risks. They do this by assessing the contractors on all the criteria derived from theory; financial strength, technical ability, management ability and health and safety and reputation. Besides the criteria from theory this study also introduces some extra criteria; location of the contractor, speed of construction and sustainability. These three criteria were also mentioned by some clients for contractor selection. Overall, mainly reputation and bid price appear to be the main factors in selecting a contractor. Clients attach much value on good relationships, trust, ability of problem solving and long-term partnerships. That is why they prefer contractors they have already worked with to minimise risks. This research therefore confirmed to the theory of Pesämaa et al. (2009) that not only objective characteristics are important but also subjective characteristics such as familiarity, reputation, legitimacy, compliance with quality and quality standards need to be considered to avoid risks (Pesämaa et al., 2009).

Furthermore, according to other the literature, clients often select contractors primarily based on the most competitive bid price (Xiaohong, 2011; Zavadskas et al., 2008). This turns out to be partly true because clients do consider financial strength, technical ability, management ability and health and safety and reputation. However, often all the contractors are on the same level, which enables them to choose based on the lowest price.

Risk allocation

According to the literature, risk management involves identifying risks and implementing strategies to minimise, share, transfer, or accept the risks (Jergeas & Put, 2001). Therefore, the client needs to handle the risks or transfer them to another party (Abderisak & Lindahl, 2015). In many cases most of the responsibilities are passed to the contractor (Jergeas & Hartman, 1996; Lam et al., 2007). This study found that indeed almost all the risks are allocated to the contractor by the client. However, according to theory, when the risk is unfairly assigned to the contractor, they may increase the price or sometimes deliver lower quality (Lam et al., 2007). Indeed, the contractor charges more risk percentage on the contract sum but does not deliver lower quality. In practice, he makes sure the risks are manageable and that there are no risks in the contracts that the contractor cannot handle. Both parties agree on this approach, and it is proven to be effective.

Clearly defining risks in the contract ensures that both parties adhere to the agreements which prevents disputes and ultimately leads to mutual satisfaction. However, the distribution of the risks needs to be balanced and fair with both parties having benefits and drawbacks to achieve both parties being satisfied with the contract terms.

7.2 Practical implications

This study provides insight in two risk management strategies of private sector clients; contractor selection criteria and risk allocation. Insight in contractor selection criteria contributes to a better understanding about contractor selection criteria, giving contractors the opportunity to develop better tender strategies. It is clear that lowest price, financial stability, technical capability, management capability, health and safety, reputation, contractor location, speed of construction and sustainability are the criteria which contractors are selected. This study shows that often a pre-selection is made based on financial situation, technical capability, management capability, health and safety and reputation. Once the contractor meets all the requirements, the final decision is primarily based on the lowest price. Reputation is one of the most important factors because clients often assess and select based on previous experience with contractors, previous projects, relationship and problem-solving ability. Clients like to work with contractors they have worked with before. Contractors who are financially strong and have the knowledge and skills should therefore distinguish themselves by focusing on building relationships and trust with clients. Having good relationships with clients is the most effective way of getting project awarded.

This study not only contributes to developing better tender strategies for contractors but also contributes to better and more effective risk management approach. Pre-selecting contractors based on the above aspects, indeed leads to effective risk management and thus minimizing risks. This research reflects that both parties like to work based on trust and cooperation. Furthermore, this research shows that open communication and transparency are highly valued by clients. They appreciate being allowed to be present at project meetings in order to be informed about what is going on and to know in time if something is not going well. These are important criteria for problem-solving. This study suggests that when contractors provide clients with better project insights, risk management becomes more effective because then they can both discuss solutions.

Another important contribution is the insight that relationships are very important in minimizing risk as clients are more lenient with problems if the contractor communicates well and tries to solve the problem in case a problem arises. In doing so, it appears that neither party wants to go to court to resolve disputes because it is often more expensive than the problem itself. It can thereby lead to negative media attention. Based on this knowledge, contractors and clients need to focus on good collaboration by transparent communication and timely discussion of problems.

Regarding risk allocation. It turns out that contractors are overall fine with extensive contracts as long as they can oversee the risks. Some parties are more flexible if they have a good relationship with the other party. Also in this regard, both parties should therefore focus on building relationships.

