



CHALMERS
UNIVERSITY OF TECHNOLOGY



Performance in Construction

The Influence of Middle Management on the Construction Workers' Performance in Production

Master's Thesis in the Master's Programme Design and Construction Project Management

THOMAS POSTMA

Department of Civil and Environmental Engineering
Division of Construction Management

CHALMERS UNIVERSITY OF TECHNOLOGY
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Photo by Thomas Postma. The site office of the Erasmus Medical Centre Rotterdam,
named after Desiderius Erasmus (1469 - 1536); Dutch humanist and scholar.

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ABSTRACT

A lack of human focus in construction and site management and an increasing internationalisation has been identified in the literature. The research aim of the thesis is to study the performance of the construction industry, to find out where and how the industry can improve itself on construction management during production. Several performance indicators were identified and studied, based on the 'Transaction Cost Economics' (TCE) and the 'Resource Based Theory' (RBT). A human focus is chosen in this study and the scope is given with the execution phase of construction projects. The analysis revealed that the interviewed managers identified areas, which they are not satisfied with. Four performance indicators and three organizational support performance indicators were selected for the discussion. In order to improve the construction sector, it was found that in some cases, the efficiency of time, cost and quality management, and project leadership could be improved. The performance indicators of HRM, training and knowledge management have areas which are not paid enough attention to and should therefore improve.

Key words: competency, construction manager, construction workers, improvement performance, site manager, Dutch and Swedish construction sectors.

Contents

ABSTRACT	I
CONTENTS	II
PREFACE	V
1 INTRODUCTION	1
1.1 Performance in Construction Management	1
1.2 Research Aim	2
1.3 Research Questions	3
1.4 Scope	3
1.5 Structure	4
2 BACKGROUND THEORIES	5
2.1 Transaction Cost Economics	5
2.2 Resource Based Theory	6
2.2.1 Efficiency and Competitive Advantage	6
2.2.2 Resources and Profitability	7
2.2.3 Concluding remarks	8
3 PERFORMANCE INDICATORS	9
3.1 Time, Cost and Quality	10
3.1.1 Time	11
3.1.2 Cost	11
3.1.3 Quality	11
3.2 Work Satisfaction	12
3.3 Work Environment	12
3.4 Leadership	13
3.5 Communication	14
3.6 Human Resource Management (Organisational Support)	15
3.6.1 Recruitment and Hiring	15
3.6.2 Training	15
3.6.3 Knowledge Management	16
4 METHOD	18
4.1 Introduction	18
4.2 Research Design	18
4.2.1 Qualitative Research	19
4.2.2 Deductive Research	19
4.2.3 Literature Research	19
4.3 Data Collecting Method	20

4.3.1	Semi-structured Interview	21
4.3.2	Interview Guide	21
4.3.3	Personal and Skype Interviews	22
4.4	Data Analysis	22
4.4.1	Ethics in Social Research	23
4.4.2	Research Validity	23
4.4.3	Research Reliability	24
5	THE INTERVIEWEES	25
5.1	Construction and Site Manager as Middle Manager	25
5.2	Background Interviews	26
5.3	Context	29
5.3.1	Introduction: The Construction Industry	29
5.3.2	The Dutch Construction Industry	30
5.3.3	The Swedish Construction Industry	31
6	ANALYSIS OF THE INTERVIEWS	33
6.1	Introduction	33
6.2	Analysis of the Performance Indicators	35
6.2.1	Time, Cost and Quality	38
6.2.2	Leadership	40
6.3	Organisational Support	42
6.3.1	Human Resource Management	42
6.3.2	Training	44
6.3.3	Knowledge Management	44
7	DISCUSSION	46
8	CONCLUSION	51
8.1	Suggestions for further research	53
8.1.1	Main Suggestion	53
8.1.2	Further Suggestions	53

9	APPENDIX	54
9.1	Guidelines for construction and site managers	54
9.2	Interview Guide - Dutch	55
9.3	Interview Guide - English	56
9.4	Interview Guide - German	57
9.5	Thesis Scheme	58
9.6	Learning Goals	59
9.7	Time Planning	60
10	REFERENCES	61

Preface

The thesis study is in the area of project management regarding the improvement of the construction or site management during the execution of construction projects. Interviews were done with construction and site managers from several companies to gain empirical data. A diverse scope is reflected, since not only Dutch and Swedish companies were involved, but even one from Germany. Most of the delegates of the companies have long work experience within the construction industry, which made the whole endeavour very enriching.

The main question of the thesis is relevant to today's construction industry and is applicable in an international setting. The topic of diversity of employees in construction firms is much in the news (men and women; different age groups etc.). It shows an increased awareness of diversity and that diversity adds competencies, which increase the performance of the industry. The thesis design is also related to my personal interest, since I would like to work in one of the countries included in the analysis in the near future.

One reason for designing the study as an inter-country management study is its aim to find out the best of the different construction industries. Are there different understandings of performance regarding construction work? Another reason is that the author is well aware of the increasing internationalisation of the construction industry. It set the main objective to find out about the performance of construction managers, of which some operate in an international context.

Some acknowledgements for those who supported the master thesis are made here.

Petra Bosch-Sijtsema as the main supervisor from Chalmers University of Technology was most closely involved in the thesis process with her feedback. Meisam Pashah, a fellow student, was my peer-review partner and therefore also closely involved.

Nicky Sargentini, a student from TU-Delft, worked parallel to me on a thesis about improving the construction work by using particular lean tools. We discussed some themes and shared writings to give each other feedback.

All the interviewees are kindly thanked for participating, for their time and involvement in the study. This group stays anonymous. In return, I will provide them with the thesis and the guidelines.

Some other students and my family who were interested in the process, were stimulating for this study in one way or another. Many thanks to all of the above supporters, foremost to my supervisor and peer-review partner.

Göteborg April 2016

Thomas Postma

1 Introduction

“Give light, and the darkness will disappear of itself.” - Desiderius Erasmus

1.1 Performance in Construction Management

This thesis on construction management is about the role of the construction or site manager and how he or she can have a positive influence on the construction workers' performance. What constitutes a company's strength is its 'resource base', the capabilities it has (Peteraf and Barney 2003). The Resource Based Theory is a theory in the field of strategic management and makes clear how differences between the resource bases of companies have an effect on their 'competitive advantage', so the authors. This is particularly relevant for this study, therefore the study is based on this theory. Winch (2010) states that challenges in improving performance are largely organisational and do not depend on high levels of technology in the production process. This study focuses on the issue of 'performance' and how to increase it through a new or better management. Dainty et al. (2003) describe performance as the result of a variety of behavioural competencies. Dainty (2003, p. 878) defines 'performance' as shaped by input and output based criteria. The input based criteria are: "the personal characteristics, behaviours, traits, competencies and skills that an employee brings to his/her job to engender project success." The output based criteria of performance are defined as: "the individual performance standards that relate to an overall company strategy or individual job description" (Ibid.). This definition of performance is used for this dissertation in which managers' are asked about several indicators of performance.

The focus of the thesis is therefore a 'people's' focus, a focus on human capital. Winch (2010, p.465) states that "Human capital is held by people in the form of their skills and capabilities". People in construction organisations are responsible for the execution of the work. This study puts the management of construction workers central to find out how work performance can be increased.

Organisations do increasingly project based work (Bushuyez et al. 2014). This also applies to the construction industry: it is a project based industry (PBI) (Bosch-Sijtsema and Postma 2009). A project is defined as: "temporary organizations, limited by a certain scope, and implemented within a certain amount of time (Bushuyez et al. 2014). For the organisation it is necessary to define the success factors right from the start of the project in order to be successful (Bushuyez et al. 2014). The critical success factors in this study regarding performance are the performance indicators. They can also be called key performance indicators (KPI) (Bushuyez et al. 2014).

For this study 'competence' is defined as: "the person's abilities to comply with a range of externally agreed standards" (Dainty et al. 2003, p.878). This thesis explores several performance indicators that influence 'efficient' construction project management (CPM). The goal is to find out which indicators are of particular importance and lead to an increased performance in production.

