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Risk management and leadership on construction sites

Perspectives of Swedish site managers and foremen

Master's thesis in Design and Construction Project Management

ISHAK ALI
KAMIL ABDI SHEIKH

DEPARTMENT OF TECHNOLOGY MANAGEMENT AND ECONOMICS
DIVISION OF INNOVATION AND R&D MANAGEMENT

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Report no. E2022:108
Department of Technology Management and Economics
Chalmers University of Technology
SE-412 96 Göteborg
Sweden
Telephone + 46 (0)31-772 1000

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ABSTRACT

Currently, risk management on construction sites is ineffective in the Swedish construction industry. Even though a construction project consists of numerous stages, it is during the construction phase that all the ideas are converted into a final product via the cooperation of different actors with specialised skills. In this phase, the site managers and foremen are responsible for monitoring and controlling risks that may arise to ensure the efficient completion of the project. The literature imply that time delays and cost overruns are two risk factors that contribute to inefficiency on construction sites. The purpose of this research is to determine how Swedish site managers and foremen manage those risks and steer the diverse actors on the construction site successfully.

Given the scarcity of prior research using qualitative research methods and merging leadership and risk management, this study analysed construction site risk management and leadership via qualitative research methods. Through semi-structured interviews with construction site managers and foremen from several construction firms, qualitative data was acquired. Since there were limited literatures on leadership covering construction sites, the obtained qualitative data was analysed using abductive reasoning.

The findings of this study indicate that there are two categories of risks associated with time delays and cost overruns on construction sites: preventable and inevitable risks. The site managers and foremen utilise distinct methods to handle these risks, including a distinct leadership style suited to each project. Other external and internal variables affecting the competence of site managers and foremen in managing risk and practicing leadership have been identified and discussed.

The conclusion of the study is that site managers and foremen must apply their management and leadership skills adequately to tackle the risks of time delays and cost overruns. Moreover, we conclude that good planning is essential for mitigating time delays and cost overruns, and more research should be devoted to enhancing the planning methods utilised. Future researchers interested in researching the role of site managers and foremen on construction sites may find the findings of this study useful.

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Keywords: Risk management in construction, Leadership in construction, Time delays, Cost overruns, Site manager, Foremen.

Contents

1 Introduction

This chapter gives a summary of the construction process, the role of the site managers and their foremen, and their significance for the overall success of a construction project. Thereafter, the aim and the research questions are outlined, and the delimitations are mentioned.

1.1 Background

Sears et al. (2015) highlights that the construction industry occupies a fundamental position in many national economies. The product produced in this industry has a huge impact on the lives of everyone on a daily basis. The construction sector is distinct from other industries owing to its fragmentation and complexity. The industry is made up of multiple projects of varying sizes that are managed throughout their lifespan by a variety of different companies and stakeholders. The customer owns the project, yet it is controlled and managed at various stages and phases by several parties, each with their own interests and project goals (Simu, 2009). The industry is also considered to be conservative and resistant to change (Babalola et al., 2019). Despite this, there are several changes being implemented in the industry such as implementation of different methods and technology to boost the efficacy and productivity of construction projects.

Another characteristic of construction industry is interdependency and uncertainty (Sandberg et al, 2021). For many years, the construction sector's profitability has been constrained, and the sector's task is to boost profitability over the long term. In this sense, the phrase "long-term profitability" refers to a steady, dependable business. To create stability, it is critical to provide certainty. Certainty is the polar opposite of uncertainty, and the construction industry has spent many years working on mitigating uncertainties, which are inextricably linked to what is referred to as risk (Simu, 2009). Additionally, the industry deals with inefficiencies. According to Babalola et al. (2019), one of the most egregious forms of inefficiency in the construction sector is cost overruns associated with site-related activities. This fact goes against the goal of boosting the long-term profitability in this sector as cost overruns clearly effects

profitability. Risk management is therefore vital to accomplish the long-term profitability ambitions in the construction sector (Oztaz & Okmen, 2004).

Following months of preparation, the construction project enters the production phase, during which a large number of actors work together on the construction site to execute the project. It is at this stage that changes have detrimental impact on project goals, requiring adequate risk management techniques to be used as well as effective leadership to lead the actors on site. When it comes to projects, risks manifest themselves at many points throughout the life cycle; nevertheless, the production phase presents a particularly challenging environment in which to operate and must be managed effectively in order to complete the project successfully (Simu, 2009).

In order to effectively finish the project, the assigned contractor appoints a site manager who is responsible for monitoring and managing site-based personnel and activities, as well as ensuring that the project is completed in accordance with the contract. Site managers together with their foremen must deal with the risks that arise on the construction site during the project's execution in order to guarantee that the work is completed safely, on schedule, within budget, and to the highest quality standards achievable. As a consequence, both construction site manager and their foremen are critical to the success of a construction project's completion (Zavari & Afshar, 2021). Risk management is significantly influenced by the site manager. It has been argued that on the construction sites, the management system has less of an influence on risk management than the site manager himself or herself (Simu, 2009). Risks that manifest themselves on the construction site and are directly connected to the work of site managers and foremen, such as time delays and cost overruns, constitute some of the more important risks that site managers and foremen have to manage in their daily work.

1.2 Research Gap

Following the review of some of relevant published material, it was observed that the research utilized quantitative methodologies when investigating the subject of risk management in construction. It was also discovered that there is a dearth of literature

about leadership on construction sites and the connection between leadership and risk management on construction sites.

1.3 Aim and research questions

The aim of this study is to assess how site managers and foremen execute construction projects successfully in the Swedish construction industry. This is done by specifically looking into how the Swedish site managers and foremen manage risks on the construction site and how they lead the different actors on the construction site to achieve the objectives of the project. This report will attempt to answer the following research questions:

- What are the daily tasks of site managers and foremen?
- What types of time and cost-related risks do the site manager and their foremen face on the construction site?
- How do the site managers and foremen lead the different actors on the construction site to manage those risks on site?

1.4 Delimitation

A part of this study pertains to the daily tasks of site managers and foremen. As such, other managerial positions, although vaguely relevant, will not be discussed. Furthermore, risk management is part of the study. However, the focus will specifically be on risk arisen from time delays and cost overruns. Hence, other risks, such as safety, will not be included in this thesis. The study investigates building projects and therefore excludes other form of construction projects.

2 Theory

The aim of this chapter is to provide a theoretical framework for the subsequent qualitative interviews. Herein, a brief overview of the construction process is provided, followed by sections related to site managers and foremen, risk management, and leadership.

2.1 The Swedish construction industry

The Swedish construction sector has been experiencing strong growth in the recent years. -However, there is structural undersupply of dwellings in Sweden and despite the high levels of dwelling construction in 2016 and 2017, these were not sufficient to address the housing shortage, which requires the construction of 600,00 new homes by 2025 (European Commission, 2018). At the end of 2021, Sweden's population has been recorded to be 10 452 326 after a population growth of 73 031 people in 2021 alone (SCB, 2022). In 2017, 88% of municipalities to report an increase of available and affordable housing shortage in Sweden.

Owing to the high cost of land, labour, and materials, there is a dearth of new public housing or rental flats. The reason behind these high costs is due to the very high demand. There is limited available land for development, and architects and municipal planners are hesitant to build higher in accordance with Swedish construction standards (Gagnon, 2020).

According to Eurostat figures, Sweden's building costs are the third highest in Europe. Housing construction costs in Sweden are around 70% higher than the European average (Spolander, n.d.). The increasing demand for housing demonstrates the potential for growth for companies in this industry. On the other hand, excessive construction costs and cost overruns have an adverse effect on the profitability of the construction project, which is a risk. If the profitability objective is not met, supply will fall short of demand. While the high construction prices are difficult to affect in Sweden, cost overruns are where companies in this industry are concentrating their efforts on understanding and controlling (Simu, 2009).

2.2 Construction processes

Construction projects are complex and time-consuming activities involving a varied variety of occupational groups, including clients, contractors, construction workers, suppliers, and government officials, to name a few. All these actors are involved in different phases in the project contributing their skills and knowledge to the end product (Mäki & Kerosuo, 2015; Simu, 2009). The many design disciplines, contractors, and managers involved in a building project are loosely tied organizationally (Mäki & Kerosuo, 2015).

The construction process can be named and described differently in the literature but in general, the process could be described in five phases. Those phases are "Idea, Briefing, design, production and maintenance management" (Simu, 2009). The site manager becomes involved in the process during the design (which is highly desirable and extensively discussed in comparison to being a major contributor to enhancing productivity and efficiency in building projects) or production stages and oversees the project until it is done. It is common practice to conduct competitive bidding process to ensure project continuity. Each competing firm submits a proposal during this process, and the customer selects the most advantageous one. The successful bidder is the one who will take the project forward into the design and/or production stages of the construction process. However, this is not common for all companies as some companies are exclusive and not required to compete in bidding process (Simu, 2009).

2.2.1 Contractual form of collaboration

Before initiating the bidding process, the client selects contractual form. A construction contract is a negotiation between the contractor's pricing for the operation and his commitment to accept controlled and uncontrollable risks. The cost of doing the operation is partially determined by the contractor's assessment of the risks involved. The type of contractual form determines the risk allocation between the project stakeholders in terms of liability. According to Simu (2009), There are different types of contractual form but there are three commonly used contractual

forms in Sweden, Design-Bid-Build, (DBB), Design-Build, (DB), and partnering. The characteristics of these contractual forms are the following:

- Design-Bid-Build, DBB: This sort of contract enables the customer to maintain a separation between the design team and the contractor. After the design phase is complete, the customer separates the two phases and commences the bidding process with the contractor. From the contractor's perspective, this sort of contract is desirable since the contractor is exclusively responsible for construction while the client is responsible for design and any other issues that occur during this phase.
- Design-Build, DB: This kind of contract allows for collaboration between the client and the contractor throughout the design and construction stages. From the perspective of the site manager, this kind of contract includes more risk but also increased opportunity. In this view, opportunity implies that the contract produces possibility, since the design may be modified to accommodate the contractor's constructability strengths. This is believed to be a safer option for the client owing to the outsourcing of all design and construction responsibilities.
- Partnering: Reaching as far back as at least the 1990s, partnering as an applied concept has been used in the construction industry (CII, 1991: Egan, 1998). It has had a great effect on the industry to a point of being described as the single most impactful development in regard to improving project performance (Wood & Ellis, 2005). This is in stark contrast to the traditionally adverse relation between difference actors in the construction industry (Bygballe et al, 2010). What, then, is partnering? There is a plethora of definitions that have been proposed for partnering, and most agree that there is no clear definition which is agreed upon (Li et al, 2000). However, the definition given by the Construction Industry Institute is widely used:

"A long-term commitment by two or more organizations for the purpose of achieving specific business objectives by maximising the effectiveness of each participant's resources. This requires changing traditional relationships to a shared culture without regard to organization boundaries. The relationship is based upon trust,

dedication to common goals, and an understanding of each other's individual expectations and values. Expected benefits include improved efficiency and cost-effectiveness, increased opportunity for innovation, and the continuous improvement of quality products and services." (CII, 1991)

When it comes to risk management on the construction site, these three kinds of contractual forms need three distinct methods, since the risk distribution for each contract is distinct from another. The three forms of contracts also vary when it comes to leadership, since the obligations of the three types of contracts are different.

2.2.2 Construction phase

Simu (2009) claims that construction enterprises generate revenue at the production stage, which sets them apart from many other types of organisations. In this industry, the CEO is unable to boost profit by adjusting volume or price per unit. They are dependent upon the project's on-site performance and the construction site's staff. According to research done by Josephson and Hammarlund, the majority of construction project cost overruns occur during the production phase. This necessitates a delicate balancing act between the budget and the cost of risk occurrence in order to generate profit (Simu, 2009).

Regardless of how much time is spent designing the project, this phase will always provide difficulties. Scheduling errors, delays and cost overruns, as well as a lack of communication or missing information, are just a few of the problems (Gabrieyel, 2021). Contractors of varying sizes and specialties perform the construction work in this phase. Certain contractors choose to specialise on a particular activity or aspect of a construction project, and hence are referred to as specialty contractors. Others, referred to as prime contractors, assume broader responsibility for the whole of the project. Prime contractors often subcontract portions of a project to specialised contractors, creating a contractual web of prime contractors and specialised contractors (Sears et al., 2015). While the designers, site managers, and subcontractors are loosely connected organizationally, their activities are tightly interwoven throughout the building period (Mäki & Kerosuo, 2015). The activities are

planned in a certain sequence, which places a major pressure on the site manager, who is tasked with coordinating the whole construction process.

2.3 Construction site management team

In this section, the relevant literature pertaining to the role of the site manager and the foremen, the leadership accompanied with it, and the uncertainties and prevalent risks in construction projects will be reviewed.

2.3.1 Site manager

Construction projects are, to their nature, complex endeavours that differ from one project to another. Each projects comprises several distinct groups that work together, contractors, clients, designers, etc. Despite the disjunction of their positions in the project, their work is strongly connected to produce the end-product. It is, therefore, of imminent importance for the site manager to adequately facilitate the collaboration of the different groups (Dossick and Neff, 2010). The site manager is the most important middle manager in the construction sector, playing a foundational role in the success or failure of the project "for the contractor, professional team, the client and ultimately the general public" (Mustapha & Naoum, 1998). The position of the site manager, hence, necessitates the capability to enable the smooth interaction of diverse practical and administrative activities, indicating the substantial workload associated with such a role (Styhre & Josephson, 2006). Indeed, site managers are subject to both being responsible financially and economically and being involved in the day-to-day activities on site (Styhre, 2012). This makes the role of the site manager tremendously demanding, or as Djerbarni (1996) put it:

> *Site managers carry out one of the toughest and hardest jobs in the construction process. Site management is characterised by a high work overload, long working hours, and many conflicting parties to deal with including the management, the subcontractors, the subordinates, the client, etc. This trait of the job makes it very prone to stress. (Djerbarni, 1996).*

The site manager plays a crucial role in the organizational hierarchy as the intermediate between the design phase and the construction phase of a project. As a

result, the site manager has the task to assess the design documents and, if they contain errors or are otherwise incomplete, either asks for supplementary information and a more correct design or interprets it and completes it by virtue of experience and theoretical knowledge in the production, or by consulting other site managers (Mäki & Kerosuo, 2015). This mutual collaboration, consultation, and communication between site managers (and beyond) in the construction phase is a feature characteristic for the role (Styhre et al., 2006).

The expectation of the site manager is to be in full control of all the activities taking place on site, both expected situations and unexpected situations. The unforeseen situations that occur are not treated as anomalies; they are a typical part of construction projects, and the site managers therefore deem them hard to be averted by preplanning (Dossick & Neff, 2010). The work of the site manager in relation to the expected situations is one of problem-solving in a skilful and improvisational manner, in contrast to the unexpected situations where immediate reaction and instant decisions are necessary (Dossick & Neff, 2010). Despite the evident difference of leadership styles by different site managers, they have a shared goal of continuing the production phase and not halting it whatever the conditions may be (Styhre, 2012).