7.3 Limitations and future research

While this research has valuable theoretical and practical contributions, it also has some limitations. This chapter addresses the limitations of this research.

Firstly, the study was conducted with a single contractor, meaning that all collected data from the contractor's perspective comes solely from this company. Additionally, only clients who have worked on one or more projects with this company were interviewed, which means no parties have been asked that have no connection with the contractor. As a result, the study has limited reliability. For more in-depth and reliable results, research should be conducted with other contractors and clients. However, it serves as a good starting point as an exploratory study to gather initial insights.

Second, the empirical data was collected using triangulation, which ensured the validity of the study findings. It involved a combination of contract analysis and two interviews for each project; one with the contractor and one with the client. This approach felt appropriate because the questions were thorough, and the interviews were conducted after the contract analyses were completed. In this way the interview could be adapted to the findings of the contract analysis. However, by conducting more interviews, the validity can be increased more.

Thirdly, five projects were analysed, with two of them having the same project manager of the contractor, meaning that the opinion and view of the same person was given for both projects. Furthermore, for the fifth project, only the contractor was interviewed which means that the story was not viewed from both sides. The best approach would be to use triangulation in all projects to obtain the most reliable answers, this was not achieved in this study. Moreover, the interviews were conducted with project managers who are not always involved in the contract formation and do not have as much knowledge about contracts as people at the commerce department have. To gain deeper insights, future research could focus on a wider range of interviews with employees of different functions to ensure that both sides are interviewed and that employees with different functions are included in the interview sample.

Fourthly, the contractor selection criteria and risks were discussed in the interviews based on aspects derived from the theoretical framework. To prevent interviewees from being too guided by these aspects, the questions were initially asked in an open manner. Nevertheless, it is still possible that other important aspects were not mentioned in the interviews. This could be because the interviewees did not think of them at the time or because they subconsciously remained within the framework of the interview or the certain project.

Fifthly, the contractor selection criteria and risk factors were all categorised under specific categories. These categories are quite broad. To ensure a clear distinction, the definitions of the categories were determined in advance based on literature. However, there is still a possibility of overlap between certain categories, and the assessment remains still partial subjective because they are allocated by only one researcher. In future research, this classification could be conducted by multiple researchers to enhance reliability.

Sixthly, although the coding of the interviews was reviewed by the supervisors, all interviews were coded by a single researcher. Therefore, intercoder reliability is not guaranteed. Future research might therefore consider having the data coded by multiple professionals to ensure its reliability.

Since it is an exploratory study, there are plenty of opportunities for future research. For instance, the above recommendations can be followed up, but alongside those recommendations around more extensive and deeper research, there can also be focus on broader research. There are opportunities in conducting deeper research into the difference between the UAV and the clients' comprehensive contracts. Unfortunately, an in-depth analysis of this difference was not possible in this study due to time constraints. It is also recommended to conduct further research into the difference between different type of clients, in this research four developers were studied and one client which builds for own use. In future research this difference can be further assessed with a bigger sample and even distribution of the type of clients.

In addition to future research recommendations based on the limitations, follow-up research can be done based on what the literature implies. Since it was stated that much research has been done on the public sector, further research can be conducted on the differences between the private and public sector in order to understand the strengths and weaknesses of both sectors. This may allow both sectors to learn from each other. Furthermore, research can also be done on the influence of the type of relationship on pricing and the degree of price selection when selecting a contractor.

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Appendix I

Description of building of company premisses

The case company is company in the private sector and is primarily specialized in the construction of business premises. The company does not have a separate procurement organisation. This means that goods and services are purchased by the project managers. There is no coordinating department that supervises this or actively checks that the best possible deal is being made. However, there is mutual consultation between the project managers, for example in the area of experience with certain suppliers or other knowledge that the other project managers might have.