The influence of the middle manager on the performance of construction workers is studied in the Dutch and the Swedish context by conducting interviews and studying the respective construction industries. By studying particular performance indicators,

this study should increase the understanding of the management of people.

The study should reflect upon the strengths (and weaknesses) to see how and what industries or firms can learn from each other. Therefore the study has a qualitative approach. Dainty et al. (2007, p.4) states that: “International comparisons are invariably useful in challenging assumptions that there ‘is no other way of operating’.” Particularly the interview study should reveal whether these kinds of assumptions exist.

The main intended audience of this dissertation are middle managers – both construction and site managers - who want to increase their understanding and want to reach a higher performance. In addition, the dissertation is aimed at everyone with a vested interest in the construction industry.

1.2 Research Aim

This study is about the effect of the management of the construction manager on the performance of construction workers. The management role is studied through several performance indicators, with the aim to find out about ‘how the work-force should be managed to increase the performance, i.e. the evaluative indicators can be used by the construction or site manager as a guide for appraisal or training demand etc.’

The purpose of the thesis is to shed light on management in the construction industry. Chaminda et al. (2007) describes that the human factor has been neglected within the field, leading to a lower performance level of the construction industry, of which Egan (1998) and several other authors have written about in the 1990s. Egan (in: Winch 2010, p. 14) claimed: “. . . much of construction does not yet recognise that its people are its greatest asset and treat them as such. Too much talent is simply wasted, particularly through failure to recognise the significant contribution . . . We understand the difficulties posed by the fragmented structure of the industry, but construction cannot afford not to get the best from the people . . .” All too often today, we focus on the results and not on the people who get us the results. This lack of humanistic approach influences how people perceive their roles and responsibilities in a team and whether or not they enjoy it (Cleland 2004). Chamida et. al. (2007) and some other authors claim that even though the ‘human factor’ in construction gets increasingly attention, it represents an area with undiscovered areas. The result of the thesis should lead to a list of guidelines that summarises the main findings on construction or site management improvement, which should be a help for both construction and site managers.

1.3 Research Questions

The thesis focuses on the site and construction management of construction workers to increase their performance. The main question is: *“What are the main indicators that are important for performance of the workers on site?” (RQ1)*

Of special interest for this study is the role of the construction or site manager. ‘Performance indicators’ in relation to human aspects are studied to find out what can be improved. Two sub-questions were chosen to support and answer the main question:

“How can the performance indicators improve the construction workers’ performance during a construction project?” (RQ2)

“Which performance indicators are found most important from RQ2?” (RQ3)

The research questions should help to understand or find out what possibilities exist for improvement. A prerequisite for RQ3 is the analysis of the interview study. The aim of the analysis is to contribute to the development of the construction industry or a single firm in construction. Due to the internationalisation of the construction market, it is desirable to have an understanding of it. The outcome of this study is therefore not limited to theoretical description, but aims to connect to practice with some guidelines for practicing professionals. These should contain points for improvement and should show what is especially of importance.

1.4 Scope

The scope is given by the research questions. The questions concern performance related issues of management, especially of construction workers, which is the human capital of the firm. Different performance indicators are investigated, like time, costs and quality, work satisfaction, work environment, project leadership, communication etc. A differentiation is made between hard indicators (the quantifiable) and soft indicators (the non-quantifiable). RQ3 focusses more on particular performance indicators which are found to be most important.

Hereby, the thesis takes the perspective of the construction or site manager and limits itself on the construction of buildings. Furthermore, the scope is given with the industries in the Netherlands and Sweden (and one expert interviewee from Germany), which means that cultural aspects play a part in this study.

To compare industries, some background information of the country is needed first. Particular characteristics of each country, that have an effect on performance, were studied.

1.5 Structure

The thesis is divided in eight chapters. In chapter 1 the topic is introduced and the research questions are outlined. Also, ‘performance’ and ‘competence’ are defined. Furthermore, the motivation to choose this topic is explained.

In chapter 2 and 3 the main theory on which the thesis is based is reviewed. It is needed to help answer the research questions. The transaction cost economics (TCE) by Oliver Williamson in relation to the resource based theory (RBT) by Birger Wernerfeld and others are outlined.

In chapter 3 the different performance indicators are studied, which were partly or all used during the interviews. The performance indicators were identified through a literature study. Also, a closer look is taken at characteristics of the construction industry. This extensive review of theory was needed to increase the depth of the interviews and the discussion.

Chapter 4 on methodology contains the research design, the scope and reflections of the procedure of the data collection. It also explains what sort of scientific research was chosen. The interview study is introduced by elaborating on the semi-structured interview form. Furthermore, the analysis technique of ‘coding’, the selection criteria, the validity and generalizability are explained.

Chapter 5 is used to define the functions of the construction and site manager. Some key-facts of the interviewees are given, a stepping stone for the later analysis. A division is made into three groups: Dutch, Swedish and expert interviewees. Furthermore the context of the Dutch and Swedish construction industries is outlined. This gives some background knowledge of the countries involved, including some key facts of the recent developments of the respective construction industries.

Chapter 6 contains the analysis of the results of the interview study, thereby building a bridge to the discussion of the results and the earlier literature review. Here, the literature study and the interview findings are discussed relating to the most important issues that came up during the interviews.

Chapter 7 represents the discussion based on the earlier chapters. It leads to the final chapter 8 with conclusions. Here, the research questions are answered and an outlook is given on further research.

2 Background theories

The theory of transaction cost economics (TCE) by Oliver Williamson and the resource based theory (RBT) by Birger Wernerfeld, Jay Barney and Margaret Peteraf etc. are introduced. The TCE is a theory of the firm and market organisation within the area of governance. It is about economising transaction costs. Bounded rationality, opportunism, the primacy of markets and the action of economising are the core issues of Oliver Williamson's TCE theory. The TCE theory forms the fundament of the resource based theory (RBT). This theory has a resource based view, which defines what role capabilities within for a company's efficiency and therefore its competitiveness. Both theories support this management study regarding the relation of construction or site management and performance.

2.1 Transaction Cost Economics

Already in the 1930s the problem of economic organization was defined by R. Commons as: "The ultimate unit of activity ... must contain in itself the three principles of conflict, mutuality, and order. This unit is a transaction" (in: Williamson 2010, p.1). Similarly, other authors wrote about the topic of transactions, like Commons in the 1950s, which was the point of departure for Williamson's research.

The central question that led to the TCE theory is: "What efficiency factors determine when a firm produces a good or service to its own needs rather than outsource?" (Williamson 2010, p.1). Pessali (2006) describes that 'contractual man' within a firm does economic transactions with a particular frequency, asset specificity and uncertainty. The frequency is related to learning, since the more often a transaction takes place, the more experienced the people involved get. Asset specificity is connected to opportunism which is the result of a strong self-interest and is possible because not every aspect can be specified in the contract (see figure 2.1). Uncertainty is the resultant of bounded rationality. He points out that Williamsons view in 1975 is that 'contractual man' will chose the cheapest governance form possible. Williamson's theory has become a generally accepted theory of the firm (Pessali 2006).

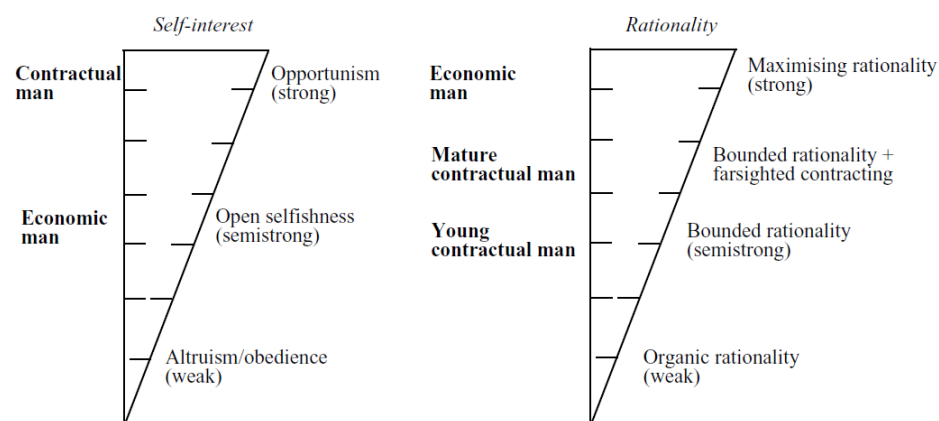


Figure 2.1 A difference of degree: contractual man meets economic man (Pessali 2006, p.55)

In order to reach a certain project mission, clients need to have particular resources (Winch 2010). Williamson came up with the TCE theory in which: “total cost of supply is derived from two main components: production costs and transaction costs” (Winch 2010, p. 94). The cost of the production can be viewed as a movement of particular inputs that result in certain outputs (Winch 2010). The costs give insight into the efficiency of the process. It means that the more efficient you can do a particular job, the lower the transaction costs are. It is not about minimizing the transaction costs.