2.3.2 Foremen

Following an understanding of the role and responsibilities of site managers, it is time to take a look at the construction foreman, who is often referred to as the "bridge" between the workforce and upper management, or as a key member of the contractor team who is responsible for organising construction activities on-site. The success of a construction project is heavily dependent on the performance of the construction foreman (Arabia, 2021; Designbuildings, 2014; Institution of Civil Engineers, 2021). The actors in this role are referred to by a variety of titles, including site supervisor, construction works manager, site foreman etc. They will be referred to as "construction foreman" throughout this study. In the construction industry, a construction foreman is a position below the superintendent and project managers but above typical construction labourers (Arabia, 2021). It has been argued by Shohet and Laufer (1991) that the work of a construction foreman is less organised than the job of his industrial colleague. It is necessary for the foremen to rethink their work

techniques, site organisation, and material, equipment, and tool logistics with each project and, at times, with each floor level they manage. Construction foremen is often a construction worker who have a number of years of experience in their chosen craft, and their major responsibility is to coordinate with the rest of the team to ensure that projects are efficiently executed (Arabia, 2021).

When it comes to problem solving and cooperation, the construction foreman is responsible for a large number of actors and competencies. This demands the foreman to be a good collaborator as well as a strong leader, which is not always easy. To ensure they master the critical skills required, they work alongside a site manager who helps them to develop their abilities and eventually take on more responsibility. This allows them to ensure they acquire the important skills necessary for the position (NCC, n.d.). According to Elvnäs (2010), foremen are also among the most significant key employees in many firms and organisations when it comes to quality, development, and efficiency, as well as profitability.

Having established the vital position in which construction foremen work in order to bring a concept into reality, it is necessary to comprehend the duties and obligations that they are tasked with doing. The construction foreman is responsible for directing and overseeing a team of crew members who are accountable for a variety of responsibilities ranging from training new workers to providing project reports for higher management and supervisors and other stakeholders. The daily activities performed by the construction supervisor, on the other hand, vary according on the size and kind of the project; nonetheless, some of the more frequent tasks listed by Arabia (2021) include the following:

- Examining project plans and specifications
- Creating schedules and keep the project on schedule
- Supervising and organising the activities of crew members
- Identifying and resolving issues as they occur
- Assuring that equipment is kept maintained
- Compliance with current OSHA (Occupational Safety and Health Administration) regulations Ensuring that projects are completed successfully

- Calculating rates of productivity

All of these tasks appear to be difficult, but it is important to note that construction projects frequently experience changes in methods and equipment, necessitating the use of highly skilled teams to navigate through these changes. The foreman is responsible for guiding the teams through these changes (Arabia, 2021). There are several qualifications that must be met before one may advance to the position of construction foreman. The function of a construction foreman is an experience-based position that may involve a variety. There is no one set of qualifications necessary for the position; some employers demand a certificate in a skilled craft, while others just require a high school diploma or equivalent certification. Their job, on the other hand, requires considerable knowledge of the trade, which can only be gained via years of experience. Because they supervise a group of employees, construction foremen need a variety of broad skills in order to carry out their responsibilities effectively (Arabia, 2021). The skills required include:

1. Effective Communication: This entails providing specific instructions, communicating changes to the team, and offering feedback on performance, among other things. This fuels the relationship building with the crew members
2. Organization and planning: This include keeping track of the budget and timetables, allocating work to crew members, and reducing the number of mistakes that occur as a result of poor organisation.
3. Decision-making: This includes the foreman's ability to apply his or her knowledge, experience, and critical thinking abilities to make the best choice in difficult circumstances for the success of the project. Foremen are responsible for making changes to daily operations and dealing with issues as they emerge.
4. Administrative skills: These tasks include scheduling, time monitoring, budgeting, aiding with recruiting, and documenting staff evolutions.
5. Training and monitoring: Assisting crew members with little experience in learning their trade through on-the-job training.

All of these skills are critical for the construction foreman to master in order to effectively complete the project on schedule, within budget, and within the quality requirement. According to the Institution of Civil Engineers (2021), the personal impact of construction foremen on site organisation may be a significant component in obtaining and sustaining efficiency.

2.4 Risk management in construction

Construction projects are risky to their nature, due to the uniqueness of each project in terms of complexity and difficulty (PMBoK, 2017; Zavadkas et al, 2010). The objective of executing a project successfully is done under different constraints that contribute to the complexity, in addition to fulfilling the stakeholders' expectations that may vary in time (PMBoK, 2017). There are many definitions of what constitutes a risk in the relevant literature. For instance, Iqbal et al (2015) define risk as "exposure to loss/gain or the probability of occurrence of loss/gain multiplied by its respective magnitude", which is a broad and widely applicable definition. Essentially, risk is found in any action whose outcome is not entirely predictable and could be both positive and negative. Hence, there is some previous knowledge and experience upon which the undertakings are grounded for a specific, possible outcome (Renault & Agumba, 2016).

The risks have been studied from many angles, and different research have classified risks in numerous ways. For instance, some have looked at risks from a probability perspective; what is the rate of occurrence? Others have ranked risks according to the impact they have on the projects. Furthermore, the sources of these risks have been taken into consideration in some studies (Klemetti, 2006). For example, risk sources that relates to stakeholders has been studied which include risks related to environment, time, cost, and safety (Zou et al, 2007). Kishan et al (2014) classified the risks into ten subgroups, namely:

1. **Design**: which includes designs that are incomplete, inaccurate, and lack internal consistencies
2. **Physical**: which includes the incident of accidents and causative factors such as inadequate safety measures etc

3. **Logistics**: which includes lack of materials, inadequate site investigation, etc
4. **Legal**: which includes vagueness in contracts, legal disputes, etc
5. **Environmental**: which includes, for instance, sub-optimal weather conditions, floods, and the site being remote
6. **Construction**: which includes difference between agreed upon quantities, and actual quantities during implementation, misunderstanding of the design drawings, changes of the designs, amongst other
7. **Management**: which includes inadequate communication between parties, vague or otherwise ambiguous planning, amongst other factors
8. **Cultural**: which includes cultural customs, religion, etc
9. **Financial**: which includes, for instance, inflation, cash flow that is unmanaged or poorly managed, delayed payments, and other factors
10. **Political**: which includes political instability (war, for instance), new governmental legislations or regulations, among other

In such a risky industry as the construction industry, adequate measures to manage the risks are needed. Risk management, hence, plays an important role in mitigating and diminishing the risks that the construction industry inevitably faces by providing a systematic approach to the risks for each project and therefore facilitating the management of projects (Olamiwale, 2014). What, then, is risk management in construction industry? According to Simu (2006), risk management in construction industry can be identified as the evaluation of, and the response to, the risks thar are present in the construction projects. Essentially, it is a matter of anticipating probable risks and negative uncertainties and providing measures to lessen or completely avoid those risks. By providing such proactive measures to reduce the negative impacts of risks, the outcome of positive events is increased, and the negative consequences are diminished (Klemetti, 2006). Effectively, risk management constitutes a proactive approach by trying to control and mitigate negative future occurrences, instead of acting retroactively once the damage has been done. Consequently, the actions taken to control the risks are there to facilitate the accomplishment of the project objectives.

With the construction projects becoming increasingly riskier as a result of the projects becoming higher and more complex, the need for risk management is increasing as

well. A thorough risk management of a project will reduce the plausibility of a negative event occurring, as well as minimising its effect if it occurs (Öztaz & Ökmen, 2004).

2.4.1 The risk management process

To understand how risks should be managed pragmatically, there are four risk management processes that are addressed (Smith et al, 2009; Giannakis & Louis, 2011). These are: risk identification, risk assessment or risk analysis, risk responses, and risk control. The outlining of these processes will serve as a general overview aimed at introducing the specific subtopics of risk: time delays and cost overruns.

2.4.1.1 Risk identification

The first step of the risk management process is risk identification, which aims to capture all potential risks associated with the project (Tchankova, 2002). Risk identification is therefore of great significance in relation to the project outcome. Without proper risk identification, the subsequential risk management processes cannot be adequately addressed. Conversely, with proper risk identification, the probability of unforeseen negative events diminishes rapidly. For the efficient application of risk identification, project documents such as the project charter, the scope statement, and the project management plan need to be in place. This is because the lack of these documents makes it harder to efficiently quantify and analyse the risks (Renault & Agumba, 2016).

2.4.1.2 Risk Assessment

After identifying the risks, the assessment and analysis of those risks are performed as the second step of the risk management process. The risk assessment aims to achieve two objectives: to establish the frequency at which an event may occur, and what level of consequences such an event is (Olamiwale, 2014). Similarly, Schatteman et al (2008) note that after a satisfactory risk identification, the next stage is a qualitative assessment that should result in the quantification of the plausibility of the occurrence of risks, as well as the effect that they will have. As such, there are many factors that need to be addressed. For instance, at which point in the timeline is there a risk of a

negative occurrence? What is the likelihood of the event taking place? How does it relate to the other risks identified, and how does it impact the project objective? These are all factors that should be addressed at this stage of the risk management process (Renault & Agumba, 2016).

2.4.1.3 Risk response

Following the assessment of the identified risks is the action that needs to be done to mitigate the risks, which is known as risk responses and is the third part of the risk management process. The objective of the risk response is to preferably eliminate, or at least reduce, the risks and the negative consequences arising from them (Olamiwale, 2014). During this stage of the risk management process, actions are planned prospectively in case identified risks occur. Lisa Turnbough (2005) aptly defined risk responses as the "process of identifying/developing risk response options and determining actions for treating the risk, targeting enhancing opportunities and reducing any threats to projects objectives".

2.4.1.4 Risk control and monitoring

With the risks identified and assessed, and an action plan in response to the risks put in place, the execution part is what is remaining. The aim of risk control in the larger scheme of the risk management processes is, hence, to implement the risk plan. To do this effectively, two criteria need to be met. First, the adequate and correct implementation of the action plan is needed. Second, a follow-up should be done to determine if the proposed action resulted in the desired outcome. In essence, the effectiveness of the planned risk responses is monitored and adjusted accordingly (Renault & Agumba, 2016).

2.4.2 Cost overruns

Construction projects are greatly affected by exceeding budgets and providing constructions that have been more costly than projected (Akinci & Fisher, 1998). Indeed, Morris (1990) stated that projects exceeding budgets is a regular feature of the industry. Although all construction projects are at risk of resulting in a cost overrun,

there is a correlation between cost overrun and the project size: the larger the project, the greater the cost overrun. This correlation was established by Jahren & Ashe (1990) and has since been repeated in other studies. For instance, Shrestha et al (2013), studied 363 construction projects and found similar correlation between project size and the cost exceeding budget.

The issue of cost overrun in construction projects is not dependant on country or continent. For instance, the Humber bridge in the United Kingdom experienced a cost overrun of 175% and the Great belt link saw an exceeding budget by 54% (Flyvbjerg et al, 2003). It is with this understanding that the vitality of addressing cost overrun as an important aspect of Construction Management can be properly understood.
It is of great importance to find the causes of cost overrun, or else it cannot be mitigated. However, the factors causing cost overrun are numerous. For instance, Aljohani et al (2017) conducted a critical review of the literature pertaining to cost overrun in the construction industry and found a total of 173 factors. They classified the factors into external factors, comprising factors related to weather, economy, country, and system, and internal factors that relate to the projects financier, owner, contractor, and designer and consultant. Of interest for our study are the factors related to the work of the site manager and the foreman, which are the internal factors in relation to the contractor. A total of 44 factors are provided with varying levels of frequency of their appearance in the literature that was reviewed. The 12 most frequent factors are summarised in Table 1 below:

Nr	Factors
1	Contractor's poor site management and supervision skills.
2	Shortage of available skilled and non-skilled labour.
3	Lack of cost planning, monitoring and controlling during pre-and post-contract stages.
4	Increment of materials prices.
5	Increase in manpower cost due to environment restriction, insurance premiums and other social expenses of the workforce.
6	Lack of contractor's experience
7	Shortages of materials due to unreliable sources of materials on the local market.
8	Mistakes during construction due to inadequate construction method.

9	High interest rates charged by banks on loans received by contractors.
10	Late delivery/supply of materials and equipment by contractors.
11	Increment of equipment's/ equipment's maintenance prices.
12	Inadequate or inefficient equipment, tools and plants.

Table 1: 12 leading factors causing cost overruns in the construction industry

2.4.3 Time delays

The construction industry has experienced significant growth of mega-projects across the globe during the last few decades but is nevertheless still behind sectors such as automotive and aerospace (Sanni-Anibire et al, 2020). One important cause for this is the persistent time-delays that have plagued the construction sector (Mahamid et al, 2012). Time-delays have been defined in two distinct ways in the literature. One way is to define delay as "a situation where a project´s completion time is postponed due to causes that may be related to the client, consultant, and contractor etc" (Sanni-Anibire et al, 2020; Aibinu & Jagboro, 2002). Other have defined time-delay in a broader sense, for instance by defining it as situations where planned actions happen later than expected (Trauner, 2009).

Time-delays can broadly be classified into three by different perspectives, as has been done in previous research (Hamzah et al, 2011; Sanni-Anibire et al, 2020):

1. Avoidable time delays and unavoidable time delays. Avoidable time delays need to be avoided as much as possible.
2. Critical time delays and non-critical time delays. The criticality of the time delay is in relation to the critical path of the schedule of the project, with critical time delays being defined as the time delays that postpone the completion date of the project, and non-critical time delays are delays that do not have an impact on the completion date for the project (Trauner, 2009).
3. Concurrent delays and non-concurrent delays. From this perspective, the time delays are viewed in relation to their occurrence in time. If two delays or more occur simultaneously, then the delay is concurrent. If not, the delay is regarded a non-concurrent delay (Kraiem & Diekmann, 1987)

The time delays have many negative effects in regard to the project success. For instance, contractors, clients, and consultants are all negatively affected by time delays which may lead to legal disputes, as suggested by Santoso & Soeng (2016). Moreover, time delays may lead to loss of productivity and cost overrun, as noted in the literature (Sambasivan & Soon, 2007).

The literature on time delays in the construction industry is extensive, and studies pertaining to time delays have been carried out in different part of the world and at different points in time, making the available data immense (e.g., Mansfield et al. 1994; Assaf et al. 1995; Ogunlana, et al. 1996; Chan and Kumaraswamy 1997; Kaming et al. 1997; Toor and Ogunlana 2008; Enshassi et al. 2009; Doloi et al. 2012; Lessing et al. 2017 Seddeeq et al. 2019).