The role of procurement in the building of company premises presents different challenges compared to the construction industry in general. Within the construction of business premises, seven different aspects are distinguished (personal communication, project leader case company, 30-05-2024):

1. Groundwork. This includes tasks such as levelling the terrain to the correct heights, installing sewer systems, and laying street paving. It sometimes also involves providing site furniture such as traffic signs and benches.
2. Steel construction. This encompasses the creation of the framework of the business premises.
3. Roof cladding and wall cladding. Roof cladding refers to the part that is directly placed on the steel construction.
4. Roof covering. Unlike roof cladding, the roof covering is the finishing layer of the building, serving as the general roof.
5. Installation. Installation includes all the installations that need to be present in the building, such as electrical installations, mechanical installations, and sprinkler systems.
6. Concrete floor. This is the floor of the business premises, on which another type of flooring may sometimes be laid.
7. Interior package. Also known as the finishing phase. This includes offices, walls, ceilings, floors, and activities such as painting the walls.

The complexity of constructing a business building lies in the fact that all these different basic aspects are carried out by various subcontractors. This means that many different stakeholders are involved, and proper coordination is essential. All components build upon each other, so if one component is not completed on time or is not done correctly, it will cause problems for the other components. To understand the construction process of a company premises, in Appendix I the overall process of the building of company premises is outlined. This process consists of three overarching phases (personal communication, project leader, 30-05-2024):

1. **Phase 1: The tender phase**. In this phase, the contractor attempts to win the project from the client. There are two options in this process:

    a. The client has created a design in, often in collaboration with an architect, and then puts out a tender that various contractors can enrol in. The contractors request quotes from subcontractors who can perform the different parts of the project. Based on the prices provided by the subcontractors, the contractor makes an estimate of the expected construction costs and submits a bid for the tender. The client ultimately decides who is awarded the project.
    b. The other option is that the client does not yet have a detailed design and wants to involve the contractor from the beginning. In this case, they approach either a few parties to see who they want to work with or directly approach a specific party. When the client takes this approach, it is known as a construction team. This means that the client and the contractor jointly create a design, utilizing the contractor's expertise. An architect is often still involved, but focuses more on the finishing rather than the initial design.

2. **Phase 2: The design phase**. When a normal tender process occurs and the contractor wins the project that was already designed by the client and the architect, the contractor will still review the construction and explore other possibilities. The design is often modified, and new quotes are requested from subcontractors for executing the final design. Once all this is done and all agreements are finalized, the project can proceed to execution. However, in a

construction team scenario, the contractor is involved from the start of the design phase, meaning there is no need to modify the design or request quotes again. Working in a construction team is faster for the contractor because they are directly involved and do not need to verify the design.

3. **Phase 3: The execution phase**. In this phase, the project is actually carried out, and the business premises is built.

Every project has a project team. This project team consists of a project leader, a work preparer, site supervisor and a process engineer.

Appendix II

Informed consent form interviews

Informatieblad voor onderzoek naar aannemer selectie en risico management

Doel van het onderzoek
Dit onderzoek wordt geleid door Eline Bokdam.
Het doel van dit onderzoek is het verkrijgen van inzicht in de aspecten waarop opdrachtgevers aannemers selecteren en op welke manier zij risicomanagement toepassen in het kiezen en het contracteren van een aannemer. Het onderzoek wordt uitgevoerd als afstudeerthesis.

Hoe gaat het te werk?
U neemt deel aan een onderzoek waarbij ik informatie zal vergaren door u te interviewen en uw antwoorden te noteren/op te nemen via een audio- opname. Er zal ook een transcript worden uitgewerkt van het interview.

Uitsluitend ten behoeve van het onderzoek zullen de verzamelde onderzoeksgegevens worden gedeeld met [redacted]

Potentiële risico's en ongemakken
Er zijn geen fysieke, juridische of economische risico's verbonden aan uw deelname aan deze studie. U hoeft geen vragen te beantwoorden die u niet wilt beantwoorden. Uw deelname is vrijwillig en u kunt uw deelname op elk gewenst moment stoppen.

Vertrouwelijkheid van gegevens
Ik doe er alles aan uw privacy zo goed mogelijk te beschermen. Er wordt op geen enkele wijze vertrouwelijke informatie of persoonsgegevens van of over u naar buiten gebracht, waardoor iemand u zal kunnen herkennen.
Voordat onze onderzoeksgegevens naar buiten gebracht worden, worden uw gegevens zoveel mogelijk geanonimiseerd, tenzij u in ons toestemmingsformulier expliciet toestemming heeft gegeven voor het vermelden van uw naam, bijvoorbeeld bij een quote.