Finally, the TCE is a theory of the firm in which transactions are done. These economic transactions have a particular frequency (learning), asset specificity (opportunism) and uncertainty (bounded rationality). To be competitive the transaction costs should be reduced. ‘Opportunism’, ‘bounded rationality’ and ‘atmosphere’ are the main human factors, which play a role in TCE. An optimum of the three variables ‘uncertainty’, ‘frequency’ and ‘asset specificity’ should be reached to have the most efficient governance of the firm.

2.2 Resource Based Theory

From the TCE, the resource based theory (RBT) was developed, which is about the resources of a firm, including the equipment, materials and human resources. The human resources are viewed from a managerial perspective. The RBT explains how resources form the basis of the competitiveness of a firm. Whereas the TCE is about the production and transaction costs, the RBT is about the resources and explains how their efficiency relates to performance and business success and is based on the TCE.

Peteraf and Barney (2003) defined that performance differences exist among companies, resulting from the different knowledge bases they have. According to the authors, it is a theory of rents (not profit) and of sustainable competitive advantage. Heterogeneity of the resources is the foundation of this theory.

2.2.1 Efficiency and Competitive Advantage

Helfat and Peteraf (2003, p.999) define a resource as: “an asset or input to production (tangible or intangible) that an organisation owns, controls, or has access to on a semi-permanent basis”. Furthermore, a capability of the possibility (by the organisation) to execute particular jobs by using resources or the organisation is needed for the final outcome.

The RBT tries to optimize the balance of monetary input and what value is produced (Peteraf and Barney 2003). The degree of competitiveness is elaborated on with several performance indicators with ‘cost’ being one (a tangible resource). The RBT uses a resource-level and an enterprise-level to explain why there are continuous performance differences between firms. Besides, it is about factors inside the firm, like the resources and capabilities, in contrast to other theories, that focus on factors outside the firm like ‘how the market is organised’ etc.

The RBT uses ‘efficiency’ to explain why companies have different performances. The

reason for this lies in the different available resources for a firm. There exist resources with different degrees of efficiency (Peteraf and Barney 2003). The more efficient the resources, the more economical they are and reach a higher customer satisfaction. Efficiency is not only seen in relation to 'cost', rather it is seen in terms of value or net benefits (Peteraf and Barney 2003).

'Competitive advantage' is defined by Peteraf and Barney (2003) as the extra value generation by a company, compared with the competitors that produce the same product. To explain what is meant with 'economic value creation', the same authors define 'economic value' as the value difference between what you buy and what the product or service costs to produce for a company. In the construction industry, value is created by the employees who work during the production phase and the preparation phases before this. The client needs to know the total cost before construction begins. It is a view of creating value that is in accordance with economic principles. Furthermore, the authors explain their definition by pointing out that the definition shows that the value is subjective, as it is perceived by the potential customer. To have a higher value than your competing firms, means to have a higher 'efficiency' (Peteraf and Barney 2003). To be competitive, the firm should either produce the same value for a lower cost or a higher value for the same cost (Ibid.).

Peteraf and Barney (2003) propose a definition of 'competitive advantage' in which a connection is made with the 'essential resources' (human resources etc.) that the company has in the process of producing 'value': material, equipment, human resources etc. Focusing on the value creation, as given by the definition of RBT by Peteraf and Barney, is helpful for a broad range of organisations. In the end, the main goal for all organisations is to create value (Peteraf and Barney 2003), which is a prerequisite for growth. Moreover, importance is continuously given to an efficient result as well as an analysis of 'the resource-level'. In contrast to other definitions, 'competitive advantage' is not understood as a 'profitability advantage', but rather as a form of advantage over other companies. Herewith the company can have a potentially higher level of rent, be more profitable, have more customers etc. (Peteraf and Barney 2003)

2.2.2 Resources and Profitability

'Cost' is an important performance indicator. How is this linked to the resources? So far it has become clear that a resource can be regarded both as a strength or a weakness for a particular company. Resources are - for instance - technological knowledge, hiring skilful employees, particular contracts, equipment etc. (Wernerfeld 1984)

Resources need to be exploited and further developed. 'Domestic contracts' are a prerequisite for development of 'production abilities' by means of 'shared cost results' (Wernerfeld 1984). Mostly, resources can be used in different end-products, which consequently is reflected in part of the earning. Managerial expertise is an example of this.

2.2.3 Concluding remarks

The RBT is a theory of the resources of a firm, defining its competitiveness within the market the firm is active in. The RBT is a resource perspective from within the company towards the market. A variety or heterogeneity of resources and capabilities are needed for performance. Different levels of performance are explained by the level of efficiency of the resource. The resources are linked directly to the profitability of the firm. Even though this thesis focuses on middle managers, it becomes clear how strategic decisions directly relate to the topic of the RBT.

This thesis is concerned with the human resources on an organisational level. Hereby, the project manager has an important role. The focus on performance leads to the capabilities of the employees, a competency-based approach. The different performance indicators that are found are also used in the interview study.

The literature research identified seven performance indicators, regarding the construction workers' performance, both tangible and intangible resources. These are: time (tangible), cost (tangible), quality (tangible), work satisfaction (intangible), work environment ([in]tangible), leadership (intangible) and communication ([in]tangible). Three organisational support indicators were found which are: human resource management, training and knowledge management. Even though there may be more performance indicators, these ten were selected to be studied. They are highly interlinked. Seven performance indicators were selected for the analysis and discussion, because of their importance for the performance.

The construction industry is a project based industry (PBI), which is highly complex, among other things because of the different stakeholders involved. Most common, different firms work together on a project and share resources. The main contractor contracts sub-contractors to execute the work. Sometimes a total contractor does all the work themselves, but usually there are sub-contractors involved. For large projects, contractors from abroad may be involved.

3 Performance Indicators

As the TCE showed, within a market different transactions take place between companies. The RBT takes an inside-out view on strategy. There is a relation between specialisation and competitiveness: the more specialised, the more specific resources can be build, as well as a value chain (Wit and Meyer 2014). When adopting an inside-out perspective, the competences of the company are stressed, rather than the tangible resources (Ibid.). It takes a bigger effort to acquire competencies (intangible) and these cannot be bought (Ibid.).

The different performance indicators introduced in the first sub-question (RQ2) are reviewed in this chapter. Bergly (2001) argues that the project success measures time, cost and quality (TCQ) are not sufficient to get an appropriate understanding of project performance. Therefore, new initiatives were developed like concurrent engineering, total quality management, lean construction, just in time etc. to improve the construction sector (Bergly 2001). The author continues explaining that other industry sectors were studied to find out about methods and processes that could be applicable to the construction sector and help improve the sector.

In relation to lean management, the authors Josephson and Björkman wrote 31 recommendations to increase the profit in construction. These are far reaching recommendations and some of them are brought up in the literature review. Performance can be related to one person or a group of people (Josephson and Björkman 2011). The values, interests and motives of a group can be influenced by the leader (Josephson and Björkman 2011). The authors point at the relevance of organisation and leadership for influencing the values, interests and motives during the process.

The performance indicator ‘communication’ is a core management skill. Other performance indicators for the study are: time, cost and quality (TCQ), work satisfaction, work environment, project leadership and communication. Several company supportive issues were identified with HRM: training and knowledge management. All these indicators have been mentioned in the literature and are important for performance in production.