To synthetise the extensive data related to time delays in the construction industry, Sanni-Anibire et al (2020) conducted a meta-analytical review of the literature. After a thorough review, 11 influential studies pertaining to time delay were selected based on criteria mentioned in their study. A total of 36 major causes of time delays were identified and classified into nine groups, of which the following factors where the most prevalent.

Nr	Factors
1	Contractor´s financial difficulties
2	Delay in approval of completed work
3	Slow delivery of materials
4	Poor site organisation and coordination between various parties
5	Poor planning of resources and duration estimation/scheduling
6	Delay in subcontractors work
7	Inaccurate site investigation
8	Slowness in decision making
9	Client's cash flow problem / delay in contractors' payment
10	Design changes

Table 2: 10 leading factors causing delay

2.4.4 Relationship between time delays and cost overruns

Time is money in the world of economy. This means that delays inevitably come with a cost from which the construction industry is not excluded, which has negative consequences for the involved parties (Kaming et al, 1997). For instance, the contractor may take the burden of the cost, but the client will take the burden of having the project finished at a later point in time. Another negative consequence of time delays is that disputes may arise depending on the contract form used, as pointed out by Yogeswaran et al (1998). It is, however, important to note that although time delays cause cost overruns, the factors driving cost overruns are not identical to the factors causing time delays despite their great overlap (Hariharan & Sawant, 2012). This means that a project can suffer cost overrun, but still be completed in time. This can easily be conceptualised considering, for instance, the possibility of increment of material prices leading to a cost overrun but not to the delay of the project.

2.4.5 Relationship between risk management and time delays & cost overruns

Risk management is a broad term under which all risks and uncertainties possible and their potential solutions are unified (Klemmeti, 2006). Time delays and cost overrun, however, are but a specific part or the risks that may manifest themselves on the construction site. For instance, safety issues are also potential risks and would therefore be part of the risk studied in a risk management process (PMBoK, 2017). As such, time delays and cost overruns are subject to risk management in a similar fashion as other risks.

2.5 Leadership in construction

Due to a variety of circumstances, leadership is receiving more interest in a variety of sectors. Effective leadership is critical to any organization's success in achieving corporate objectives and promoting individual professional development. Leadership is becoming more important in project-based companies. This is unsurprising, since leadership has been recognized as a vital component in the performance of

construction organizations (Ismail & Syazli Fathi, 2018). The leadership position is crucial for an organization's operation, and without effective leadership, the company may lose focus, particularly while attempting to accomplish a goal. On the construction site, things become more challenging as all the plans and ideas must be transformed into a finished product, which requires several actors that are highly interdependent but fragile to collaborate and combine their diverse skills. This needs leadership, since success in any undertaking involving collaboration between a group (or groups) of persons requires leadership (Liphadzi et al., 2015). According to Holmberg and Tyrstrup (2010), The capacity to cope with uncertainty and take the necessary precautions to avoid being at the mercy of chance is the skill most closely associated with leadership.

Leadership cannot be defined in a single way. It is a sophisticated, emergent process that may be characterised in a number of different ways, using different components, styles, and traits. In general, it is the process through which an individual motivates others to accomplish a goal (Bolden et.al, 2012; CIOB, 2008; Liphadzi et al., 2015). Effective leadership, according to COIB (2018), combines cognitive qualities such as "self-awareness, self-management, and social awareness" with more tangible qualities such as such as the capacity to empower individuals, establish teams, coordinate employees towards shared objectives, and build relationship. Leadership in construction is defined as the manner in which the project managers and construction managers conduct themselves in their role, in order to obtain the best performance from the people they are managing (Liphadzi et al., 2015).

Construction projects are huge in scope, technically challenging, and need a diverse set of different skills (Liphadzi et al., 2015). What is more challenging is that teams are not only huge but also multifunctional, with members ranging from a variety of different building disciplines. This highlights the importance of leadership in the construction industry. Although the construction industry has a lot of literature and research on a wide range of topics, leadership has gotten less attention. According to Ismail and Syazli Fathi (2018) and Löwstedt et al., (2021), the lack of attention to leadership in the construction industry may be attributed to a lack of understanding of industrial expertise on the side of social scientists and a lack of understanding of the social sciences by individuals in the construction industry. Theoretically, social

scientists may be well-versed in the subject, but they lack practical understanding of the construction industry. Those in the construction sector, on the other hand, lack a grasp of social science, making it difficult for researchers to conduct a study, particularly on themes such as leadership, in the construction industry. Because of the technological changes that the construction industry is experiencing, as well as risks such as a skills shortage, advocates for the importance of leadership, particularly on construction sites, as it is most sensitive to changes and thus has an impact on the achievement of project objectives (CIOB, 2008).

2.5.1 Management vs Leadership in construction

According to Liphadzi et al. (2015), The construction industry mainly operated in a context of management being managers instead of leaders and there is a continuing controversy about the difference between leadership and management. Price (2009) argues that when studying leadership style practiced in the construction industry, it could be relevant to distinguish between leadership and management. Construction professionals or managers think that their main goal should be to finish their jobs. To be a successful construction manager, in this case a site manager and foreman, it is necessary to possess skills beyond those of a manager. These managers must also possess and cultivate exceptional leadership skills in order to inspire employees to achieve at their highest level and support the necessary work. Understanding the distinction between leadership and management is crucial for a construction manager, since leading projects is a greater responsibility than managing them (American Institute of Constructors, 2022). However, the words "leaders" and "managers" are often employed identically despite their essential distinctions (CIOB, 2008). Table 2 below ilustrates the differences between the two terms in the context of construction industry defined by American Institute of Constructors (2022). Table 3 below illustrates the differences between managers and leaders in the construction industry.

Managers	Leaders
Establishes Objectives	Direct and guide
Establishes policies and procedure	Motivates and increases the employees commitment
Makes short term decisions	Make long-term decisions

Makes Short-term problem solving	Make Long-term problem solving
Hard skills: Planning, directing (give orders) and organizing	Soft skills: Influence thoughts and behaviours
Works within existing structures	Extend their reach across organisational lines
Do not take risk and favour procedures	Take risk that facilitate innovation
Do not communicate the vision by hard skills	Communicates the vision by soft skills
Just care about the the completion of the tasks	"Do the right thing"- Ethical

Table 3: Differences between Managers and leaders in construction

Management is focused on the needs of a certain job within an organisational structure. A construction manager, for example, is given instructions for a specific project, and the management seeks to carry out their orders using the power granted to them based on their function and the roles of others in the company. In contrast, leadership is not dependent on positional authority granted by an organisation. Instead, followership is the foundation of leadership. A person attains leadership through contributing to the well-being of others in a way that they see as beneficial (American Institute of Constructors, 2022; Plecas et al., 2018).

2.5.2 Leadership styles in construction

As previously mentioned, leadership is not one fit all and the leaders' leadership style varies. The leadership style practiced by the leader is vital for the success of the company and plays a vital position in enhancing and retarding the interest and commitment of the individuals in the organization (Liphadzi et al., 2015). According to Ismail & Syazli Fathi (2018), leadership style should be selected in a way that fits the organization, situations, groups and individuals. Due to the characteristics of the construction industry, different leadership styles are required in different situations. However, practicing different leadership styles comes with its own obstacles as it may affect organizational effectiveness or performance (Liphadzi et al., 2015). According to Pretorius et al. (2017) cited by Ismail & Syazli Fathi (2018), The project life cycle

consists of starting the project , Organizing and preparing, carrying out the project work and closing the project. As each stage differ from the other, different types of leadership has to be utilized in the different stages in order to execute the project successfully.

The combination of characteristics, skills and behaviour that the managers use to interact with employees is referred to as leadership style. The selection of appropriate leadership is critical for project-based organization to not only increase their coordination and knowledge sharing but also increases producing and improving the high levels of innovation performance (Ismail & Syazli Fathi, 2018). These are very important for the construction industry claim of being conservative and resistant to change but also the lack of productivity and effectiveness in performances.

This study will focus on the transformational, transactional and situational leadership styles in construction. Transformational leadership style allows the leader to transform their employees in long term perspective (Zavari & Afshar, 2021).

Transactional leadership style allows the leader to control activities by enhancing managerial skills and keeping things the same (Odumeru & Ogbonna, 2013). The situational leadership style emphasises the fact that there is no best leadership style and the type of leadership style employed by the leader depends on the tasks being carried out and the employees conducting the tasks (Hersey & Blanchard, 1997).

2.5.2.1 Transformational leadership

James MacGregor Burns, a presidential biographer and leadership specialist, created the notion of transformational leadership in 1970. Due to today's fast-paced, diversified, and highly technical workforce, the use of this form of leadership has received a lot of attention. To put it simply, a transformative leader encourages, inspires and motivates workers to innovate and create change that will have a positive impact on an organization's long-term prosperity (University of Massachusetts Global, 2020; White, 2018). Hay (2006) describes a transformational leader as one who engages subordinates in order to increase their own awareness of the importance of specific goals and innovative means to accomplishing them, as well as higher personal needs (to learn, to leave a legacy etc.) of their subordinates. A

transformational leader is one that inspires their employees with trust, enthusiasm, loyalty, and respect. This style of leadership requires leaders to interact with followers as "whole" individuals, not merely as workers. As a consequence, critical characteristics of transformational leadership emerge, such as leaders and followers elevating one another's accomplishments, morals, and motives (Hay, 2006). Transformational leadership can been defined as the following:

"... facilitates a redefinition of a people's mission and vision, a renewal of their commitment and the restructuring of their systems for goal accomplishment. It is a relationship of mutual stimulation and elevation that converts followers into leaders and may convert leaders into moral agents. Hence, transformational leadership must be grounded in moral foundations."

(Leithwood, as cited in Hay, 2006)

Hay (2006) claims that this style of leadership fosters capacity development and promotes subordinates' personal commitment to organisational goals. Transformational leadership, according to Rafferty and Griffin (2004), may assist leaders inspire their employees to perform above and beyond their expectations by altering their employees' attitudes, beliefs, and values. Transformational leaders employ a variety of methods to help their subordinates achieve positive change, including communication, charisma, flexibility, and empathetic support (University of Massachusetts Global, 2020). There are four fundamental components to the leadership style known as the four common I's:

1. Idealized influence

This component of transformational leadership focuses on developing self-assurance and trust in others while also serving as a role model for others to follow. According to Hay (2006), the leader's confidence is critical since it serves as a basis for embracing (radical) organisational change. Confidence in a leader isn't only important during times of extreme organisational change, but rather the influence it has on the subordinates. In order for subordinates to be more open to their leader's ideas, they must have faith in their leader's abilities. Charismatic leadership is a trait of transformational leadership and is dependent on both leaders and followers to be fully

realised. According to Hay (2006), it is at times of crisis that the connection between charismatic and transformational leadership is most apparent.

2. Inspirational Motivation

This subdimension of transformational leadership has been characterised in several ways as a necessary component. It is as follows: According to Yukl (1981), as stated in Rafferty and Griffin (2004), the skill of a leader to create enthusiasm among subordinates and to make statements that instil confidence in subordinates' abilities to work effectively and accomplish goals is connected with inspiring motivation. According to Hay (2006), inspirational motivation is the capacity to persuade individuals to work together toward a shared goal. In its simplest form, a leader's power to instil confidence, inspiration, and a sense of purpose in his or her followers is referred to as inspiring motivation.

3. Intellectual stimulation

Increasing and influencing followers' knowledge of and ability to solve problems are the primary concerns of this sub-category (Hay, 2006). In the words of Rafferty and Griffin (2004), this subdimension encompasses not just behaviours that increase followers' interest in and awareness of problems/issues, but also behaviours that increase the follower's ability and success in thinking creatively about difficulties. According to Rafferty and Griffin (2004), intellectual stimulation adds to an emotional connection to an organization's mission and vision. In turn, intellectual stimulation communicates to workers that the company recognises and appreciates their contributions, so encouraging them to become more effectively involved in the organisation.

4. Individualized consideration

This subdimension includes involving followers in the organization's transformative process by responding to their distinct, unique requirements. As a consequence, individuals are treated uniquely and differently based on their abilities and knowledge, with the goal of enabling them to attain greater levels of performance than they may have reached otherwise (Hay, 2006).

Project managers in successful projects used more directive and task-oriented leadership, but such leaders do not ignore their connection with workers. This

emphasises the necessity of construction project leaders prioritising leadership style in order to impact workers' commitment by provide a welcoming and psychologically supporting atmosphere. Individuals and societal systems are transformed through transformational leadership, making it more applicable to project-oriented organisations (Zavari & Afshar, 2021). Site managers are in charge of the day-to-day operations of a project on-site, and there is a direct interaction between a site manager and the site staff. As a result, it is important for site manager to implement this sort of leadership style. A transformational site manager may raise the chance of project success and improve team performance by concentrating on improving social interactions, clarifying responsibilities, and resolving interpersonal issues.

2.5.2.2 Transactional leadership

Transactional leadership, which is also referred to managerial leadership, is a leadership style that promotes compliance of the followers through reward and punishments (Odumeru & Ogbonna, 2013; Ismail & Syazli Fathi, 2018). This leadership style focuses on short-term relationship of exchanges that occur between leaders and followers (McCleskey, 2014). According to Odumeru & Ogbonna (2013), Leaders that adopt a this leadership style use an exchange model that rewards their subordinates for their hard effort and successful outcomes. However, the followers are punished for their bad effort and unfavourable results until the issue is fixed. Transactional leadership and effectiveness are linked in specific contexts, according to McCleskey (2014). Transactional leaders are concerned with the lowest levels of the hierarchy, and their leadership style is effective at satisfying basic needs. Transactional leaders, according to Odumeru & Ogbonna (2013), aren't interested in changing the future; rather, they want to maintain the status quo, and they achieve this by paying attention to the work of their subordinates in order to spot inconsistencies and errors.

Transactional leadership consist of two factors, Contingent reward and management-by-exception. The contingent reward is a reward for subordinates when they meet certain goals on time or ahead of schedule, but also to encourage them to work at a reasonable pace at different points in the process (Odumeru & Ogbonna, 2013). The reward might be monetary or in the form of praise. Employees may be disciplined for

poor performance or failing to reach goals and objectives. This is referred to as a contingent punishment. Management-by-exception is a commonly used technique for applying contingent punishments when anything goes wrong. Management-by-exception is a method for maintaining the status quo. It requires stepping in and taking corrective action when subordinates fall short of expectations (Ismail & Syazli Fathi, 2018). In management-by-exception, there are both active and passive methods for handling exceptions. Leaders who use an active management-by-exception approach regularly monitor the output of each subordinate and make modifications to their work to correct problems as they occur, while leaders who use a passive management-by-exception strategy wait until issues arise before addressing them (Odumeru & Ogbonna, 2013).