In een publicatie zullen anonieme gegevens of pseudoniemen worden gebruikt. De audio-opnamen, formulieren en andere documenten die in het kader van deze studie worden gemaakt of verzameld, worden opgeslagen op een beveiligde locatie bij de Universiteit Twente en op de beveiligde (versleutelde) gegevensdragers van de onderzoekers. De onderzoeksgegevens worden indien nodig (bijvoorbeeld voor een controle op wetenschappelijke integriteit) en alleen in anonieme vorm ter beschikking gesteld aan personen buiten de onderzoeksgroep.

Tot slot is dit onderzoek beoordeeld en goedgekeurd door de ethische commissie van de faculteit BMS (domain Humanities & Social Sciences).

Vrijwilligheid
Deelname aan dit onderzoek is geheel vrijwillig. U kunt als deelnemer uw medewerking aan het onderzoek te allen tijde stoppen, of weigeren dat uw gegevens voor het onderzoek mogen worden gebruikt, zonder opgaaf van redenen. Het stopzetten van deelname heeft geen nadelige gevolgen voor u. Als u tijdens het onderzoek besluit om uw medewerking te staken, zullen de gegevens die u reeds hebt verstrekt tot het moment van intrekking van de toestemming in het onderzoek gebruikt worden.
Wilt u stoppen met het onderzoek, of heeft u vragen en/of klachten? Neem dan contact op met de onderzoeksleider.

Voor bezwaren met betrekking tot de opzet en of uitvoering van het onderzoek kunt u zich ook wenden tot de Secretaris van de Ethische Commissie / domein Humanities & Social Sciences van de faculteit Behavioural, Management and Social Sciences op de Universiteit Twente via

ethicscommittee-hss@utwente.nl. Dit onderzoek wordt uitgevoerd vanuit de Universiteit Twente, faculteit Behavioural, Management and Social Sciences. Indien u specifieke vragen hebt over de omgang met persoonsgegevens kun u deze ook richten aan de Functionaris Gegevensbescherming van de UT door een mail te sturen naar dpo@utwente.nl.

Tot slot heeft u het recht een verzoek tot inzage, wijziging, verwijdering of aanpassing van uw gegevens te doen bij de Onderzoeksleider.

Contactgegevens onderzoeksleider:
Eline Bokdam
E-mail: [redacted]
Telefoonnummer: [redacted]

Door dit toestemmingsformulier te ondertekenen erken ik het volgende:

1. Ik ben voldoende geïnformeerd over het onderzoek door middel van een separaat informatieblad. Ik heb het informatieblad gelezen en heb daarna de mogelijkheid gehad vragen te kunnen stellen. Deze vragen zijn voldoende beantwoord.
2. Ik neem vrijwillig deel aan dit onderzoek. Er is geen expliciete of impliciete dwang voor mij om aan dit onderzoek deel te nemen. Het is mij duidelijk dat ik deelname aan het onder- zoek op elk moment, zonder opgaaf van reden, kan beëindigen. Ik hoef een vraag niet te beantwoorden als ik dat niet wil.
3. Ik geef toestemming om de gegevens die gedurende het onderzoek bij mij worden verzameld te verwerken zoals is opgenomen in het bijgevoegde informatieblad.
4. Ik geef toestemming om tijdens het interview opnames (geluid) te maken en mijn antwoorden uit te werken in een transcript.
5. Ik geef toestemming het contract van het betreffende project te analyseren onder de voorwaarde dat het geanonimiseerd wordt.

Naast het bovenstaande is het hieronder mogelijk voor verschillende onderdelen van het onderzoek specifiek toestemming te geven. U kunt er per onderdeel voor kiezen wel of geen toestemming te geven. Indien u voor alles toestemming wil geven, is dat mogelijk via de aanvinkbox onderaan de stellingen.