A differentiation can be made between the hard or quantifiable performance indicators of TCQ and the softer or qualitative performance indicators like leadership. A differentiation between tangible and intangible resources is made, whereby the intangible resources are most important for the human perspective of this thesis.

Wit and Meyer (2014) define tangible resources as the physical resources a company has. In contrast, intangible resources are not physical. Whereas tangible resources need to be bought, intangible resources are held by people and need to be developed (Wit and Meyer 2014). Within the intangible resources a differentiation can be made between relational resources and competences which can be seen in figure 3.1.

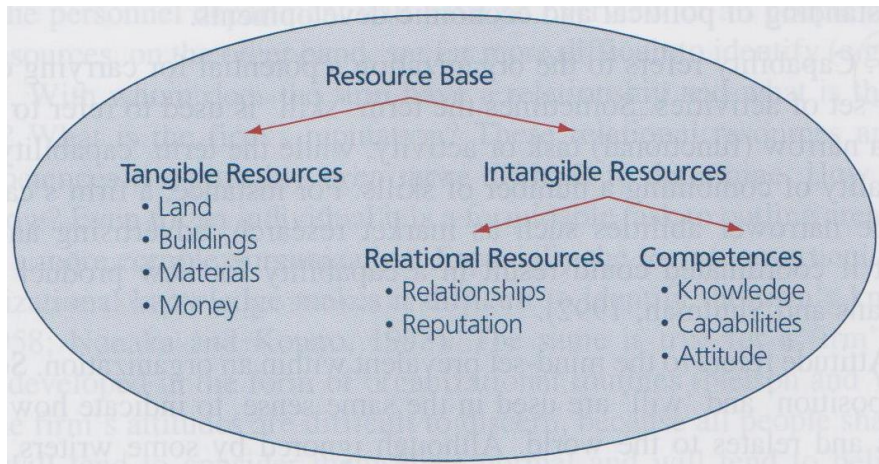


Figure 3.1 Types of firm resources (Wit and Meyer 2014, p.93)

3.1 Time, Cost and Quality

Time, cost and quality (TCQ) represent the classical performance indicators for successful project management (Bannerman 2008). They are closely connected which is illustrated in figure 3.2 (The Iron Triangle). In line with Atkinson (1999), Cleland (2004) states that the TCQ is too limited for modern business. However it is helpful for the company to have these measures as a primary trust. Cleland (2004) proposes 'customer satisfaction' as a fourth performance indicator and refers to the need to include all stakeholders, which form the basis to judge whether a project is successful or not.

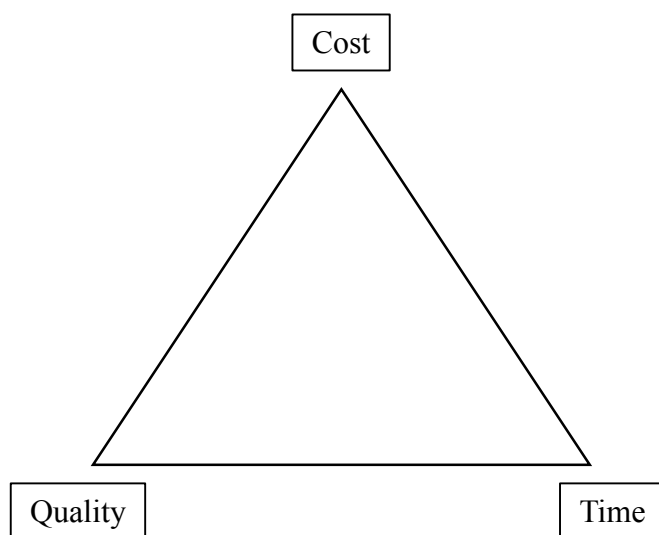


Figure 3.2 The Iron Triangle (Atkinson 1999, p.338)

3.1.1 Time

Cleland (2004) describes in his 'Field Guide to Project Management' that setting goals plays an important role in project management. Goals help to measure the progression of the work. When the project is behind time plan, extra costs will arise (Ibid.). The same author argues that project plans, policies, procedures and correct resource allocation are needed to reach the project goal. Also, a project control system needs to be in place to keep track of the time schedule, cost and technical performance (Ibid.).

When performance is according to schedule, the project can continue. Corrective action is needed, when a deviation between the goals and the delivered work exists. Sometimes it happens that objectives need to be reassessed when during the course of the project new information becomes present (Winch 2010). The project manager has a coordinating role to play and must assure that work is done on time (Clough et al. 2008).

3.1.2 Cost

As described under 'time', a cost tracking system needs to be in place (Cleland 2004). Possibilities of wage and promotion represent the companies' values (Josephson and Björkman 2011). Some weaknesses in the payment system are recognised by the authors, mostly regarding the construction work. It should be a strategic goal of the company to have an adequate reward system in place (Ibid). As earlier reviewed, the rewarding for work relates to motivation and job satisfaction. Josephson and Björkman (2011) state that Sweden must compete on the efficiency in work – management and processes – not on material and cost. Reducing costs has become more relevant due to the global financial crisis in the autumn of 2008, which led to a depression in the Swedish construction industry and reduced the construction activity of buildings. Reducing costs in the long-term, however, requires that any given product has to be produced using less resources (Josephson and Björkman 2011).

'Labour costs' need to be estimated in advance by an estimator. It depends on how quick the work can be completed and the price that is paid for a particular construction worker per hour (Bennett 2003).

3.1.3 Quality

The quality of the construction work is defined by the contract and should follow the norms and rules applicable. It is also related to the capabilities of the construction workers and therefore the quality is closely linked to human resource management. Standard contracts are applied during a project to assure "current standards of workmanship" (Dubois and Gadde 2002, p.626). These standards reduce the earlier described uncertainty due to undefined details for the work at the construction site, or a 'lack of complete specification' as Dubois and Gadde (2002) described.

Laszlo (1999) differentiates between quality assurance and quality management. It shows that quality is a very broad subject. The author further pointed out that products and services are under quality assurance, which includes people and activities.

Bannerman (2008) further notes that the technical and the management processes relating to project management are important during the different phases of the project. In accordance with the quality management, these processes should improve non-stop

(Bannerman 2008). Bond (1999) finds that quality is subtly linked to perfection. Diminishing the waste thus means a higher effectiveness, because resources are saved (Bond 1999).

3.2 Work Satisfaction

Motivation and satisfaction are essential to excel in all endeavours one can undertake. ‘Motivation’ is defined as: “a psychological state that exists whenever internal and/or external forces stimulate, direct or maintain behaviours.” (Hellriegel et al. 2005, p.384) Closely connected is ‘satisfaction’, which is defined as: “a psychological state that indicates how a person feels about his or her situation, based on an evaluation of the situation.” (Hellriegel et al., 2005, p.384)

Supervision increases the ‘motivation’ and ‘satisfaction’ of the construction workers and “a happy worker is a productive worker” (Hellriegel et al. 2005, p.384). According to this saying, it is crucial for construction managers and site managers to have an understanding of this, since it influences the performance of the construction workers and it reduces job changes. Much research and debate has been done on this topic for a long time. According to the earlier defined role of the ‘construction manager’ (middle manager) and the ‘site manager’ (first-tier manager) it is understandable that the site manager has the largest effect on the construction workers performance, since they are the closest to them and communicate regularly (Hellriegel et al. 2005).

Bennett (2003) pointed at different hurdles that lower the work progress: for example when materials and or equipment are/is not available, unsafe conditions on the working site, a need for re-work, not enough communication and a lack of respect of the supervisors. The ‘work environment’ as a performance indicator will get more attention later on in this chapter when leadership is described. The site manager can only have a high-performance on site, when adequate resources are present. If so, it will have a positive effect on the motivation. If there is a lack of resources, the manager needs to act in a way that the project plan is followed in order to avoid delays (Clough et al. 2008). Therefore the different resources – equipment, materials and construction workers – are interconnected and all are needed for the work to be done.

According to Harris and McCaffer (2001, p.138), job satisfaction is related to: “achievement, recognition, the work itself, taking responsibility, the chance to advance”. In contrast, dissatisfaction can exist when work conditions, payment, the connection to the superior and the policy of the firm are not adequate (Harris and McCaffer 2001). Motivation and employee satisfaction are increased by: communicating in a personal way, realistic goal setting, praise, rewards for good work (for instance monetary rewards) (Hellriegel et al. 2005).