A number of researchers have criticised transactional leadership theory for taking a universal approach to leadership theory development that ignores situational and contextual aspects that are critical to organisational difficulties (McCleskey, 2014). When it comes to achieving organisational goals and objectives, transactional leaders are prepared to operate within the organization's existing structures while also negotiating on their behalf. When presented with a dilemma, transactional leaders are prone to reverting to old habits and methods of problem solving. One reason for this might be because transactional leaders are more concerned with procedures than they are with innovative thinking. Leaders of this category are known for being directive and action-oriented in their approach. When it comes to getting particular tasks performed, transactional leaders are successful because they manage each piece independently. A leader who uses this style of leadership is successful in crisis and emergency circumstances, as well as when tasks must be completed in a certain way (Odumeru & Ogbonna, 2013).

2.5.2.3 Situational leadership

According to the American Institute of Constructors (2022), leadership is a dynamic relationship, not a transaction to complete a project swiftly and efficiently without regard for subordinates, the organisation, or the big picture. To be a successful leader in the construction sector, the leader must be able to adapt their leadership style to the ever-changing demands of the team they lead, the project they manage, and the

organisation they represent as a whole. The ability of a leader to adapt his or her style to the demands of the situation is a key determinant of their success as a leader (Hersey & Blanchard, 1997). Paul Hersey and Ken Blanchard established the concept of situational leadership in the 1970s. This style of leadership emphasises that there is no one-size-fits-all approach to leadership; rather, the most effective leadership style varies on the context and the tasks at hand. A situational leader evaluates the circumstances influencing their situation and then chooses the appropriate leadership style (Setiawan et al., 2019; Hersey & Blanchard, 1997; American Institute of Constructors, 2022; McCleskey, 2014). There are three components to situational leadership: (1) task behaviour, (2) relationship behaviour, and (3) "readiness" levels that followers display in order to fulfil the leader's goal. Tasked behaviour describes the extent to which a leader engages in one-way communication by outlining what each follower is expected to accomplish as well as “when, where, and how” they should go about it. How much a leader interacts in two-way communication by offering “social emotional support”, "psychological strokes," and encouraging actions is referred to as relationship behaviour. Readiness is the capacity and willingness of an individual to control their own behaviour in respect to a given activity to be performed (Hersey & Blanchard, 1997).

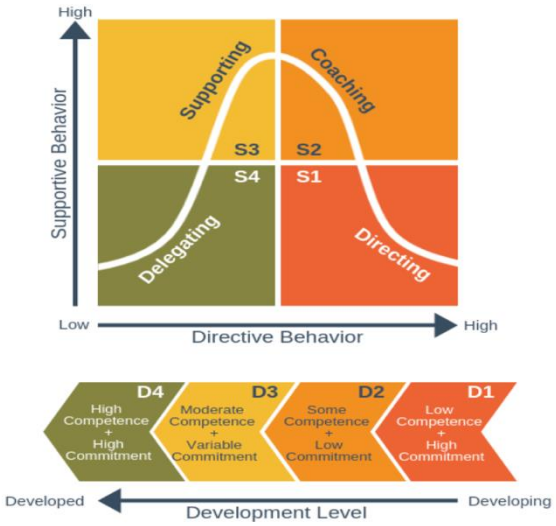

Figure 1: Situational Leadership Model

Figure 1 depicts the four-quadrants chart of situational leadership style, which is comprised of task behaviour indicators on the horizontal axis and relationship

behaviour indicators on the vertical axis. The table below illustrates the "readiness"/"maturity" of the personnel in terms of their skill and dedication to depending on the tasks (Setiawan et al., 2019). When a leader adopts the directing role (S1), the leader participates in one-way communication in which he or she specifies the responsibilities of followers and directs them on what, when, and where to execute specified tasks in accordance with established guidelines. In this role, the leader's primary responsibility is to train the employee, which is appropriate for those with low levels of competence and high levels of dedication (D1). S2 refers to the second situational leadership style in which the leader assumes the role of a coach while still providing the majority of direction and supporting the team's decision-making process via two-way communication and emotional support. In the second situational leadership style, Coaching (S2), the leader takes the position of a coach, where he or she continues to provide the majority of the direction and supports the team's decision-making process via two-way communication and emotional support. If an employee has a moderate degree of competence and low level of dedication (D2), this form of situational leadership style is appropriate. The third situational leadership style (S3) is appropriate for employees with moderate competence and variable commitment (D3) because the leader and followers now share decision making through two-way communication and a great deal of facilitating behaviour from the leader, and followers have the ability and knowledge to complete the task. The fourth situational leadership style (S4) allows the leader to delegate the task to the employees without engaging in relationship behaviours as the employees are high in competency and high commitment to the task (D4) therefore they are able to take the responsibility by themselves (Hersey & Blanchard, 1997; Setiawan et al., 2019).

The compatibility between the situational leadership style of the leader and the sort of employee might avoid any management issues that could hinder the project's success. If such a mismatch happens, the leader must be adaptable and adapt his or her style to the sort of employee they are leading to achieve the project objectives (Setiawan et al., 2019). Setiawan et al (2019).'s research examined four distinct high-rise building projects developed by one of the largest construction firms in Indonesia. They examined the effect of situational leadership on these projects, and their findings revealed a correlation between the project manager's situational leadership style (S3) and the employee type (D3). The project manager and his/her employee may benefit

from this matching, which might lead to a better working relationship which is important for successful project execution.

The compatibility between the situational leadership style of the leader and the sort of employee might avoid any management issues that could impede the project's success. If such a mismatch happens, the leader must be adaptable and adapt his or her style to the sort of personnel (McCleskey, 2014; Setiawan et al., 2019).

3 Methodology

In this chapter, the methodology employed is described. First, the research approach is presented. Next, the research process is outlined, consisting of the literature review and the interviews. Last, the ethical aspects of the thesis are considered.

3.1 Research approach

This study will use qualitative research approaches to answer the research questions. What is qualitative research? Toloie-Eshlaghy et al (2011) defined it as;

"'Qualitative methods' is an umbrella term to cover the methods and techniques which have not been able to be 'quantitative'".

More precisely, the qualitative research approach is concerned with how social occurrences and phenomena are interpreted, not the measurement of said phenomena (Bryman & Bell, 2011).

The process entails the collection, analysis, and interpretation of non-numerical data. This method is helpful for acquiring a more in-depth understanding of complex human behaviour processes and patterns. This research uses this strategy since quantitatively collecting phenomena such as experiences, viewpoints, and behaviours is difficult. The qualitative research methodologies allow for in-depth examination and subsequent questioning of respondents depending on their replies in this study.

The site managers' and foremen's methods for controlling risk associated with cost and schedule overruns, as well as leading the many actors on site to successfully complete the project, vary based on the kind of project, the people they are leading, and their individual qualities. This sort of study approach permits the comprehension of the respondents' motivations and emotions, which influence their risk management and leadership decision-making (Tenny & Sharts-Hopko, 2019; Bhat, 2018).

As per Dubois & Gadde (2002), there are three approaches that may be utilised when conducting research. The first approach is the deductive theory approach, which aims

to compare the data acquired with the pre-existing theory. A second approach is the inductive theory approach, which aims to utilise the new data collected by forming and giving rise to new theories. The third approach is the abductive approach. This approach makes the relationship between the data and the theory less excluded from each other and allows for a process of iteration where the data may influence the research questions as more data is collected. The benefit of the abductive approach is aptly explained by Dubois & Gadde (2002):

> *"This approach creates fruitful cross-fertilization where new combinations are developed through a mixture of established theoretical models and new concepts derived from the confrontation with reality."*

For this study, the abductive approach is best suited and will thus be utilised.

3.2 Research process

The research process is twofold. First is a literature review, followed by interviews.

3.2.1 Literature review

A literature review was conducted in this study to ascertain the current state of knowledge about the study subject and assist in shaping a theoretical framework. This assessment of the literature served as the foundation for the subsequent empirical study, which was conducted to clarify the concerns raised in the literature on a more detailed level. The data for the literature review was collected from journal articles and reports available on Google Scholar, as well as books relevant to the topic. The keywords used in obtaining the literature included: "Site manager construction", "Foreman construction", "Cost overrun construction", "Time delays construction", "Leadership in construction", "Management construction".

3.2.2 Interviews

After the initial literature review was compiled, semi-structured interviews were conducted to for the empirical part of the study. There are three types of interviews:

structured interviews, semi-structured interviews, and unstructured interviews, where a semi-structured interview utilises pre-planned questioned but with the flexibility to accommodate new issues and questions as they arise (Sreejesh et al, 2014).

There are both advantages and disadvantages with this approach. To begin with, we will consider the disadvantages. Firstly, it is time-consuming. The preparation of the interviews, finding the relevant interviewees and setting up a meeting, conducting the interviews and then analysing the interviews are all time-consuming activities inherent to this interview method. With lack of sufficient personnel, the interviews conducted may be too few to draw conclusions applicable to a wider population (Adams, 2015).

There are also advantages to semi-structured interviews. Most notably, they give a possibility to understand issues on a deeper level, giving a platform to answer the "how" instead of just the "what". In our case, this is of great significance because the "what" has been answered by hundreds of academic articles. It is the "how" that is missing, which makes the semi-structured interview approach the best method available for the purpose of this study.

The semi-structured interview format was guided by a protocol of questions that were developed in advance of the interview by reviewing and assessing the relevant literature, and the questions were focused on a single central theme to risk management related to cost and time overruns and leadership on the construction site. This approach enables the participants to clarify and elaborate on specific responses which increases knowledge about the issue, while also allowing for discovery, with room to pursue relevant directions as the discussion progresses (Magaldi & Berler, 2020).

3.2.2.1 Interview participants

It was difficult to set up meetings with many interviewees. The possibility to contact the site managers and foremen and set up meetings is slim because they are constantly busy on a construction site and therefore hard to reach. The pandemic had an influence on their construction site employees, resulting in a shortage of construction workers, limiting their time to dedicate to other things other than managing the

construction site. Despite these challenges, a total of seven interviews were conducted, including two with site managers and five with foremen. Table 4 illustrates the participants and their experiences, as well as the company they work for.

Nr	Role	Company	Experience in this role (Years)	Overall experience in construction industry (Years)
1	Site manager A	NCC	2	6
2	Site manager B	PEAB	2	9
3	Foreman A	NCC	2,5	5
4	Foreman B	Veidekke	2,5	2,5
5	Foreman C	PEAB	6	7
6	Foreman D	NCC	4	11
7	Foreman E	NCC	5	24 years

Table 4: Details about the interviewees

3.2.2.2 Interview data collection

Some of the interviews in this study were conducted on-site and other were conducted virtually. The virtual interviews took place on Teams and Zoom. All interviews were recorded for transcript purpose with the permission of the interviewees. The on-site interviews were also recorded on teams for the same purpose. All interviews were performed in Swedish in order to allow participants to express themselves in a language they are more familiar with in regard to risk management, as well as leadership. Although the study is in English, the interviews were conducted in Swedish in order to benefit from the excess information that they may explicate in a language they find more comfortable. We avoided mentioning theories and definitions, instead focusing on the managers' personal judgments of leadership and risk management. During the interviews, we allowed the managers to act as "free storytellers" as there has been identified that construction industry workers lack basic understanding of social science (Löwstedt et al., 2021). Researchers may be able to learn more about the connections between leadership and risk management in the actual world by collecting open-ended tales on these topics.

After the interviews had been conducted, they were transcribed and subsequently analysed.

3.3 Ethical considerations

Several measures were made to ensure the ethicality of the study. First of all, they were informed about the objective of the study and what the interviews would be about. All the interviewees were asked prior to the interviews if they would allow it to be recording, of whom all answered in the affirmative. Second, they were asked if what they said could be transcribed verbatim so to ensure the originality of the results presented. Moreover, the confidential procedures have been performed to protect the anonymity of the interviewees. Lastly, their participation was voluntary and as such, they were free to opt out if they did not want to continue the interview.

4 Results

The interview results will be presented in this section. The findings have been organised into categories that correspond to the research question and general comprehension of the findings. The categories are intended to demonstrate the daily responsibilities and obligations of the site management team, risk management and mitigation on the construction site, and construction site leadership.

4.1 Tasks and responsibilities of the site management team

The tasks and responsibilities of site managers and foremen vary, and their daily tasks are influenced by their hierarchy. As a result, their daily activities and responsibilities will be presented separately.

4.1.1 The site manager´s daily tasks and responsibilities

The site managers are in charge of overseeing and monitoring the work environment, purchasing materials, scheduling the next few days and weeks, monitoring and controlling project budget, and coordinating all project actors on the construction site. Some site managers are compelled to maintain continual control over project budgets, which is heavily dependent on the contractual arrangement. They also provide forecast reports in which they try to provide clear answers to questions such as "How are we doing on the project?" What have we achieved? What kinds of obstacles are we up against? What are our options? What are the alternatives? How many employees have we scheduled? How much money do we still have? Depending on the project and the organization, the site managers are also in charge of the logistical issues on the construction site. As one site manager put it:

"…. We are ultimately accountable for everything that occurs on the construction site" - Site manager A

The amount of time that site managers spend on the construction site varies based on the type of project and the sort of site manager in question. The site managers interviewed, on the other hand, were heavily active on the construction site on a daily basis. They make an attempt to be on-site with the personnel as much as possible to

retain control of the daily actions and circumstances, to compare the outcome to what may have happened, and to assist in making required modifications to keep the project on schedule and under budget. The projects that the site managers interviewed were involved in were different, with varying numbers of employees on the construction site; nonetheless, all of them emphasised the critical importance of daily monitoring of the project's progress and team performance. As one of the site managers expressed it:

"(…) There are a lot of issues that come up on the construction site on daily basis and cannot be solved over the computers and therefore I have to be on site with the workers and solve them by qualitative solutions in order to execute the project on time and on budget as well as meeting the requested quality" - Site manager B

The time spent on the site depends on the type of project, contract but also construction workers that the site managers are leading. However, the distribution of their time is divided into motivating and inspiring the construction workers and their team, Admirative work, Planning, monitoring, and controlling the project performance (this involves health and safety, quality control, updating documents etc.). The percentage of the time spent at each category varies depending on the day.

4.1.2 The foreman´s daily tasks and responsibilities

The foremen have the responsibility to ensure that the production work is per the schedule in regard to time, cost, and quality. As such, the single most important issue for the foremen is to be aware in detail regarding the activities occurring at the construction site. Because of this, it is apparent why the foremen would need to be in close contact with the construction works as often as possible. As it happens, the interviewed foremen all begin their day by having a meeting with the construction workers to have a brief look at what has been done, what is to be done, and solve any problems that are present or may arise, such as order materials for the upcoming activities. Foreman C noted accordingly:

"(…) (In a) typical day: important start at 6:30 with (a) review with the guys; Everything that has been, what we plan to do, and everything between that. They come with their thing: "but we need this and that and that" and then we order it, or

we make sure that everything is in place and then, yeah, that's how it looks like. A lot of meetings (also) with the clients; quarrels about prices, costs, such things."