6. Ik geef toestemming om mijn antwoorden te gebruiken voor quotes in de onderzoekspublicaties.	JA □	NEE □
7. Ik geef toestemming om de bij mij verzamelde onderzoeksdata te bewaren en te gebruiken voor toekomstig onderzoek en voor onderwijsdoeleinden.	□	□

Naam Deelnemer:

Handtekening:

Datum:

Naam Onderzoeker:

Handtekening:

Datum:

Appendix III

Interview protocol aannemer

Meenemen:

- Opnamemateriaal (iPhone, opgeladen)
- Toestemmingsformulier
- Pennen
- Protocol

Inleiding:

Ik ben student aan de Universiteit Twente en voor mijn afstudeerscriptie doe ik onderzoek naar de aspecten waarop opdrachtgevers aannemers selecteren en de manier waarop risicomanagement wordt toegepast binnen de constructie sector. Dit doe ik voor de master
Business Administration met de specialisatie Purchasing & Supply Management. In mijn onderzoek wil ik antwoord geven op de
hoofdvraag: "*Welke strategieën gebruiken opdrachtgevers in de bouwsector om projectrisico's te beheren, met name gericht op de selectie van aannemers en contractvorming, in de particuliere sector?"*

Het doel van dit interview is om antwoord te geven op de volgende deelvragen:

"Welke risico's nemen opdrachtgevers in overweging bij het selecteren van aannemers in de bouwsector, en welke strategieën en contractuele bepalingen gebruiken ze om deze risico's te beheersen?".

"Hoe ervaren aannemers de risicomanagementstrategieën van opdrachtgevers in de bouwsector en hoe anticiperen ze op deze aanpak"

Om antwoord te geven op de hoofdvraag heb ik mijn onderzoek in 3 fases ingericht.

1. Literatuuronderzoek naar inkoop in de bouwsector, verschillende contractvormen in de bouwsector, aannemer selectiecriteria van opdrachtgevers en risico's in de bouwsector;
2. Contractanalyse van de verschillende projecten die ik onderzoek;
3. Interviews met zowel opdrachtgevers als medewerkers van [redacted].

In dit interview wil ik ingaan op de contractvorming en het risicomanagement bij het project ….

Dit interview duurt ongeveer een uur en vindt plaats op een semigestructureerde manier. Dit houdt in dat ik vooraf vragen heb opgesteld om inzicht te krijgen in het onderwerp, maar dat de mogelijkheid er is om extra vragen te stellen om zo het onderwerp beter te begrijpen. Voor het interview vraag ik u om een het toestemmingsformulier te tekenen.

Toestemmingsformulier doornemen en laten tekenen
** Opname starten**

Algemeen:

1. Wat is uw functie?
2. Op welke manier was u betrokken bij project… ?

Risico visie aannemer:

1. Welke risico's voorziet u bij een project?
2. Welke risico's zijn het meest waarschijnlijk en welke ziet u het vaakst?
3. Per categorie, werk de risico's uit en leg uit waarom je die belangrijk vindt of niet.
    a. Extern:
        i. Milieu
        ii. Politiek
        iii. Economisch
    b. Intern:
        i. Ontwerp – indien van toepassing
        ii. Technisch
        iii. Constructie
        iv. Management
        v. Contractueel
        vi. Financieel
4. Op welke manier wordt er met deze risico's omgegaan?
5. Vaak is er een contract met de opdrachtgever, hoe beoordelen jullie zo'n contract?
6. De meeste contracten zijn gebaseerd op de UAV, houden jullie je daaraan of worden sommige dingen gewijzigd en op basis waarvan?
7. Zijn er criteria waarmee jullie niet akkoord gaan?
8. Wat is uw visie tegenover de manier waarop opdrachtgevers de risico's beheren en dus ook toewijzen aan jullie?
9. Zitten er grote verschillen per opdrachtgever of is dit vaak redelijk universeel?
10. Heeft u het idee dat het soort relatie met de opdrachtgever van invloed is op de manier hoe er met risico's om gegaan wordt?
11. Wordt er voor uw gevoel genoeg gedaan aan risicobeheersing door de opdrachtgever en nemen zij genoeg risico's op zich?
12. Heeft de manier waarop een opdrachtgever met jullie omgaat invloed op het gedrag waarop jullie de opdrachtgever behandelen en waarom? (Bijvoorbeeld stapje harder lopen wanneer opdrachtgever coulant is)
13. Heeft de relatie die u heeft met de opdrachtgever voor u invloed op de risico's en waarom?
14. Wat zou voor u de manier zijn waarop de opdrachtgever het best met risico's kan omgaan?
15. Zijn er externe omstandigheden die de keuze voor het akkoord gaan met een contract beïnvloeden of niet? (Bijvoorbeeld krappe markt of covid 19)