3.3 Work Environment

The work environment is included in the leadership model by Hughes et al. (2012) within ‘situation’. The literature review so far included already some aspects of the work environment, which makes this section shorter. Bennett (2013) describes that work conditions have an impact on the work performed. The influencers on productivity are jobsite layout and accessibility, the degree of administration and the cleanness, the

chance for unsafe circumstances and accidents and minor hindrances like overcrowding, bad lighting, temperature regulation and ventilation (Bennett 2013). Bond (1999) mentioned that once an operative said that the morale on the construction site could be seen at the toilets. So in turn, the optimism which is connected to the atmosphere on site has an influence on how clean the site is.

Safety in the job environment connects to this performance indicator: it is “a measure of effectiveness, because accidents cause disruption.” (Bond 1999, p.1322) Accidents interrupt the work and therefore reduce the performance.

3.4 Leadership

The authors Hughes et al. (2012) present the central idea of ‘leadership’ as a process instead of a position. Leadership is about the relation of the leader and the followers within a particular context as figure 3.3 illustrates.

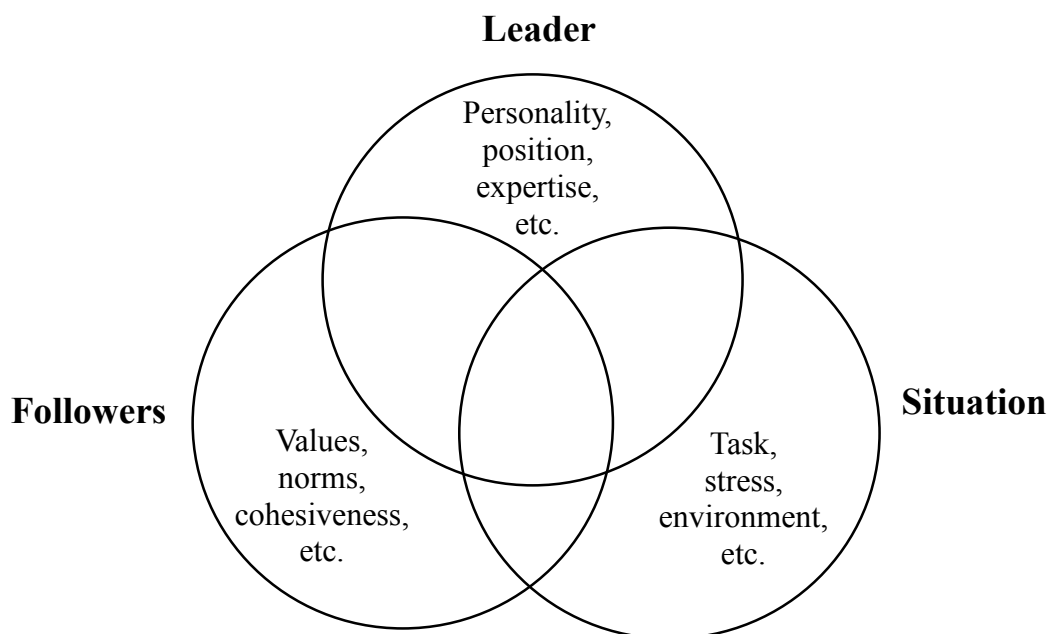


Figure 3.3 Leadership is a process, not a position (Hughes et al. 2012, p.15)

‘Management’ and ‘leadership’ have some commonalities and differences. Hughes et al. (2012) describe that managers are more concerned with coordination and controlling the work, whereas leaders are more concerned with the strategic questions and long term developments and inspiring the employees etc. Moreover, the authors state that organisations are in need of both roles to be successful. In line with this is what Bolden (2011, p.72) describes as: “Effective leadership and management are now widely recognized as key ingredients in the effective performance of individuals, groups, organisations, regions and nation states.” It is key that the construction workers know what the common goal is; if not, work will be executed less efficient and those involved won’t be committed to their task (Josephson and Björkman 2011). Also, choosing the right goal(s) is important to be motivated to do the work. A project is a temporary

organisation and so are its resources of people and equipment (Winch 2010). The grouping of people can be seen as a 'project coalition' with a common goal (Ibid.). The 'project team' is led by the project manager (Ibid.).

Bolden et al. (2011) refer that when evaluating the leadership development and capacity, it is important to differentiate between the individual, group and organisational level. The individual level is concerned with the capacity of the leader, when taking a broad range of measures on productivity, strategy etc. The group level is about the impact of the leader's behaviour on co-workers and subordinates. It is concerned with measures for the improvement of for instance motivation, communication etc. (Ibid.). Finally, the organisational level is about the influence the leadership has on the success of the entire business (Ibid.).

3.5 Communication

Since many people are involved in the construction work, communication is of utmost importance. According to Hellriegel et al. (2005), effective communication is a core competence of managers. Managers explain the purpose of the work and set goals, which are key to the performance of the work. Bennet (2003) explains that 'construction management' in general has a lot of administrative work. This is necessary to direct the work, answer questions, agreements and information to secure the project's progresses according to time, cost and quality (Bennett 2003).

Hellriegel et al. (2005) point out that there are two main types of communication: 'formal' and 'informal'. Additionally, the authors mention verbal and non-verbal communication as another main distinction (Ibid.). Several ways of communication are defined with: "face-to-face interactions, phone calls, faxes, e-mail, notes posted on bulletin boards, letters, memos, reports, videos, and oral presentations" (Hellriegel et al. 2005, p.449) and probably this list can be even more extended, resulting from a high level of innovation.

Harris and McCaffer (2001) allude that communication in the construction sector is characterised by 'direct lines' of communication between the manager and the operational work force. The authors indicate that it is essential that the communication works well to get the work done successfully.

Josephson and Björkmans (2011) 25th recommendation for construction leaders is about giving instructions in a clear way, to avoid understanding issues. The importance of communication is evident in construction management and it is recommended to build habitual ways of communication to overcome problems in this respect, so the authors. Construction supervision should include unambiguous instructions regarding what is to be done and the applicable standard performance (Ibid.).

Finally, Cleland (2004) mentions that team size matters to communication. The larger the team, the more communication lines are needed. It is recommendable for large teams to form a core and a sub team (Ibid.). Also, forming sub teams related to the functional line or the task group can improve the performance and effectiveness.

3.6 Human Resource Management (Organisational Support)

The next performance indicators belong to the human resource management function and are needed to support or improve the construction on site. Possibly, the CEO or director of a company is in charge of this, which is usually the case in small companies. In larger companies this is a separate function.

3.6.1 Recruitment and Hiring

Human resource management (HRM) is an organisational function of a company and contributes to the performance delivered on site. One of the function's responsibilities is who is given a contract as employee, i.e. construction worker at the firm. Since it is costly to hire someone, the HR manager has a dialogue with the construction or site manager about this. Daintly et al. (2007, p.3) pointed out that "Human resource issues too often lie outside the remit of project managers who neither know nor care about the employment status of many operatives on the project for which they are responsible." However, according to Cleland (2004), the true assets of an organization and a project team are the people. This implicates they should be taken care of right from the start.

Demographics play a role when hiring, for instance factors such as sex, age, nationality, sexual orientation etc. are considered (Hellriegel et al. 2005) According to the RBT, diversity increases performance, because different capabilities or heterogeneous resources have a positive influence on performance. This is why construction companies are interested in attracting different age groups (people with different experiences), both men and women etc.

Clough et al. (2008) argue that the project manager is also responsible for checking the need for construction workers. Therefore the construction or site manager is in direct contact with the HR manager. Experienced workers are more efficient than newly hired construction workers (Ibid.). 'Manpower levelling' is the balancing of the need of workforce, by moving non-critical activities in time. It helps to become more efficient (Sears et al. 2008, p.180). The supervisor in the field (site manager), does the workforce levelling every day, based on experience (Clough et al. 2008). For smaller and less complex projects this is enough, but for larger and more complex projects the project execution will benefit from some calculations for the labour requirements (Ibid.).