Other duties that occur regularly as per the interviews are reviewing the drawings and designs, overseeing the work of the subcontractors, ensuring that safety measures are abided by the workers, and documenting in detail what has happened thus far in the project in order to better schedule what is remaining.

Take, for instance, the issue of overseeing the work of the subcontractors. In addition to the construction workers that the foreman is responsible for by default, there often more workers that need to be attended to due to the nature of interconnectedness of the work between contractor and subcontractor. Because the foreman is also the one reviewing the drawings and providing the subcontractors with instruction, the duty of overseeing their work follows naturally. In this regard, foreman B duly remarked:

"Then I go to check a bit with our subcontractors (and) how they are. Then it happens quite a lot in between where you get to run and look at things that have gone wrong or where people ask questions (about) how things should be?"

It is of great significance to note that the foremen and the site managers work very close to each other and are constantly in contact. And in various duties, their work overlap. Regarding this close collaboration between the site managers and the foremen, foreman C said the following:

"The site manager and I, we, we work together. We work together very, very closely."

However, there are differences. Perhaps the most striking difference is that, although the foremen also participate in activities related to economy, the site managers seem to have the most, if not all, of the responsibility upon their shoulders. Thus, foreman C continued by stating:

"What separates me from the site manager (is that) the site manager has the financial responsibility. The project now; we see that we go about 13, 14 million in loss. Okay, we have not received the costs. No boss comes and asks me: why are we 13 to 14

million (in loss)? Those managers go to the site manager and ask how you are 13, 14 million in loss, where is the money and (what) have gone wrong etc.
Okay, so, we work very hard together. We plan together. We look at costs together at, well, everything. So, the big difference is that the financial responsibility lies on the shoulders of the site manager."

4.2 Managing and mitigating risks; different approaches

The information obtained through the interviews regarding time delays and cost overrun can be divided into two parts. First, the factors identified by the interviewees that cause either time delay or cost overrun. Second, how they as leaders manage the causes of such risks.

4.2.1 Identified factors causing time delays and cost overruns

The following factors causing time delays and cost overruns were identified by the interviewees:

Nr	Factor causing time delay or cost overrun	Number of interviewees citing this factor
1	Weather conditions	3
2	Late supply of deliveries	4
3	Ineffective workers	2
4	Lack of workers due to sickness	4
5	Poor planning	6
6	Shortage of materials	5
7	Increment of material prices	6
8	Poor designing	3
9	Equipment breaks down	1

Table 5: Factors causing time delays and cost overruns as per the qualitative data

4.2.2 Different approaches

The factors causing time delays and cost overrun can broadly be divided into non-avoidable factors and avoidable factors, and the interviews indicate different approaches to each of these two categories.

4.2.2.1 Unavoidable delays and increment in cost

This category of factors includes weather conditions, sickness, shortage of materials, etc. For this type of category there is not much that can be done. For instance, a reoccurring point raised in the interviews was that a worker being sick can be replaced with ease. However, if many are sick simultaneously, and there is a shortage of workers that can be hired, a delay of the project becomes inevitable. Or as one of the site managers aptly put it:

"I came to think that in these times Corona has caused a lot of trouble due sickness. As has been the case lately, it is the foremost (factor) to cause a delay. If a company has 8 guys, and 4 are sick due to Corona; Should they be in 10 different projects, there will be too little staff and you have to postpone it. And it is not possible to say anything about it, (because) they are sick. So, illness is the (factor) that has played the biggest role. So, it's the one I say is the biggest (factor)." (Site manager A)

Nevertheless, a cost means that some party must carry the burden of non-avoidable delays and increases in price, and it is here where disputes in regard to the contract may arise. The go-to solution thus becomes to fall back on the legislative documents and contract that specify what each party has a right to and for what they are responsible. For instance, a non-avoidable delay caused by weather may delay the execution time of the project. However, the client may ask for increased staff to avoid the delay. In a DBB-contract, the contractor can then justifiably claim that the increased cost will be on the client. Site manager B noted accordingly:

"(..) and the client may say: "take in 10 extra men". It may not be twice as fast, but it is good, of course. And, if you do it the right way, you do not even need to bear the cost yourself. If you have documented it properly, then the client will take that cost" (Site manager B)

4.2.2.2 Avoidable delays and increments in cost

The cost and delays that are avoidable are the most important to consider because they constitute the most significant area where time delays and cost overrun can be mitigated with the right approach. Factors constituting cause to avoidable delays and cost increases could be, for instance, ineffective workers, poor planning, late supply of deliveries, etc.

The site managers and foremen largely agreed that the single most important action that help mitigate avoidable risks is good planning. By planning good, problems that could arise can be dealt with in an earlier stage when the effect is less, or they could in a best-case scenario be entirely avoided.

Consider, for example, the issue of late supply of deliveries. Even the most well-established and relied upon supplier may find it difficult at times to supply the deliveries in time. If not anticipated, the contractor is forced to halt the construction work. However, a solution could be to have several potential suppliers of a specific product. Thus, if any one supplier gives any indication of potential delay, other suppliers could fill the gap. Foreman B elucidates this point by noting:

"(…) Then maybe we have one (supplier) that we prefer, but it just happened a few weeks ago here that the one we prefer could not deliver on time and for a period we barely got hold of them, because they had so much to do. And then we chose that, yes, we should maybe order the next few weeks from the other supplier."

On the same note related to planning in advance, site manager B stated the following:

"It is important to always be one step ahead in your planning, and especially recently that a material that you usually buy a week before now needs to be ordered a month before. So, it is important to evaluate the market situation. Unfortunately, even the most standard products there have been problems with: wood, joists, etc. This is something that all building supplier stores usually have at home, but which has been a problem lately." (Site manager B)

Some factors that cause delay and increase in cost are, however, not able to be avoided or managed by means of good planning. Consider the case of ineffective workers. The planning of the site manager and foremen is of little value if the workers work inefficiently, if they are lazy, or if they make mistakes during the construction. Here, the leadership of the foreman and the site manager is paramount in order to fulfil the goal of collaborating with the workers to finish the project on time and on budget. The interviewees approached this rather uniformly by establishing clear directives of what should be done and when it should be finished. However, some of the participants in the interviews mentioned that they try to positively compensate the workers when they do their job properly, and that this has a good effect on the overall effectivity. It is this notion of reward that foreman E refers to:

"And I usually when they have done something that is really good, then I say to their supervisor: "now tell the guys". It is often the case that you instead talk about it being something bad all the time, but that you make sure that they find out when something has worked well as well… I think that is very important. Then you (make them) feel a little (more) trust then"

4.3 Leadership practiced by site managers and foremen

The leadership characteristics that could be identified based on the findings of the interviews illustrated similarities but also differences between the site managers and the foremen. The differences were connected to their hierarchy. Therefore, this section will also discuss the site managers and foremen separately.

4.3.1 Leadership of site managers

The site managers interviewed had a unique journey to their positions. One of the site managers began working in the construction sector as a carpenter at a young age. He did not pursue a civil engineering degree, but instead began working at PEAB as a carpenter and was assigned administrative duties when needed. After a few years, he was promoted to foreman and served as one for 5 years before being promoted to site manager. The other site manager studied civil engineering but worked part-time as a

foreman during his studies and stayed as a foreman for NCC after graduation. He was a foreman for three years before being promoted to site manager.

The leadership characteristics of the site managers was mainly concerned with motivating and inspiring their foreman as well as their team (team of construction workers from NCC respectively PEAB). This was done by encouraging their foremen to take the lead on problem solving and always involved in decision making process even though the site managers had the final decision. Being a role model was also their most important concern as a leader. Not only do they keep their foreman motivated and trying to develop them in their career, but they also paid a lot of attention to their team's personal development. One of the site manager states:

"I have close relationship with my foremen and my team (PEAB's own construction personnel). I always motivate them and try to create a welcoming environment for them, so they find it fun to come to work and also leave happy. I always try to engage at the site when I am done with the administrative work and help them clean up or even nail up drywall. This makes me look humble to them but also aids in creating team spirit culture on the construction site" - Site manager B

Both of the site managers had previously studied leadership provided by the companies they work for. They were interested in the topic of leadership and were eager to adapt their knowledge of leadership to their projects. They described it to be difficult to adapt the theories of leadership as it takes time and patience however there are some theories, they found extremely helpful. As Site manager A states:

"...I found the group dynamic in leadership to be quite fascinating. It explains how groups function and how they will change if certain modifications are made to the group. This assisted me in efficiently forming teams. Every team (NCC's own construction personnel) consists of two carpenters, and understanding how they operate together is critical to making them as productive as possible. Simply said, putting two lazy people together will result in inefficiency; but, putting a highly effective and driven person along with the lazy one will inspire the lazy one to work more since he will understand that this is how we operate and will improve. This also

helps when new employees join us since they will instantly catch up on the existing culture on the construction site and adapt."

Site manager A explained that his foremen, and construction employees all follow each other from project to project. However, the Covid-19 made its own changes to his team when several members were ill, and he needed to acquire new staff to cover the vacancy. This slowed down their pace and also increased engagement on the site to facilitate for the new and temporary staffs to adapt to the pace and the culture on the construction site. The issue of skill shortage also creates challenges for the site managers to practice their leadership skills. Site manager B was involved in a project where they hired foreign sub-contractors for various activities. Even though these foreign sub-contractors were highly skilled for the tasks they were hired for, the communication was quite challenging. As Site manager B explained:

".. *The foreign sub-contractors create difficult in terms of communication and therefore my approach towards them differ. Since the workers do not speak English it opposes a create risk in terms of misunderstanding which can lead to re-work that will have impact on time and costs. Me and my foremen constantly try to stay proactive to this matter and be on site as much as possible to correct any diversions before the risk creates a great negative impact on the tasks execution"*

On a construction site where many people are involved and each contributing to specific skills, conflicts between the workers are expected to occur. Conflicts on construction sites may escalate to the point where it may oppose a negative impact on the project performance. However, this was not the case for all the site managers interviewed. Site manager A states:

"... I have actually not had any conflicts here or been involved in conflict at my construction site, but it is well obvious it could happen. I mean, if it happens, it's important to get to grips with it before it starts to escalate. Really listen to what the problem is and try to solve it fairly"

The strategy the site manager A described seems to be the natural way to go about when conflicts arise on the construction site. However, the situation for site manager

B was different and therefore the strategy would not have been as effective. Even though the strategy in dealing with conflict was the same, Site manager B had to deal with foreign sub-contractors where the communication would be challenging. Site manager B states:

"Well of course, in any industry that require a group of people to work with each other, there will be some conflicts. However, I did not have any conflicts that would affect the project performance. It is about engaging before it gets bigger but the communication with the sub-contractors can be challenging to resolve the conflict as they don't speak good English some not even a single word, but they have their foreman, and my foremen deal with this. And the communication issue is something we deal with every day and trying to solve the issue as good as we can. Hopefully such challenge will not take place. "

When staff do well, both site managers stressed the significance of recognising them with appreciation. It's not only about continually pointing out the negative results; it's also about applauding them for their efforts when they accomplish the task's objectives. This will improve their motivation and commitment to completing the project effectively.

4.3.2 Leadership of foremen

The foremen's leadership is highly connected to their technical knowledge of the construction activities. They have direct contact with the work force who are highly competent and do require leader who understands what they are doing. If the foreman is lacking technical knowledge, he/her leadership will be challenged. Some of the foremen interviewed became a foreman by accomplishing a civil engineering degree without any prior knowledge of the construction industry. They were assigned in management role where they must manage and lead staff that highly skilled without understanding the technical knowledge of the activities that are being conducted. Foreman B states:

"I *did not have any practical experience in the industry and therefore not capable of taking decisions by my own. I try to stay humble and include the workers in my*

decision making by asking them how they want to carry out an activity and what method they believe is the most effective for carrying out this activity"

Remaining humble enables these types of foremen to have a better understanding of how activities are carried out and how to resolve certain challenges that arise, but it also increases the workers' dedication to the work by including them in decision-making thus enabling the achievement of efficient project execution. According to the foremen, it is unusual that staying humble as a leader result in the construction workers not achieving the desired degree of satisfaction. They are accountable for completing assigned tasks and ensuring that the results are accurate. The foremen's' intention is to enable the construction workers to carry out activities in whichever way they like as long as the outcome meets the task objective. These types of foremen were concerned about how to motivate their workers and inspire them to increase their commitment to executing the project efficiently. As foremen D stated:

"It is important to engage more on the site with the workers, not only when something is wrong but also assist them with the activities physically in order to illustrate your humbleness and to increase the team spirit. It also shows that I am not only a manager who dictates but a manager who care about them and aiming to together finish the project successfully. This actually increased the respect they have for me as a leader"

The more experience foremen that have been interviewed had different approach towards their workers. This was not anything connected to the technical knowledge enabling them to take directing leadership but the situation and the contract form in use were different. The contract has great impact in the way foremen manage and lead the project as the most concern is to generate profit. This leads active control of the activities and the processes that take place on the construction site. These foremen were leading not only foreign sub-contractors but also their own team of carpenters were foreigners with their own foremen who apparently is the only one who speaks English. Foreman C describes the concern in this way:

"*If I see a worker who are doing something wrong there is no point to stop them at spot and correct the mistake since they do not speak English. I must go and look up their foreman and speak to him/her about the concern I have and he/her will tell their*

workers how I described it. Doing it this way is very risky as the decision taking will take longer and in the worst scenario, they say they understand but they did not properly comprehend what my concern was. This is actual a challenge we try to solve every day"

When it comes to dealing with conflicts on the construction site, the strategy was different as some of the foremen had to deal with foreign construction workers while others had Swedish speaking construction workers. Foreman C and Foremen E dealt with foreign construction employees which required to the problem to be handled by involving the foremen of the foreign construction workers and resolving the matter there. This is the only approach since engaging with them directly is pointless. However, Foreman C and Foreman E emphasised that the few conflicts they had did not persist long and had no influence on project performance. Foremen A, B, and D each had their own crew of carpenters and had no communication concerns with the subcontractors. This facilitated for them to deal with conflicts effectively. Foreman B states:

"*I did not have a conflict on the construction site, but it is something to expect, and it can have an impact on the project. But if I tell you how I will go about it, I will first look into how dependent they are to carry out the activities. If they are not depended, we will separate them by placing one in another group of workers but if they are independent, we have to take them in on a meeting with the site manager and try to resolve the issue there and then.*"

All of the foremen agreed that rewarding the workers' hard work was an important part of improving their enthusiasm and dedication to the project's successful completion. Because all people need to feel appreciated for their efforts, it is critical for the foremen to emphasise this rather than focusing on their shortcomings.