Tabel contractanalyse

Aannemer selectiecriteria

Selectie criteria	Omschrijving
Laagste bod	Hierbij kiest de opdrachtgever zijn aannemer op basis van het laagste bod voor de uitvoering van het project.
Financiële situatie	Dit betreft de financiële status, sterkte en stabiliteit van de aannemer.
Technische bekwaamheid	Dit betreft de technische competentie van de aannemer, inclusief hun ervaring en de beschikbaarheid van middelen en technisch gekwalificeerd personeel.
Managementcapaciteit	Dit betreft de projectmanagementprestaties van het bedrijf en of zij over managementgekwalificeerd personeel beschikken. Managementervaring maakt hier ook deel van uit.
Gezondheid en veiligheid	Gezondheid en veiligheid gaat over gezondheids- en veiligheidsmanagement en of de aannemer voldoet aan regels en voorschriften.
Reputatie	Reputatie gaat over de ervaring met de aannemer en of er in eerdere projecten iets mis is gegaan. Het gaat ook over de zakelijke relatie die de opdrachtgever met de aannemer heeft. Dit wordt getoetst aan de drie kenmerken van een zakelijke relatie, zoals beschreven in de bovenstaande theorie. Deze zijn: vertrouwen, betrokkenheid en tevredenheid.

Risico's in de bouwsector

Risico categorie	Omschrijving	Bron
External risks		
Milieu risico's	Slechte weersomstandigheden, klimaatverandering en de milieu-impact van het project, zoals verlies van flora en fauna.	(Kamane & Mahadik, 2013; Nagalla et al., 2018; Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Politieke risico's	Wijziging van wet- en regelgeving.	(Nagalla et al., 2018; Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Economische risico's	Inflatie	(Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Internal risks		
Ontwerp risico's	Fouten in het ontwerp, onnauwkeurige hoeveelheden.	(Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Technische risico's	Het kan zijn dat de locatie niet goed is beoordeeld, dat er sprake is van een tekort aan materialen of dat de kwaliteit van de materialen slecht is.	(Kamane & Mahadik, 2013; Tessema et al., 2022)
Constructie risico's	Risico's verbonden aan de uitvoering van het project, dit zijn vooral tijd-, geld- en kwaliteitsproblemen. Voorbeelden zijn onder meer de beschikbaarheid en productiviteit van arbeid, materiaaltekorten, omstandigheden op de locatie en veiligheidsomstandigheden. Verschil tussen specificaties en daadwerkelijke uitvoering.	(Kamane & Mahadik, 2013; Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Management risico's	Het ontbreken van een goede projecthandleiding, slechte communicatie, gebrek aan procedures, het onvermogen om snel corrigerende maatregelen te nemen, slechte kwaliteitscontrole, slechte controle van statusbeoordelingen, gebrek aan een ervaren persoon in het projectteam en een ontoereikende communicatie-infrastructuur. korte aanbestedingsperiode, onjuiste haalbaarheidsstudie van het project, tijdsdruk en gebrek aan ervaring met soortgelijke projecten in het verleden zijn ook enkele van de managementrisico's.	(Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Contractuele risico's	Risico's gerelateerd aan fouten in contractdocumenten, ongepaste documenten of ongepaste contractuele relaties.	(Akintoye & MacLeod, 1997)
Financiële risico's	De opdrachtgever heeft niet genoeg geld om het project te voltooien, gaat ook over de financiële situatie van aannemers en onderaannemers.	(Akintoye & MacLeod, 1997; Tessema et al., 2022; Yembi Renault & Agumba, 2016)

Appendix IV

Interview protocol opdrachtgever

Meenemen:
- Opnamemateriaal (iPhone, opgeladen)
- Toestemmingsformulier
- Pennen
- Protocol

Inleiding:

Ik ben student aan de Universiteit Twente en voor mijn afstudeerscriptie doe ik onderzoek naar de aspecten waarop opdrachtgevers aannemers selecteren en de manier waarop risicomanagement wordt toegepast binnen de constructie sector. Dit doe ik voor de master
Business Administration met de specialisatie Purchasing & Supply Management. In mijn onderzoek wil ik antwoord geven op de hoofdvraag: "*Welke strategieën gebruiken opdrachtgevers in de bouwsector om projectrisico's te beheren, met name gericht op de selectie van aannemers en contractvorming, in de particuliere sector?"*

Het doel van dit interview is om antwoord te geven op de volgende deelvragen:

"Welke criteria hanteren opdrachtgevers bij het selecteren van aannemers en welke aspecten vinden zij het belangrijkst?"

"Welke risico's nemen opdrachtgevers in overweging bij het selecteren van aannemers in de bouwsector, en welke strategieën en contractuele bepalingen gebruiken ze om deze risico's te beheersen?".

Om antwoord te geven op de hoofdvraag heb ik mijn onderzoek in 3 fases ingericht.
4. Literatuuronderzoek naar inkoop in de bouwsector, verschillende contractvormen in de bouwsector, aannemer selectiecriteria van opdrachtgevers en risico's in de bouwsector;
5. Contractanalyse van de verschillende projecten die ik onderzoek;
6. Interviews met zowel opdrachtgevers als medewerkers van [redacted].

In dit interview wil ik ingaan op de contractvorming en het risicomanagement bij het project ….

Dit interview duurt ongeveer een uur en vindt plaats op een semigestructureerde manier. Dit houdt in dat ik vooraf vragen heb opgesteld om inzicht te krijgen in het onderwerp, maar dat de mogelijkheid er is om extra vragen te stellen om zo het onderwerp beter te begrijpen. Voor het interview vraag ik u om een het toestemmingsformulier te tekenen.

Toestemmingsformulier doornemen en laten tekenen
** Opname starten**

Algemeen:

1. Wat is uw functie?
2. Op welke manier bent u betrokken bij de keuze voor aannemers bij projecten (en bij dit project specifiek)

Selectiecriteria voor aannemers:

1. Welke criteria gebruiken jullie voor het selecteren van aannemers en waarom?
2. Volgens mijn literatuuronderzoek zijn er vijf criteria welke vaak worden getoetst bij het kiezen van een aannemer. Leg bij elke categorie uit of jullie dit belangrijk vinden en hoe dit een rol speelt in de keuze:
    a. Financiële situatie van de aannemer
    b. Technische capaciteit van de aannemer
    c. Managementcapaciteit van de aannemer
    d. Gezondheid en veiligheid van de aannemer
    e. Reputatie van de aannemer
3. Welke criteria vinden jullie het meest belangrijk en waarom?
4. Selecteren jullie voornamelijk op de laagste prijs of zijn andere factoren belangrijker?
5. Vind u de aard van de relatie die u met de aannemer heeft belangrijk en waarom?
6. Hoe is deze relatie gevormd en hoe onderhoudt u deze relatie?
7. Hoe zou u een goede relatie met een aannemer omschrijven?
8. Hoe zou u een slechte relatie met een aannemer omschrijven?

Risicomanagement bij aannemers:

9. Welke risico's voorziet u bij een project?
10. Welke risico's denkt u dat het meest waarschijnlijk zijn en welke zie u het vaakst?
11. Houd u rekening met die risico's bij het selecteren/kiezen van een aannemer? Op welke manier?
12. Per categorie, werk de risico's uit en leg uit waarom je die belangrijk vindt of niet.
    a. Extern
        i. Milieu
        ii. Politiek
        iii. Economisch
    b. Intern:
        i. Ontwerp – indien van toepassing
        ii. Technisch
        iii. Constructie
        iv. Management
        v. Contractueel
        vi. Financieel
13. Hoe beperkt u de risico's en waarom op die manier?
14. Vindt u dat de meeste risico's bij de aannemer moeten liggen?
15. Hoe verdeelt u de risico's in de contracten met de aannemer?
16. In de contracten worden de meeste risico's toegewezen aan de aannemer, vindt u dat eerlijk en moet de aannemer de problemen oplossen of werken jullie liever samen?
17. Heeft u de voorkeur om samen te werken en waarom?
18. Zijn alle contracten hetzelfde of verschilt het per aannemer? En waarom?
19. De meeste contracten zijn gebaseerd op de UAV, houden jullie je daaraan of worden sommige dingen gewijzigd en op basis waarvan?
20. Geven jullie de voorkeur aan bepaalde aannemers en waarom?
21. Vindt u dat de aard van de relatie die u met de aannemers heeft belangrijk is voor risicobeheersing? Beïnvloedt het de keuze van de aannemer en waarom?
22. Zijn er bepaalde (externe) omstandigheden die de manier waarop risico's worden behandeld beïnvloeden? Misschien vertrouwen in de aannemer of omstandigheden zoals covid-19 of een krappe markt?