3.6.2 Training

It is found that those firms that continue learning, belong to the most mature firms in terms of their project management (Bushuyez et al. 2014). In fact, project based learning plays a vital role in the success of a project, equally important as project performance (Bushuyez et al. 2014). However, Bennett (2003) describes that many contractors do not offer, or only offer little or no possibilities for training for forepersons and supervisors. Also, only few companies succeed in project based learning (Bushuyez et al. 2014). So, having the latest knowledge and skills is important for performance. Consequently, 'Training' is a performance indicator in this study.

The 20th recommendation of Josephson and Björkman (2011) for improvement of the construction workers' performance is related to training. The authors found out that learning takes place as "learning by doing" or "learning on the job" (Josephson and Björkman 2011, p.49). The 'other' training is seen as non-productive, because a

discrepancy exists with its practice. However, when more training takes place, there would be a better understanding of the value-creation process, of which the construction worker is part. The 22nd recommendation is on ‘reflection and training’ (Josephson and Björkman 2011). The intense work often does not leave much time to reflect on the work that has been done. Usually only the break time, the general company meetings and ongoing trainings leave some time for reflection, according to the authors. Furthermore, the work is experienced as stressful. Both blue and white collar workers would like to have more time for reflection (Ibid.). Reflection for the growth of the whole organisation is rare, so the authors. Reflection time is needed to implement improvements and to heighten the efficiency. Post-project documentation should be done, in order to facilitate knowledge transfer (Ibid.).

Training is identified as a performance indicator, since training improves the capabilities and skills needed to do the work. Due to developments and innovation in the construction industry, it is found to be of the utmost importance to have training for this. Training is closely related to learning in the PBI. If there is new knowledge available, it should be shared among the people involved in the project. Similarly important is learning from mistakes. For this, it is key to transfer knowledge to other project groups, so the ‘lessons learned’ are not lost. On the contrary: by sharing knowledge becomes available to other people, through which the construction industry will improve itself as a whole. Therefore, having a structure for knowledge management can be seen as a performance indicator for a company.

3.6.3 Knowledge Management

Since this study adopts a human perspective, knowledge management has importance, especially for future projects. Correct and up to date knowledge is needed for the performance on site, which is the reason why knowledge management is classified as a performance indicator. It is defined by Hellriegel et al. (2005, p.73) as: “the creation, protection, development, and sharing of information and intellectual assets.” Thereby, trust is elementary for joining organisational knowledge processes, i.e. sharing knowledge and other resources (Hislop 2013). Three forms of trust are mentioned by Hislop (2013): companion, competence and commitment.

Knowledge resources and capabilities are build up, when projects are performed (Bosch-Sijtsema and Postma 2009). Bushuyez et al. (2014) mention that studies have found that 85 per cent of those who work on projects, acquire new explicit and implicit knowledge during the execution phase. However, argue Bushuyez et al. (2014) that knowledge management, as a topic is however underexposed, since only a few papers have been published on what impact knowledge management has on project performance. From the knowledge-based point of view, the authors state that ‘knowledge’ is the prime strategic factor for the company (Bosch-Sijtsema and Postma 2009). A firm’s competitive advantage depends more than anything on its knowledge: “on what it knows – how it uses what it knows – and how fast it can know something new.” (Hislop 2013, p.1)

Several constraints for knowledge management are found, namely: “the lack of procedures and routines for data gathering, the lack of reports and other documentation on the results of the previous projects, and inconsistent documentation that do not always fit the needs of projects” (Bushuyez et al. 2014, p.773). Characteristic for learning organisations is that they are flexible, which increases their competitiveness

(Hislop 2013). So, a traditional bureaucracy or other highly centralised and hierarchical forms of organisation are counterproductive for organisational learning (Ibid). Learning organisations should ideally have no big hierarchy, open communication, reduced top-down steering and autonomy for the employees (Ibid). Finally, the motivation of the employees to join knowledge management processes is of prior importance for its success. The human, social, and cultural factors also play a role in the knowledge management process, which has been found and underlined by several case studies (Hislop 2013).

4 Method

4.1 Introduction

The methodology was developed to set the framework for the thesis, and is depicted in figure 4.1. Moreover, this chapter reflects on the data collection that was done by means of a qualitative interview study. The study undertaken is qualitative, with a deductive research approach. Both the interviews and the literature study are needed to answer the research questions. To collect data from the construction industry, an interview study has been done: with construction and site managers. This chapter explains and reflects upon the research design and applied methods.

4.2 Research Design

The research was designed as a management study with six interviewees from Sweden and four interviewees from the Netherlands. Three expert interviews were held to extend and enrich the study with additional perspectives.

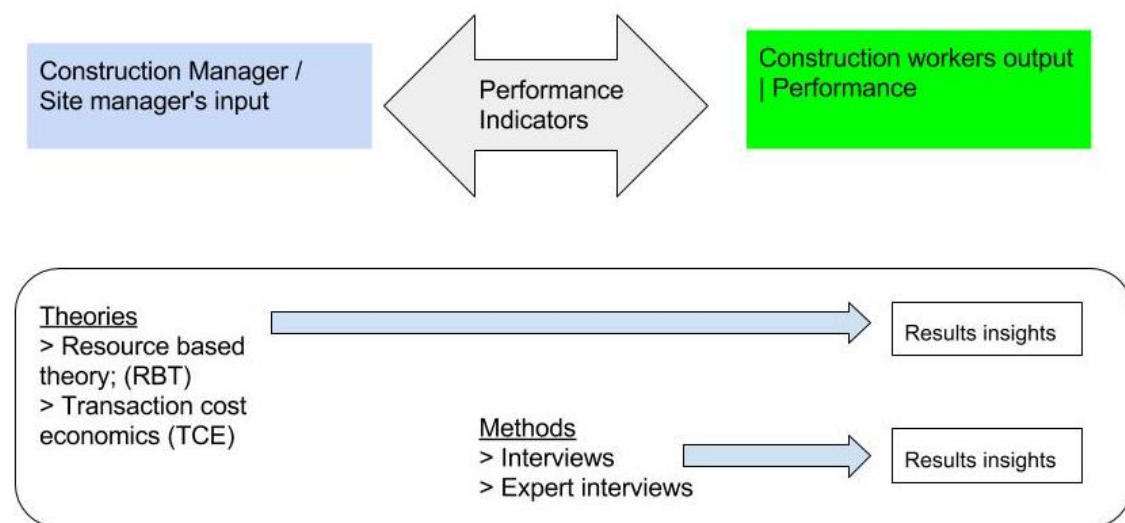


Figure 4.1 Research design scheme

4.2.1 Qualitative Research

Flick (2002) alludes to this type of research as especially important for studying social phenomena. Whereas quantitative studies are concerned with quantifying data, qualitative studies aim to identify the qualities.

Qualitative research starts with an idea for a research study, which leads to a particular research question and sets the scope of research. Figure 4.2 shows that the qualitative research approach is characterised by a spiralling back and forth or iterative approach (Berg 2009). This means that the research question will most likely come to change and evolve during the process. A research question can either be descriptive of a situation or processual (Flick 2002). It is key that the research has a focus and a purpose (Berg 2009).