All of the foremen were really interested in leadership and willing to learn more about it. They highlighted group dynamics, team leadership, and organisational leadership, to name a few topics that piqued their attention. Some of them received leadership training through their company, while others attended university courses. Those who studied on their own, on the other hand, were not provided leadership training by their organisation. However, one of the foremen who studied by her own some years ago was offered to attend a leadership course in the future by her organization.

5 Discussion

In this part, we will analyse the findings and theories, as well as provide our own perspectives on the comparison. The themes will be grouped into the following categories: *Tasks and responsibilities, Risk management on construction site, leadership on construction site, the impact of external factors on risk management and leadership on the construction site, Methodology discussions*.

5.1 Tasks and responsibilities

In analysing the tasks of the site managers and foremen as explained in the interviews in relation to the data acquired in the theory, it would perhaps be good in taking an approach of analysing the similarities regarding their activities as well as the divergence considering the large overlap between the two different managers.

5.1.1 Similarities in tasks and responsibilities

There are many tasks and responsibilities that both the site manager and the foreman are indulged in. From these tasks are:

1. Being involved in the day-to-day activities in the production
2. Scheduling and planning
3. Assess design documents, locate any errors, and take appropriate action
4. Leading and collaborating teams beneath them in hierarchy

Both the literature (e.g, Arabia, 2021) and the interviews pointed to the foreman being involved to a great extent in the daily work of the construction workers. The literature pertaining to site managers, on the other hand, gave little insight as to the amount of involvement of the site managers in the daily activities at the construction site. This may be because there is no uniform quantity of time that the site manager should spend on-site. Rather, it is something contingent on the type of the project, the number of workers, the efficiency of the foremen, as well as other factors. The qualitative data on the other hand, indicated that the site managers strive to be involved and have a direct experience of the daily activities as much as possible, because the responsibility of the site is, ultimately, upon the site manager.

Scheduling and planning coming activities were another point of convergence between the foremen and the site managers. The collaboration between the two managers in regard to planning is extensive, as attested to by the literature (Styhre & Josephson, 2006) as well as the interviews conducted. A point that would be of interest to study in this regard is to more thoroughly study in what ways the scheduling and planning of the activities by foremen and site managers differ. The reason for this is that, despite that the long-term planning seem to be closely scheduled in a collaborative fashion, our qualitative data may be interpreted to suggest that the short-term planning is a bit tilted to be more influenced by the foremen. This is because the foremen interviewed all had in common that they begin their day by setting up the plan for the day in conjunction with the construction workers, something that was lacking in the description of the site managers in regard to their daily activities.

Next, take the similar task of assessing the design documents. The literature (Mäki & Kerosuo, 2015) imply that both the site manager and the foreman are tasked with assessing design documents and, if they should contain any error, provide solutions. The qualitative data, however, seem to point to the foreman being the one the bear the burden of this responsibility, as several of the foremen noted that this was a reoccurring activity in which they were involved in, in contrast to the site managers that did not as much as hint at such an issue. Nevertheless, this may necessarily not be because of the lack of absence of such an activity. Indeed, it could be that the foreman has the initial responsibility of assessing the documents, and the site manager only participate in the solution-process. This is, however, just one possible explanation which could be examined in future research.

5.1.2 Divergence in tasks and responsibilities

In the section of the similarities, we briefly touched upon how some of the similarities regarding tasks themselves contain difference pertaining to, for instance, primary responsibility. The site manager and the foreman may both be involved in the daily activities on-site, but they are not necessarily involved to the same extent. Similarly, they may both be tasked with evaluating design documents, however, one of the two may have the primary responsibility and the other is a compliment.

One major point of divergence, as indicated by both the previously existing literature (Styhre, 2012) and the interviews conducted, is in relation to the financial and economic responsibility. Although the foremen are involved in financial activities as suggested by the data such as, for instance, purchasing materials, the primary burden (or maybe even the sole burden) is upon the site manager.

It is interesting to note that the primary reason given for the extraordinarily burdensome work of the site manager is that this economic responsibility is there in addition to all the other responsibilities (that, obviously, differ in workload), as emphasised by Styhre (2012).

5.2 Risk management on construction site

In regard to the management of cost and time in relation to the work of site managers and foremen, there need to be a distinction between avoidable factors causing time delays and cost overruns, and unavoidable factors causing time delays and cost overruns. The reason for this is that the approaches taken to mitigate these risks differ based on the type of factor.

5.2.1 Unavoidable factors causing time delays and cost overruns

There were nine different factors identified by the interviewees as causing either time delays, cost overruns, or both. Some of these factors are considered to be unavoidable factors causing time delays and cost overruns such as, for instance, weather conditions and sickness among the workers.

The default position in this scenario seems to be, according to our qualitative data, to fall back on the contract as stipulated between the contractor and the client, in whatever form that contract may take. This, however, is not a proactive way of mitigating such a risk. Indeed, it could be argued that not much of the described method regarding risk management, from risk identification through risk control and monitoring, can be applied. There are several plausible reasons for why this might be the case. First, it may not be something frequently occurring, and would therefore not be suited to be included in the risk management plan. Second, the assessment of such a risk may not be attainable in a satisfactory fashion because it cannot be managed except by depending

on factors external to the management team. One such example could be widespread sickness among the workers. In such a scenario, a possible solution could be to hire in external construction workers. However, this is based on the assumption that such workers are available, which may not be the case, and this risk is therefore outside the scope of what a site manager or foreman can manage adequately.

5.2.2 Avoidable factors causing time delays and cost overruns

The avoidable factors that pose a risk to the time schedule and budget of a project are numerous as identified in the literature (e.g, Aljohani et al, 2017; Sanni-Anibire et al, 2020) and some of those where alluded to by the interviewees such as poor planning and late supply of deliveries.

In this regard, it is noteworthy to mention that a proper risk management protocol as per the way it is outlined in the literature (Renault & Agumba, 2016) was not referred to by any of the interviewees. Of course, planning was a given, and a long-term planning and a short-term schedule were always in place. However, the exact mechanism of how such schedules is produced was not obtained and may be subject of future research. Nevertheless, a reoccurring theme in the literature and the qualitative data is the lack of proper planning. As such, it is of significance to invest resources into research as to what could best help mitigate the risks posed by poor planning.

Additionally, there are some methods discussed in academia that may possibly be of interest for such an endeavour, one of which is Reference Class Forecasting method proposed by Rajha & Hama (2020).

5.3 Leadership on the construction site

According to the notion, a good construction manager must possess both management and leadership qualities in order to enhance the project's performance and fulfil its goals (American Institute of Constructors, 2022). All of the foremen and site managers questioned emphasised the need of using both management and leadership abilities, demonstrating their high dependence and significance. Planning, scheduling, coordinating, forecasting, and other management abilities are necessary for the

successful execution of a project. Monitoring and controlling the project enables the site managers and their foremen to anticipate how their decisions will affect the project's performance. As a result, the site managers and their foremen must quickly make adjustments to counteract the potential negative effects of previous decisions. Even if construction managers create an excellent strategy, executing the plan is an entirely other matter.

The fact that no one in the construction industry is an expert on everything is one of the most interesting aspects of the field. This is consistent with Liphadzi et al (2015).'s assertion that a diverse collection of skills is required to meet the enormous and technological challenges of construction projects. As a consequence, site managers and foremen must depend extensively on a large number of players who possess a variety of skills in order to carry out projects successfully. They must gain leadership abilities in order to connect effectively with a group, therefore helping them to control risks on the building site. Holmberg and Tyrstrup (2010) emphasised that leadership is a competency that may enhance the ability to deal with risk and take the required precautions to avoid being at the mercy of chance. However, since we are aware that leadership is not a quality that is universally applicable, it is essential that it be selected with great care in order to boost the level of enthusiasm and commitment to reach the project objectives (Liphadzi et al., 2015). Ismail and Syazli Fathi (2018) state that the organisation that is being led, the circumstances of the situation, and the group of people being led all have a significant role in determining the appropriate leadership style to use. The truth on construction sites couldn't agree more with this statement.

Leadership is a broad topic that can be discussed from different perspectives each having suitable justifications, however, this study focused on transformational leadership style, transactional leadership and situational leadership. The concept of transformational leadership has been chosen to better comprehend the goals that construction managers have for the transformation of their subordinates. We've decided to focus on transactional leadership in order to get a better understanding of how construction workers use management leadership to maintain the status quo. Last but not least, the concept of situational leadership has been chosen in order to get an understanding of how leadership may be altered based on the circumstances, given

that each building project is unique. When discussing these different forms of leadership styles in relation to the results, it is important to bear in mind that the hierarchy of the positions held by site managers and foremen has an effect on the sorts of leadership styles that are accessible to them.

Site managers place a significant amount of importance on the capacity of their foremen to lead the crew and deal with any technical challenges that may arise. Construction site managers depend on the innovative problem-solving abilities of their foremen in order to mitigate any risks that may occur on the construction site. They include the foremen in the process of making decisions, and they put pressure on them to discover answers to any problems that may come up on the site and to make decisions that they consider to be suitable. The site manager does, of course, have the final word, although it often takes the form of a "all right, go ahead" instruction. According to the results, the leadership style used by the site managers toward their foremen was on cultivating their foremen's potential to become leaders in the workplace. The way that site managers lead foremen is linked to the individual consideration component of transformational leadership. This is because site managers react to the uniqueness of their foremen based on their skills and knowledge, enabling the foremen to attain better levels of performance than they would have otherwise been capable of (Hay, 2006).

Foremen's motivation and inspiration can be boosted by giving them the opportunity to come up with ideas and lead the workforce to achieve the goals that have been set, which is connected to the inspiring motivation component of transformational leadership as well as the intellectual stimulation component of transformational leadership (Rafferty and Griffin, 2004). The site manager may be able to focus more on the management aspects of the project (planning, budgeting, communicating with the stakeholders etc.,) if they use these transformational leadership content. However, it is essential that site managers spend as much time as possible on the construction site and engage the personnel since it is impossible to plan and predict if the site managers are uninformed of what is occurring on a daily basis on the construction site. Again, any changes made to the construction project at this phase would have a significant negative influence on both the project schedule and the cost.

The project that Site Manager B was a part of was not the same as the one that Site Manager A was engaged in. Despite the fact that site manager B exhibited leadership by expressing characteristics of transformational leadership, he had to deal with international subcontractors whose communication did not allow for the same leadership style to be implemented for all of the workers on the construction site as site manager A did. This prevented site manager B from following in site manager A's footsteps. Site manager B and his foremen were keeping a close eye on everything that the subcontractors were doing to make certain that there were no misunderstandings that may put the efficiency of the project in jeopardy. As a consequence of this, it was possible to determine that site manager B and his foremen utilised active management by expectation in order to make adjustments to the work performed by the sub-contractors, if necessary, in order to resolve issues regarding time and cost overruns before they became apparent. The research suggests that transactional leadership is beneficial not just in times of crisis, but also when responsibilities must be performed in a certain way, as shown by the project in which site manager B participated (McCleskey, 2014; Odumeru & Ogbonna, 2013). Due to the fact that communication is limited, it is absolutely essential that the site manager and the foremen involved in projects where they were dealing with foreign construction employees exercise this kind of leadership. Because of this, they must determine whether or not the foreign workers are carrying out the task in accordance with their plan. As a result, the approach that these site managers and foremen used needed to be one that was directive and centred on action.

Other foremen and the site manager who were not working with foreign construction workers did not use directive approach; instead, they demonstrated transformational leadership towards their construction employees. These foremen and the site manager were more concerned with encouraging and inspiring the construction workers by being modest and listening to their requirements to create a pleasant and inspirational atmosphere. Part of both the site manager and the foremen leadership was also inspiring their construction workers by leading by example. Both the site manager and the foremen performed manual labour, such as nailing drywall or cleaning. This is consistent with the Idealized influence aspect of transformational leadership, which emphasises the building of self-confidence and trust among workers and provides them with a model to emulate (Hay, 2006). According to the site managers and

foremen questioned, this transformative component is essential for the leaders on the construction site in order to increase collaboration and establish a good culture that will foster effective cooperation and help to the successful completion of the project. Creating this sort of culture on the building site enables new recruits to adapt without difficulty and reduces the amount of time construction managers must invest in educating new recruits.

The qualitative data revealed that site managers spend as much time as possible on the building site with the employees; nevertheless, depending on the project and the day, administrative duties consume a significant portion of their time. Therefore, they rely on their foreman to manage the activities and provide updates on the construction site's status. In order to change their foremen into leaders, site managers must tailor transformational leadership precisely to their foremen.

The foremen and site manager, construction managers who were not confronted with the issue of foreign construction workers, exhibited situational leadership characteristics. As the construction workers have the requisite skills and knowledge to do their tasks, the construction supervisors were less directive. The construction managers and construction workers shared decision-making through two-way communication, and the construction manager was concerned with facilitating the construction workers' behaviour, which aligns with Hersey and Blanchard's (1997) concept of situational leadership support. Setiawan et al. (2019) found that situational leadership is also helpful in construction projects.

As for the construction manager who dealt with the foreign construction workers, they displayed a situational leadership style that was directive regardless of the employees' skills and commitment. This is because of the language barrier, which makes it difficult to communicate in both directions. Foremen working on these types of projects need to have a significant amount of expertise in the building sector so that they may exercise in directing behaviours.

The necessity of contingently rewarding subordinates has been stressed favourably in both the Odumeru & Ogbonnac (2013) and this qualitative study's results. It has been underlined that rewarding construction employees for excellent performance and not

simply engaging them when they do not accomplish desired targets has a significant impact on how leadership is received on the building site. If there is a reward for excellent work and a punishment for poor result (in this example, correcting their mistakes and making it known for not reaching the task's objective), the employees would naturally desire to be complimented rather than allowing modifications to their work and blame to occur. All of the site managers and foremen questioned, regardless of the project they worked on, emphasised that this is an essential aspect of leadership. People crave appreciation more than material wealth. The goal of construction managers should not be "you got paid to do this, so do it"; rather, they should exploit the nature of human beings, recognise when they do well, and engage when done incorrectly in a positive way, without criticising them or making them feel foolish, incompetent, or apathetic.

Instead of placing a huge focus on foremen's technical and managerial skills, construction organisations must place a significant attention on their leadership development. The technical and managerial abilities are essential, but without strong leadership, they are ineffective. The literatures and qualitative data demonstrated the importance of foremen in construction organisation in terms of quality, efficiency, growth, and profitability. The foremen interact with individuals that vary not just in personality, but also in abilities, behaviours, work culture, and finally, interests. To be effective on the construction site and ensure the successful completion of the project, construction foremen must have a balance of technical knowledge, management abilities, and leadership qualities.