Tabel contractanalyse

Aannemer selectiecriteria

Selectie criteria	Omschrijving
Laagste bod	Hierbij kiest de opdrachtgever zijn aannemer op basis van het laagste bod voor de uitvoering van het project.
Financiële situatie	Dit betreft de financiële status, sterkte en stabiliteit van de aannemer.
Technische bekwaamheid	Dit betreft de technische competentie van de aannemer, inclusief hun ervaring en de beschikbaarheid van middelen en technisch gekwalificeerd personeel.
Managementcapaciteit	Dit betreft de projectmanagementprestaties van het bedrijf en of zij over managementgekwalificeerd personeel beschikken. Managementervaring maakt hier ook deel van uit.
Gezondheid en veiligheid	Gezondheid en veiligheid gaat over gezondheids- en veiligheidsmanagement en of de aannemer voldoet aan regels en voorschriften.
Reputatie	Reputatie gaat over de ervaring met de aannemer en of er in eerdere projecten iets mis is gegaan. Het gaat ook over de zakelijke relatie die de opdrachtgever met de aannemer heeft. Dit wordt getoetst aan de drie kenmerken van een zakelijke relatie, zoals beschreven in de bovenstaande theorie. Deze zijn: vertrouwen, betrokkenheid en tevredenheid.

Risico's in de bouwsector

Risico categorie	Omschrijving	Bron
Externe risico's		
Milieurisico's	Slechte weersomstandigheden, klimaatverandering en de milieu-impact van het project, zoals verlies van flora en fauna.	(Kamane & Mahadik, 2013; Nagalla et al., 2018; Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Politieke risico's	Wijziging van wet- en regelgeving.	(Nagalla et al., 2018; Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Economische risico's	Inflatie	(Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Interne risico's		
Ontwerp risico's	Fouten in het ontwerp, onnauwkeurige hoeveelheden.	(Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Technische risico's	Het kan zijn dat de locatie niet goed is beoordeeld, dat er sprake is van een tekort aan materialen of dat de kwaliteit van de materialen slecht is.	(Kamane & Mahadik, 2013; Tessema et al., 2022)
Constructie risico's	Risico's verbonden aan de uitvoering van het project, dit zijn vooral tijd-, geld- en kwaliteitsproblemen. Voorbeelden zijn onder meer de beschikbaarheid en productiviteit van arbeid, materiaaltekorten, omstandigheden op de locatie en veiligheidsomstandigheden. Verschil tussen specificaties en daadwerkelijke uitvoering.	(Kamane & Mahadik, 2013; Tessema et al., 2022; Yembi Renault & Agumba, 2016)
Management risico's	Het ontbreken van een goede projecthandleiding, slechte communicatie, gebrek aan procedures, het onvermogen om snel corrigerende maatregelen te nemen, slechte kwaliteitscontrole, slechte controle van statusbeoordelingen, gebrek aan een ervaren persoon in het projectteam en een ontoereikende communicatie-infrastructuur. korte aanbestedingsperiode, onjuiste haalbaarheidsstudie van het project, tijdsdruk en gebrek aan ervaring met soortgelijke projecten in het verleden zijn ook enkele van de managementrisico's.	(Tessema et al., 2022; Yembi Renault & Agumba, 2016)
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Financiële risico's	De opdrachtgever heeft niet genoeg geld om het project te voltooien, gaat ook over de financiële situatie van aannemers en onderaannemers.	(Akintoye & MacLeod, 1997; Tessema et al., 2022; Yembi Renault & Agumba, 2016)