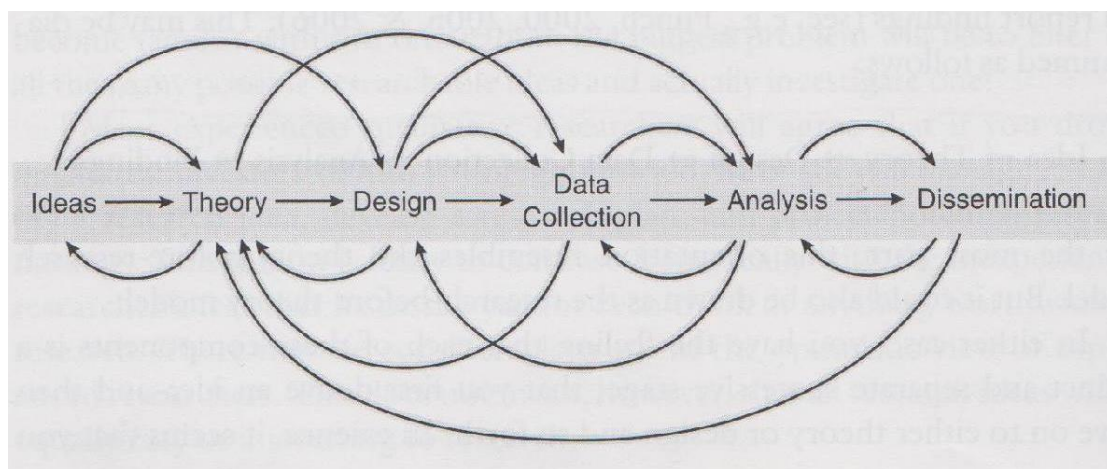


Figure 4.2 The spiralling research approach (Berg, 2009, p.26)

4.2.2 Deductive Research

According to Flick (2009) deductive research methods are about formulating research questions or hypotheses based on theoretical models. As a next step, empirical data should be used to help answer the research question or hypotheses, so the author. It is opposed to inductive methods, which entail the collection of facts are to form theories (Ibid.).

For this dissertation, no hypothesis was formulated, instead it contains three research questions. The ten identified performance indicators were used to structure the interview study.

4.2.3 Literature Research

The literature research is based on several sources from: Chalmers Library, Google Scholar, and different material from a variety of Design and Construction Project Management (D.C.P.M) courses (project management, construction governance, managing organisations in the construction industry, leadership, construction management, knowledge management etc.). Furthermore, several websites were used, for instance those where national statistics are published (the Dutch central office of statistics: CBS and the Swedish counterpart: CSB) and building institutions (the Dutch:

‘Bouwend Nederland’ and the Swedish ‘Sveriges Byggindustrier’). Only rewarded sources were used. Often the articles and books are from respected authors in the field, who are frequently quoted. To get a better understanding of the literature, some review papers and critiques were studied. This was especially helpful to quickly gain an understanding of important literature on a particular subject.

4.3 Data Collecting Method

This dissertation is based on data collection by means of interviews. Generally, interviewing is a frequently used form for qualitative research. Qu and Dumay (2011) write that the research interview is one of the most important methods for collecting qualitative data. There is some danger with this form of data collection, when it comes to simplifying sources or information and idealising through assuming interviewees as capable sources and that they answer always truthfully (Ibid.).

The data is retrieved from thirteen semi-structured interviews of a length of 40 to 60 minutes; all of which were recorded. Thirteen interviews are enough for the purpose of a master thesis. The number is random and shows only that thirteen people confirmed for participating in the interview study. A rule was that the interviewees should have enough time to answer the questions, but not exceed 60 minutes. A pilot interview was done to see how much time is needed to answer the questions. This first interview took 45 minutes, on which the time frame is based.

The interviews were conducted at several independently selected companies, during a three week period. The participants remain anonymous for this study (see ethical note: §4.4.1; p.23). The reason for this is that the interviewees should speak out freely. Three of the interviews are so called ‘expert interviews’, which include interviews with a site manager, a CEO of a structural engineering firm and a construction consultant. The other ten interviews were conducted with construction or site managers. The different interview groups of interviewees have an average work experience, which can be seen in figure 4.3.

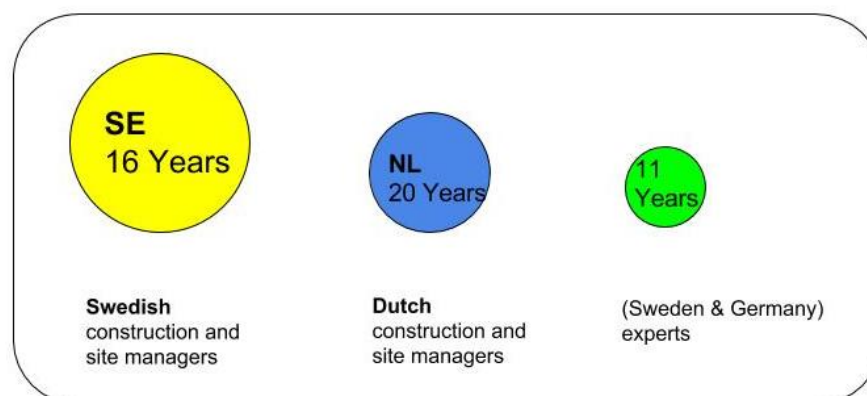


Figure 4.3 Interviewees and their work experience

4.3.1 Semi-structured Interview

According to Bryman (2012) the ‘qualitative interview’ (semi-structured or unstructured interview) distinguishes itself from the survey interview (structured interview) – which is more commonly used in quantitative research - in that it is much less structured. Berg (2009) states that the semi-structured or semi-standardised interview can be seen as in between the structured (standardised: formal) and unstructured (unstandardized: informal) interview.

For this dissertation, the semi-structured form was chosen; it is the most common form of qualitative research (Qu and Dumay 2011). It increases the ‘reliability’ and ‘validity’ of the interview by allowing the interviewees to bring up their own view, something which is different in the quantitative interview, in which the interviewee reflects on the questions given (Bryman 2012). Berg (2009) states that it is characteristic for the semi-standardised interview to be partly structured. A record of the interview may be made; the questions may be formulated with some flexibility and the interviewer may ask for clarifications and some explorations may be undertaken, before the subject is changed (Berg 2009). Regarding effective communication, Berg (2009) brings up that the meaning of the questions should be spoken out passably. Hereby the interviewer must have an understanding of the language of the interviewee to avoid misunderstandings.

The expert interview is a distinct category of interview. Flick (2002) mentions that the expertise of the person is more of interest than their particular personal perspectives. The expert represents a group of people of their field of expertise (Flick 2002). In contrast to the semi-structured interview, the expert interview is more restricted, therefore the guiding questions are used as a stricter orientation when asking the question (Flick 2002).

4.3.2 Interview Guide

An interview guide was developed, but questions may be added during the interview, since it is not as fixed as the structured interview form, that counteracts the richness of the answers (Bryman 2012). Questions were formulated in a more open way. This enables the respondents to answer the questions from their own viewpoint (Bryman 2012). The interviewees are helped to answer the questions by means of some method, like an interview guide, and by asking different types of questions (Flick 2002). For this thesis, the interview guide was used as a method. Qu and Dumay (2011) point out that the interview questions are a help to steer the interview and help to cover the topics of interest. The preparation with the interview guide is important to reduce misunderstandings based on different cultural understandings or due to the language (Qu and Dumay 2011). When the interviewees and interviewer have different understandings of the world, this may lead to misunderstandings (Ibid.).

There are different forms of interview questions, like open and closed questions. Reviewed are the forms that were used for this interview study, which can be partially seen from the interview guide in the appendix. To help reflect on the interviews, there are ‘personal factual questions’ to receive ‘personal information’ like their education, profession etc. (Bryman 2012) Another category is ‘informant factual question’ which are questions about the knowledge of their field of profession or interest (Ibid.). For questions about standpoints, the Likert scale is often used (Ibid.).

Interviewees were both asked about how they relate to the different performance indicators. For the TCQ, work satisfaction and work environment, a Likert scale was developed to identify them. With seven performance indicators it seems possible to reflect on performance and still not widen the scope. If the interviewees wanted to add an indicator, they were allowed to do so.

4.3.3 Personal and Skype Interviews

The interviews are conducted at the company office through a face-to-face meeting or done via Skype (only 2 interviews: the one from the Stockholm and Skåne). The interviews were recorded and transcribed within a week time and mostly direct after the interview. The interviews were held at different days of the week (Monday till Sunday) and during different times of the day, ranging from the early morning (at 10:00) to the later afternoon (16:00).