The interviewed foremen were really interested in learning leadership and understood that it is a process that requires not just theoretical knowledge but also the ability to implement it. Leadership practise is time-consuming and involves ongoing adaptation not just to time, location, and circumstance, but also to the individual's personality. No one becomes an effective leader just by comprehending the ideas; the process is much more difficult. Nonetheless, the theories of leadership may assist construction managers in comprehending the tools they might use to provide the distinctive leadership necessary for a particular project. Leadership is not a single code to comprehend. It involves ongoing adaptation to match the people being led, the existing culture, and the kind of project in order to motivate all players within the

construction manager's scope to realise the goal. The objective is to complete the project on schedule, within budget, safely, and with the specified level of quality.

5.4 The impact of external factors on risk management and leadership on the construction site

5.4.1 The contracts and impact on risk management and leadership

The contract form has been cited as having an effect on the construction site leadership performance. Some contracts impose complete accountability on the construction managers, necessitating strict budget and cost management and monitoring. This causes the construction managers to assume a directing role in order to maintain the project's budget and timeline, so securing their profit margin. According to Simu's (2009) research, the profitability of a construction project is heavily dependent on the performance on the construction site, necessitating a substantial presence of construction managers on the site. However, the directing leadership style has its own issues, as it might alter the motivation and dedication of construction employees. For example, if a supervisor instructs a worker to execute a job in a certain manner and rework may be necessary later, the construction workers will not be motivated, and their level of commitment will be minimal. This can cause tasks to take longer, which might have an effect on project schedule and cost. It seems that the motivation and commitment of construction employees may be boosted by allowing them to offer ideas rather than commanding them. This remark may be influenced by the cultural practises of Swedish construction workers and might vary in different nations.

Other contracts where the contractors' profit was secure, the construction managers focused on getting the job done and took the chance in transforming the workers by engaging two-way communication and employing transformational leadership style rather than taking directive leadership styles. This increased the construction workers ability to increase efficiency in the construction projects performance as every actor took the responsibility for their tasks to show their capability in completing the tasks but also their ability to solve issues that comes up. The efficiency of a construction projects on the construction site can not only be affected by the construction managers

but can only be achieved through the collaboration of every actor on the construction site. In other words, they have to put their heads together which can only be possible if the construction managers employ transformative and supporting leadership style. These sorts of contracts, in which the profitability of construction projects is not a concern for the contractors, allow the site managers and foremen to concentrate on reforming the workforce, which may result in increased productivity. However, this is not always achievable, and experimenting with novel materials is not feasible in this sector.

Regarding risk management on building sites, it is apparent that various contract types must be considered. According to the gathered statistics, this is likely due to the inevitable circumstances that cause schedule and expense overruns. The construction managers who worked on projects using a partnership contract did not cite the contract as the solution when such risks arose. Instead, the manager that would be in projects using DBB-contracts would cite the contract as the defining solution in the case of such issues occurring, which shows a discrepancy. Depending on the contract, the managers differ pertaining to using the contract as *the* solution or not. Why there is such a difference between projects with different contracts lies outside the scope of this study but may nevertheless be of interest for future studies.

5.4.2 The impact of skill shortage on risk management and leadership

The problem of skill shortage in the Swedish construction sector affects the capacity of construction managers to lead the actors and manage risks on the construction site. After the Covid-19, it does not seem that the skills deficit will be resolved in the foreseeable future. The need for homes will not decrease, and construction businesses want to meet this rising demand by addressing the skills gap by employing foreign construction labourers. These immigrant construction workers are extremely talented, but their leadership poses challenges for Swedish construction managers. Diverse languages and cultures are among the issues that influence the capacity of Swedish construction managers to lead international construction personnel. Communication is the most crucial aspect of leadership, and if it is constrained, we can forget about efficiency in Swedish construction projects. All of the construction managers

questioned described the communication problem as a nightmare but had no remedies other than to live with it and hope the project is completed on time and under budget. In other words, they pray daily that this problem would not affect the project in any way.

The skill shortage issue is not something that can be solved by the construction managers ability to lead the actors, but it is an external factor that has an impact on the construction industry. We need more Swedish speaking construction workers or require the foreign construction workers to have satisfactory level of the English language to facilitate the communication issue that has an impact on leadership on the construction site. As new foremen come straight out of college and lack real construction industry experience, it will be difficult for them to take decisive actions, and leading foreign construction workers, in particular, will be much more difficult. If this problem isn't solved, it might grow much worse.

The shortage of skilled workers has been mentioned as a major factor causing time delay, if no skilled worker could be hired, and cost overrun, if skilled workers can be found through hiring but was not anticipated as per the initial budget. This, obviously, has a significant and direct impact on time and cost as they relate to the project. However, something that stands out is that shortage of skilled workers was not because of lack of such workers, but rather external factors that are hard to account for such as the recent Covid-19 crisis. Another interesting point is that the rationale given by the interviewees for including shortage of manpower as a major factor causing time delay and cost overrun was the prevalence of sickness among the workers. However, in Table 5, lack of manpower is cited to be amongst the major factors causing cost overruns, and the meta-analytical study that came to that conclusion was done before the onset of the Covid-19 crisis. The question therefore arises: what was the underlying reasons for shortage of skilled labour at that time? One possible aspect of interest to investigate could be if the rationale differs according to location and country, which may give an indication as to why skilled shortage would be such a major factor causing time delays and cost overruns.

5.4.3 Lack of technical knowledge in construction

A lack of technical knowledge on the part of a construction manager might have an effect on how others view that manager's ability to lead. It should not come as a surprise that this occurs given that these leaders must manage and supervise diverse groups of workers that possess a variety of skill sets in order to generate a product. These people have a significant level of experience within the construction industry as well as in a particular trade. As a result, they expect their superiors to have the same degree of competence, which is an objectively unreasonable expectation. Despite this, the foremen take a rather interesting approach to this type of issue. They included construction workers in the process of making decisions about how specific tasks should be carried out. The workers on the building site are able to experience a sense of appreciation for their efforts, which in turn boosts their level of enthusiasm and devotion to the tasks at hand. According to the findings of qualitative research, putting into practise a supporting situational form of leadership may make it possible to minimize the effect that construction managers' lack of technical understanding has on how their leadership is perceived. Depending on the nature of the project, overcoming this barrier could present a greater challenge.

5.4.4 Lack of leadership training provided by the construction company

The site managers interviewed were provided supplied leadership training by their organisation. However, the majority of the foremen interviewed did not receive any leadership training from their employer, but they took the initiative to study this subject on their own since they recognised the significance of this talent for their position. The foremen interviewed were genuinely engaged in leadership development and recognised that it is a process that includes not just theoretical knowledge but also the capacity to apply it. Leadership is time-consuming and requires continuous adaptation not just to time, place, and circumstance, but also to the individual's character. Understanding the ideas is not sufficient to become a good leader; the process is considerably more challenging. However, the theories of leadership may help construction managers understand the tools they could use to give the unique leadership required for a certain project. Leadership is not ascribable to a single code.

It requires continual adaptation to the people being led, the existing culture, and the type of project in order to encourage all actors within the construction manager's circle of interest to achieve the objective. The purpose is to finish the project on time, within budget, without incident, and to the given quality standard. To provide the construction foremen with the necessary tools for the construction site, construction companies should provide their foremen with the appropriate leadership training. Ultimately, the profitability of construction projects is contingent on the performance of workers on the construction site.

6 Conclusion and recommendations

6.1 Conclusion

The daily tasks of the site managers and foremen have a large overlap. Indeed, the majority of the tasks are shared between them, such as involvement in the daily wok on site, scheduling and planning, and assessing design documents. However, there are two fundamental differences. First, the hierarchy plays a role in what aspect of the task is directed to whom. For instance, both are visiting the construction site on a daily basis, but the foreman has a closer connection to the construction workers and is the link between them and the site managers. Therefore, it comes naturally that the foreman spends more time on site compared to the site manager.

Secondly, our data indicate that the major discrepancy between site managers and foremen is regarding the economic and financial responsibility which lies upon the shoulders of the site managers. The foreman may be involved in economic activities, but the responsibility is ultimately an issue for the site manager.

The qualitative data collected confirmed the reported factors that cause time delays and cost overruns. More notably, our data suggest that the approach undertaken by site managers and foremen in relation to these factors is twofold. The default approach pertaining to unavoidable factors is to rely on the contractual agreement. It is plausible that the difficulty to foresee such issues as well as their relatively seldom occurrence is the reason for the absence of a proactive response. Regarding the avoidable factors causing time delays and cost overruns, the two main approaches by the interviewees was planning and practicing effective leadership. More specifically, the essentiality of good planning was emphasised as it may help to completely avoid a risk, or at least lessen its effect. It is also noteworthy that poor planning is among the leading causes of time delays and cost overruns, which warrants further investigation regarding the current planning methods and what is needed to improve the planning.

Both the findings and the literatures confirm that leadership is vital for the construction project performance. The qualitative data suggests that site managers and

foremen employ different leadership styles depending on the project. Leadership on construction site is complex and is influenced by both internal and external factors. Site managers and foremen cannot use their managerial skills alone and expect the project to be executed successfully. Tasks need to be managed and people need to be lead, two highly interdepended skills that site managers and foremen must possess.

Components of transformational leadership and supporting situational leadership are essential on the construction site, as the characteristics of these leadership styles contribute to the motivation and commitment of construction workers, as the two are closely related to how risks on the construction site are managed.
Transactional leadership has been demonstrated to be beneficial in times of crisis, and has been utilised by site managers and foremen with extensive construction industry experience and technical expertise. Their expertise and knowledge prevent subordinates from challenging their directive and action-oriented leadership.

In order to be effective leaders, site managers and foremen must investigate the theories of leadership and choose the proper leadership style based not only on the environment, the people being led, and the work at hand, but also on their own generics.

6.2 Recommendations

Poor planning has long been acknowledged as one of the leading causes of time and cost overruns. According to our qualitative data, the most effective way to minimise or at least mitigate time and expense overruns is via careful planning and the use of appropriate leadership style. Consequently, it is important to evaluate present planning processes. Additionally, it should be of interest to investigate the enhancement of such techniques and the possible introduction of new ways. These kinds of research are important since they pertain to one of the primary variables that contribute to the construction industry's widespread risk. In order for a plan to be successful, however, leadership is required; thus, it is essential to analyse how the enhanced techniques of planning would affect the leadership styles presently used by the site managers and foremen.

7 References

Aibinu, A. A., & Jagboro, G. O. (2002). The effects of construction delays on project delivery in Nigerian construction industry. *International Journal of Project Management*, *20*(8), 593–599. https://doi.org/10.1016/s0263-7863(02)00028-5

Akinci, B., & Fischer, M. (1998). Factors Affecting Contractors' Risk of Cost Overburden. *Journal of Management in Engineering*, *14*(1), 67–76. https://doi.org/10.1061/(asce)0742-597x(1998)14:1(67)

Aljohani, A. (2017). Construction Projects Cost Overrun: What Does the Literature Tell Us? *International Journal of Innovation, Management and Technology*, *8*(2), 137–143. https://doi.org/10.18178/ijimt.2017.8.2.717

American Institute of Constructors. (2022). What Every Construction Manager Should Know To Be a Strong Leader. Aic-Builds.org. https://aic-builds.org/what-every-construction-manager-should-know-to-be-a-strong-leader/

Arabia, J. (2021, October 18). What Is a Construction Foreman? | BigRentz. Https://Www.bigrentz.com. https://www.bigrentz.com/blog/construction-foreman

Assaf, S. A., & Al-Hejji, S. (2006). Causes of delay in large construction projects. *International Journal of Project Management*, *24*(4), 349–357. https://doi.org/10.1016/j.ijproman.2005.11.010

B. Flyvbjerg, N. Bruzelius, and W. Rothengatter, Megaprojects and Risk: An Anatomy of Ambition, Cambridge: Cambridge University Press, 2003.

Bhat, A. (2018). Qualitative Research: Definition, Types, Methods and Examples. QuestionPro. https://www.questionpro.com/blog/qualitative-research-methods/

Bygballe, L. E., Jahre, M., & Swärd, A. (2010). Partnering relationships in construction: A literature review. *Journal of Purchasing and Supply Management*, *16*(4), 239–253. https://doi.org/10.1016/j.pursup.2010.08.002

Chan, D. W., & Kumaraswamy, M. M. (1997). A comparative study of causes of time overruns in Hong Kong construction projects. *International Journal of Project Management*, *15*(1), 55–63. https://doi.org/10.1016/s0263-7863(96)00039-7

CIOB. (2008). Leadership in the construction industry. https://www.ciob.org/sites/default/files/CIOB%20research%20-%20Leadership%20in%20the%20Construction%20Industry%202008.pdf

Designbuildings. (2014). Site foreman. Designingbuildings.co.uk. https://www.designingbuildings.co.uk/wiki/Site_foreman

Trauner TJ. 2009. Construction delays: understanding them clearly, analyzing them correctly. Oxford, United Kingdom: Butterworth-Heinemann.

Djebarni, R. (1996). The impact of stress in site management effectiveness. *Construction Management and Economics*, *14*(4), 281–293. https://doi.org/10.1080/014461996373368

Doloi, H., Sawhney, A., Iyer, K. C., & Rentala, S. (2012). Analysing factors affecting delays in Indian construction projects. *International Journal of Project Management*, *30*(4), 479–489. https://doi.org/10.1016/j.ijproman.2011.10.004

Dossick, C. S., & Neff, G. (2010). Organizational Divisions in BIM-Enabled Commercial Construction. *Journal of Construction Engineering and Management*, *136*(4), 459–467. https://doi.org/10.1061/(asce)co.1943-7862.0000109

EGAN, S. J., & WILLIAMS, D. (1998). [SUMMARY OF] "'RETHINKING CONSTRUCTION'" - THE REPORT OF THE CONSTRUCTION TASK

FORCE. ICE BRIEFING SHEET.. *Proceedings of the Institution of Civil Engineers - Municipal Engineer*, *127*(4), 199–203. https://doi.org/10.1680/imuen.1998.31312

Emad, S., Al-Moghrabi, & Ahmad, A.-A. (2021). The Impact of Situational Leadership Styles on Projects Performance: A Field Study on Jordanian Chemical Manufacturing Organizations. أثر أس الي ب القيادة الموقفية على أداء المش اريع : دراسة ميدانية على منظمات الصناعات الكيميائية ألردنية. https://meu.edu.jo/libraryTheses/The%20Impact%20of%20Situational%20Leadership%20Styles%20on%20Projects%20Performance.pdf

Enshassi, A., Al-Najjar, J., & Kumaraswamy, M. (2009). Delays and cost overruns in the construction projects in the Gaza Strip. *Journal of Financial Management of Property and Construction*, *14*(2), 126–151. https://doi.org/10.1108/13664380910977592

European Commission. (2018). European Construction Sector Observatory: Country profile Sweden. file:///Users/abdul/Downloads/ECSO_CFS_Sweden_2018.pdf.

Gabrieyel, J. (2021, April 8). 5 Essential Phases of Construction Project Management. Jonas Construction Software. https://www.jonasconstruction.com/blog/phases-of-construction-project-management/

Gagnon, K. (2020, July 16). Homelessness in Sweden: A Country in a Housing Crisis. The Borgen Project. https://borgenproject.org/homelessness-in-sweden/

Giannakis, M., & Louis, M. (2011). A multi-agent based framework for supply chain risk management. *Journal of Purchasing and Supply Management*, *17*(1), 23–31. https://doi.org/10.1016/j.pursup.2010.05.001

Hamzah, N., Khoiry, M. A., Arshad, I., Tawil, N. M., & Che Ani, A. I. (2011). Cause of Construction Delay - Theoretical Framework. *Procedia Engineering*, *20*, 490–495. https://doi.org/10.1016/j.proeng.2011.11.192

Hancher, D. E., Haggard, R., & Construction, Austin. (1991). *In search of partnering excellence*. Construction Industry Institute, University Of Texas At Austin.

Hariharan, S., & Sawant, P. H. (2012). Analysis of relationship between time and cost overruns in some infrastructure projects. NICMAR Journal Of Construction Management, 27(2), 5-16.

Hay, I. (2006). Transformational leadership: characteristics and criticisms. E-Journal of Organizational Learning and Leadership 5, no. 2 (2006).

Hersey, P., & Blanchard, K. H. (1997). Situational leadership. Dean's Forum, Vol. 12(No. 2), pp. 1-8.

Ismail, M., & Syazli Fathi, M. (2018). Leadership in Construction: Leadership Styles Practiced in Construction Project – A Review. https://www.akademiabaru.com/doc/ARBMSV13_N1_P24_30.pdf

Jahren, C. T., & Ashe, A. M. (1990). Predictors of cost-overrun rates. *Journal of Construction Engineering and management*, *116*(3), 548-552.

Josephson, P.-E., & Hammarlund, Y. (1999). The causes and costs of defects in construction. Automation in Construction, 8(6), 681–687. https://doi.org/10.1016/s0926-5805(98)00114-9

Kaming, P. F., Olomolaiye, P. O., Holt, G. D., & Harris, F. C. (1997). Factors influencing construction time and cost overruns on high-rise projects in Indonesia. *Construction Management and Economics*, *15*(1), 83–94. https://doi.org/10.1080/014461997373132

Kishan P., Bhavsar J.J., & Bhatt R. (2014). A Study of Risk Factors Affecting Building Construction Projects, International Journal of Engineering Research & Technology, 3(12), 831–835

Klemetti A. (2006). Risk management in construction project networks. Laboratory of Industrial Management, Helsinki University of Technology, Report 2006/2, Espoo; 2006

Kraiem, Z. M., & Diekmann, J. E. (1987). Concurrent Delays in Construction Projects. *Journal of Construction Engineering and Management*, *113*(4), 591–602. https://doi.org/10.1061/(asce)0733-9364(1987)113:4(591)

Lessing, B., Thurnell, D., & Durdyev, S. (2017). Main Factors Causing Delays in Large Construction Projects: Evidence from New Zealand. *Journal of Management, Economics and Industrial Organization*, *1*(2), 63–82. https://doi.org/10.31039/jomeino.2017.1.2.5

LI, H., CHENG, E. W. L., & LOVE, P. E. D. (2000). Partnering research in construction. *Engineering, Construction and Architectural Management*, *7*(1), 76–92. https://doi.org/10.1108/eb021134

Liphadzi, M., Aigbavboa, C., & Thwala, W. (2015). Leadership styles of construction project leaders -A theoretical perspective. https://core.ac.uk/download/pdf/54198899.pdf

Löwstedt, M., Fasth, J., & Styhre, A. (2021). Leadership under Construction: A Qualitative Exploration of Leadership Processes in Construction Companies in Sweden. Journal of Construction Engineering and Management, 147(12). https://doi.org/10.1061/(asce)co.1943-7862.0002205

Magaldi, D., & Berler, M. (2020). Semi-structured interviews. *Encyclopedia of personality and individual differences*, 4825-4830.ISO 690

Mahamid, I., Bruland, A., & Dmaidi, N. (2012). Causes of Delay in Road Construction Projects. *Journal of Management in Engineering*, *28*(3), 300–310. https://doi.org/10.1061/(asce)me.1943-5479.0000096

Mäki, T., & Kerosuo, H. (2015). Site managers' daily work and the uses of building information modelling in construction site management. *Construction Management and Economics*, *33*(3), 163–175. https://doi.org/10.1080/01446193.2015.1028953

Mansfield, N., Ugwu, O., & Doran, T. (1994). Causes of delay and cost overruns in Nigerian construction projects. *International Journal of Project Management*, *12*(4), 254–260. https://doi.org/10.1016/0263-7863(94)90050-7

McCleskey, J. A. (2014). Situational, transformational, and transactional leadership and leadership development. *Journal of business studies quarterly*, *5*(4), 117.

Mustapha, F. H., & Naoum, S. (1998). Factors influencing the effectiveness of construction site managers. *International Journal of Project Management*, *16*(1), 1–8. https://doi.org/10.1016/s0263-7863(97)00025-2

NCC. (n.d.). Arbetsledare. NCC. https://www.ncc.se/jobba-pa-ncc/mot-vara-medarbetare/arbetsledare/

Odumeru, J. A., & Ogbonna, I. G. (2013). Transformational vs. transactional leadership theories: Evidence in literature. *International review of management and business research*, *2*(2), 355.

Ogunlana, S. O., Promkuntong, K., & Jearkjirm, V. (1996). Construction delays in a fast-growing economy: Comparing Thailand with other economies. *International Journal of Project Management*, *14*(1), 37–45. https://doi.org/10.1016/0263-7863(95)00052-6

Olamiwale I.O. (2014). Evaluation of Risk Management Practices in the Construction Industry in Swaziland. Master of Quantity Surveying Thesis, Tshwane University of Technology, Pretoria, South Africa

Öztaş, A., & Ökmen, Ö. (2004). Risk analysis in fixed-price design–build construction projects. *Building and Environment*, *39*(2), 229–237. https://doi.org/10.1016/j.buildenv.2003.08.018

Plecas, D., Squires, C., & Garis, L. (2018). UNDERSTANDING THE BASICS The Essentials of in Government LEADERSHIP Second Edition. https://cjr.ufv.ca/wp-content/uploads/2018/02/Essentials-of-Leadership-book-2nd-Ed-web.pdf

Price, J. (2009). The Conception and Operationalization of leadership in construction companies. https://uir.unisa.ac.za/bitstream/handle/10500/3741/2009%20MBL3%20Research%20Report%20JJ%20Price.pdf

Project Management Institute. (2017). *A guide to the Project Management Body of Knowledge (PMBOK guide)* ((6th ed.)). Project Management Institute.

Rafferty, A. E., & Griffin, M. A. (2004). Dimensions of transformational leadership: Conceptual and empirical extensions. *The Leadership Quarterly*, *15*(3), 329–354. https://doi.org/10.1016/j.leaqua.2004.02.009

Rajha, M. D., & Hama, H. (2020). *Cost and Schedule Overruns in Construction Projects. An internal study on how to manage the key factors causing project overruns* [Master's Thesis]. https://odr.chalmers.se/bitstream/20.500.12380/301793/1/2020%20ACEX30%20Maria%20Daoud%20Rajha%20-%20Honnia%20Hama.pdf

Renault, B. Y., & Agumba, J. N. (2016). Risk management in the construction industry: a new literature review. *MATEC Web of Conferences*, *66*(4), 00008. https://doi.org/10.1051/matecconf/20166600008

Sambasivan, M., & Soon, Y. W. (2007). Causes and effects of delays in Malaysian construction industry. *International Journal of Project Management*, *25*(5), 517–526. https://doi.org/10.1016/j.ijproman.2006.11.007

Sanni-Anibire, M. O., Mohamad Zin, R., & Olatunji, S. O. (2020). Causes of delay in the global construction industry: a meta analytical review. *International Journal of Construction Management*, 1-13.

Santoso, D. S., & Soeng, S. (2016). Analyzing Delays of Road Construction Projects in Cambodia: Causes and Effects. *Journal of Management in Engineering*, *32*(6), 05016020. https://doi.org/10.1061/(asce)me.1943-5479.0000467

SCB. (2022). Population statistics. Statistiska Centralbyrån. https://www.scb.se/en/finding-statistics/statistics-by-subject-area/population/population-composition/population-statistics/

Schatteman, D., Herroelen, W., Van de Vonder, S., & Boone, A. (2008). Methodology for Integrated Risk Management and Proactive Scheduling of Construction Projects. *Journal of Construction Engineering and Management*, *134*(11), 885–893. https://doi.org/10.1061/(asce)0733-9364(2008)134:11(885)

Seddeeq, A. B., Assaf, S., Abdallah, A., & Hassanain, M. A. (2019). Time and Cost Overrun in the Saudi Arabian Oil and Gas Construction Industry. *Buildings*, *9*(2), 41. https://doi.org/10.3390/buildings9020041

Setiawan, T. H., Firdaus, A., & Putra, A. D. (2019). THE STUDY OF SITUATIONAL LEADERSHIP STYLE ON AN INDONESIAN

CONSTRUCTION COMPANY. *Malaysian Journal of Civil Engineering*, *31*(1). https://doi.org/10.11113/mjce.v31n1.499

Shahid Iqbal, Rafiq M. Choudhry, Klaus Holschemacher, Ahsan Ali & Jolanta Tamošaitienė (2015) Risk management in construction projects, Technological and Economic Development of Economy, 21:1, 65-78, DOI: 10.3846/20294913.2014.994582

Shohet, I. M., & Laufer, A. (1991). What does the construction foreman do? *Construction Management and Economics*, *9*(6), 565–576. https://doi.org/10.1080/01446199100000043

Shrestha, P. P., Burns, L. A., & Shields, D. R. (2013). Magnitude of construction cost and schedule overruns in public work projects. *Journal of Construction Engineering*, *2013*(2), 1-9.

Simu K. (2006). Risk management in small construction projects. Licentiate dissertation. Department of Civil and Environmental Engineering, Lulea. LTU

S Keoki Sears, Sears, G. A., Clough, R. H., Rounds, J. L., & Segner, R. O. (2015). *Construction project management : a practical guide to field construction management*. Wiley. http://www.wiley.com/WileyCDA/WileyTitle/productCd-1118745051,subjectCd-CE12.html

Smith, N. J., Merna, T., & Jobling, P. (2014). *Managing risk in construction projects*. John Wiley & Sons Inc.

S. Morris, "Cost and time overruns in public sector projects," Economic and Political Weekly, vol. 25, no. 47, pp. M154-M168, 1990.

Spolander, P. (n.d.). About the swedish housing market. Sveriges Allmännytta. https://www.sverigesallmannytta.se/in-english/swedish-housing-market/

Sreejesh, S., Mohapatra, S., & Anusree, M. R. (2014). *Business research methods: An applied orientation*. Springer.

Styhre, A. (2012) Leadership as muddling through: site managers in the construction industry, in Tengblad, S. (ed.) *In the Work of Managers: Towards a Practice Theory of Management*, Oxford University Press, Oxford and New York, pp. 131–145.10.1093/acprof:oso/9780199639724.001.0001

Styhre, A., & Josephson, P. (2006). Revisiting site manager work: stuck in the middle? *Construction Management and Economics*, *24*(5), 521–528. https://doi.org/10.1080/01446190600658743

Tchankova, L. (2002). Risk identification – basic stage in risk management. *Environmental Management and Health*, *13*(3), 290–297. https://doi.org/10.1108/09566160210431088

Toloie-Eshlaghy, A., Chitsaz, S., Karimian, L., & Charkhchi, R. (2011). A classification of qualitative research methods. *Research Journal of International Studies*, *20*(20), 106-123.

Toor, S.-U.-R., & Ogunlana, S. (2008). Problems causing delays in major construction projects in Thailand. *Construction Management and Economics*, *26*(4), 395–408. https://doi.org/10.1080/01446190801905406

Turnbaugh, L. (2005). Risk management on large capital projects. *Journal of Professional Issues in Engineering Education and Practice*, *131*(4), 275-280.

University of Massachusetts Global. (2020). What is Transformational Leadership and Why is it Effective? Www.brandman.edu. https://www.umassglobal.edu/news-and-events/blog/what-is-transformational-leadership#:~:text=In%20recent%20years%2C%20transformational%20leadership

White, S. K. (2018, February 21). What is transformational leadership? A model for sparking innovation. CIO. https://www.cio.com/article/228465/what-is-transformational-leadership-a-model-for-motivating-innovation.html

Wood, G. D., & Ellis, R. C. T. (2005). Main contractor experiences of partnering relationships on UK construction projects. *Construction Management and Economics*, *23*(3), 317–325. https://doi.org/10.1080/0144619042000287714

Wood, L. (2021, September 13). Construction Market in Sweden - Key Trends and Opportunities to 2025 - ResearchAndMarkets.com. Www.businesswire.com. https://www.businesswire.com/news/home/20210913005656/en/Construction-Market-in-Sweden---Key-Trends-and-Opportunities-to-2025---ResearchAndMarkets.com

Yogeswaran, K., Kumaraswamy, M. M., & Miller, D. R. A. (1998). Claims for extensions of time in civil engineering projects. *Construction Management and Economics*, *16*(3), 283–293. https://doi.org/10.1080/014461998372312

Zavadskas, E. K.; Turskis, Z.; Tamošaitienė, J. (2010) Risk assessment of construction projects, Journal of Civil Engineering and Management 16(1): 33–46. http://dx.doi.org/10.3846/jcem.2010.03

Zavari, M., & Afshar, M. R. (2021). The role of site manager transformational leadership in the construction project success. *International Journal of Building Pathology and Adaptation*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/ijbpa-07-2021-0094

Zou, P. X. W., Zhang, G., & Wang, J. (2007). Understanding the key risks in construction projects in China. *International Journal of Project Management*, *25*(6), 601–614. https://doi.org/10.1016/j.ijproman.2007.03.001

DEPARTMENT OF TECHNOLOGY MANAGEMENT AND ECONOMICS
DIVISION OF INNOVATION AND R&D MANAGEMENT
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden
www.chalmers.se