The reason for choosing foremost personal interviews over Skype, instead of telephone interviews, is related to several characteristics of the personal interview. Also, the main idea was to group interviewees from particular regions, i.e. the Gothenburg and Rotterdam region, so that travelling was reduced to the minimum. It needs to be mentioned that there are also advantages with the telephone/ Skype interview: they are less costly (no travel time and costs), the personal aspects are invisible and so a potential for bias is reduced etc. (Bryman 2012) However, there exist also disadvantages with telephone interviews: “The length of a telephone interview is unlikely to be sustainable beyond 20-25 minutes, whereas personal interviews can be much longer than this” (Bryman 2012, p. 215). There is no possibility to observe the interviewee and so there is no possibility to see facial expressions, which may be a help (Bryman 2012). The same author states also that secondary visual information won't be able to be received by telephone, and neither is it possible to show the interviewee objects.

The motivation for doing personal interviews is that it becomes easier to get to know the interviewees personally during an informal chat, before and after the interview. This helps to get a broader picture of what is covered during the interview. Also, to get to know the company when visiting and experiencing the work environment: the office etc.

4.4 Data Analysis

Coding is an important part of the qualitative research regarding the open questions. Flick (2002) states, that in fact it is the core of qualitative research (Flick 2002). Bryman (2012) lifts up that the answers needs to be examined according to particular categories, which are connected to numbers. The author mentions that coding can be done on beforehand or after the interviews are held (Bryman 2012). Flick (2002) remarks that the theoretical coding cannot be viewed without paying attention to the method of data collection.

All the performance indicators and particular words with special relevance to performance were coded, to find out in what context and how frequent they were used. When one of the performance indicators is seen in the interview transcripts, it was

marked. This way, it is easier to select the relevant parts for analysis. The Dutch and German interviews were directly transcribed by the author of this thesis in English, so that the quotations are a translation of what has been said in the interview.

4.4.1 Ethics in Social Research

Flick (2009) states that informed consent is a must, when doing research; this means that the researchers need to be transparent about their research and research aims towards the participants. Furthermore, the author writes that the research may not be harmful for the participant(s), i.e. damage their privacy. Qu and Dumay (2011) bring up that the interviewees should be informed about the procedure: the use of the data, about the interviewer and about their own position.

All interviewees participated voluntarily for this thesis, which is a priority in research (Qu and Dumay 2011). The interviews were recorded for the purpose of transcription. The interviewees were informed about the method of collecting information in advance and all agreed. The interviewees stay anonymous for this reason transcriptions of the interviews are not included in the appendix. This is a common procedure, especially when there are only a few participants (Qu and Dumay 2011). Data collecting, usage and storage should be done with consent and - part of the research design - to do research carefully (Berg 2009).

4.4.2 Research Validity

The thesis study is designed in a way that the subjectivity of the researcher and interviewees to the possible extend is taken out. The evaluation of this empirical social research followed some rules of qualitative research.

The main problem with validity relates to what has been studied and how the results are presented by the researcher (Flick 2002). Three errors may occur, which might undermine the validity of a study, according to Flick (2002). Firstly, by stating a relation or principle, which does not exist. Secondly, to discard a relation or principle where it was correct. Thirdly, by asking the erroneous questions. Obviously, these error possibilities should be avoided

This study has a rather small group with only thirteen interviewees, fitting the purpose of a master thesis. So, at first sight you can ask yourself the question: “How much validity does the outcome of this study have?” Given that the average professional experience of the interviewees is 15 years (sum up all work experience and divide it by 13), and that the interview study was mostly carried out with people who have a long experience in the construction industry, provides the study with sufficient input to be valid.

The different contexts given by the Dutch and Swedish industries play a role. Already between these two nations, differences exists. There may be no big differences, when you look at other western countries.

4.4.3 Research Reliability

The semi-structured interviews were conducted in a way that the interviewees could prepare themselves, since the interview guide was sent at least one week in advance. Only two participants told me that they did not have a look at the guide in advance (Interviewee Number [Nb.] 5 and 11). The rest of interviewees seemed to be well prepared, often they had answers to other questions, written down on the guideline. The interview guidelines were translated from English into Dutch and German. The German translation was corrected by a native German speaker and site manager, who later did the 'expert interview' himself (Interview Nb. 12). One other interview (Interview Nb. 8) was held in German, because the interviewee was not able to do the interview in English.

5 The Interviewees

This chapter brings up the sort and size of companies and further introduces the professionals, who participated in the interview study. Connected to this are the company size, their function in the company and the different regions where the firms are located.

5.1 Construction and Site Manager as Middle Manager

The construction manager is defined as a ‘middle manager’ and the site manager as ‘first-line manager’. The former has more project management tasks and sometimes visits the construction site. The latter, however, is much more involved on site and is closer to the work force. This study focuses on the middle management and the first-line management.

The pyramid of figure 5.1 shows the different levels of management. First-line managers are responsible for the production of goods and services. Hellriegel et al. (2005) describes that they can be named ‘production supervisors’, or ‘team leaders’, ‘section heads’ etc. The first-line manager connects the operational level with the rest of the organisation. Often they are not connected to managers from other organisations or the higher management. The authors continue by mentioning that they are mostly involved with their work as supervisor of the workforce and with their direct fellow managers. Mostly, first-line managers have a hectic life. Much technical know-how is needed, in order to help the non-managers (Hellriegel et al. 2005).

Middle managers have a coordinating role to fulfil. They have the responsibility of “setting objectives that are consistent with top management’s goals and translating them into specific goals and plans for first-line managers to implement.” (Hellriegel et al. 2005, p.13). Hellriegel et al. (2005) notes that these managers can be called: the department head, plant manager, or director of finance etc. They have to direct and coordinate the work of first-line managers and sometimes also the non-managers. They should fulfil the intermediate role and take away ambiguities of top management and first-line management (Hellriegel et al. 2005).

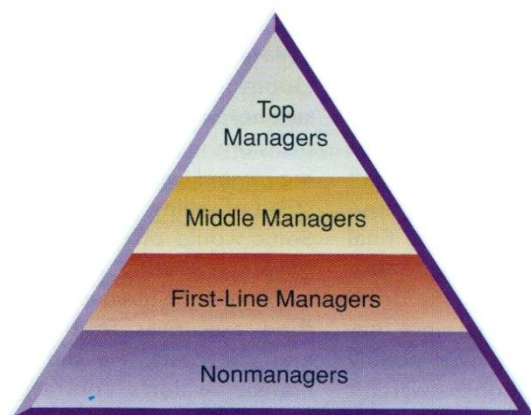


Figure 5.1 Construction and site manager as managers between the top management and the operational workforce (Hughes et al. 2006, p.47)

Bennett (2003) describes an approach used within the construction industry in the UK regarding project delivery systems. Here, the project manager works for the client, often during the whole lifecycle of a project. The project manager functions as a part of the team (Bennett 2003). If his involvement is over the whole planning and design phase, there is also a need for skills regarding the phases before the production takes place, i.e. the planning and the design stage (Ibid.).

5.2 Background Interviews

The interviewees were divided into three groups:

1. The Dutch group of managers
2. The Swedish group of managers
3. The expert group with a German and Swedish background.

Some key facts are listed here, regarding their company, their role in the company and the years' of work experience. In table 5.1 a brief description of the different company sizes is provided.

Table 5.1 Key description of the companies

Company Size
Small (S) < 20 employees
Medium (M) 20 - 200 employees
Extra Large (XL) > 200 employees

In table 5.2 the different amount of work experience is given by the employees. The indication was used as an orientation for the later analysis and discussion. The average work experience of the managers of the different groups can be seen in figure 4.3.

Table 5.2 Work experience of the interviewees

Employee experience
Short: < 5 years
Medium: 5 - 15 years
Long: < 20 years

Table 5.3 shows the four Dutch interviewees, who work in companies in Rotterdam or the greater Rotterdam area. The companies and interviewees remain anonymous and are numbered. The regions are included, because in all countries involved there exists differences from region to region. Even different cities have different cultures and economic strengths. If the study should be repeated, then it is important to know, where the participants from the study are from.

Table 5.3 Construction and site managers – the Netherlands

Company	Function	Experience (in years)	Location	Nb.
Construction company, S	CEO and construction manager	Long (20)	Between Rotterdam and Utrecht	1
Construction company, M	Construction manager, team leader	Medium (10)	Rotterdam area	2
Construction company, XL Total contractor	Customer & Market, construction and site manager within several other companies	Long (25)	Rotterdam	3
Construction company, XL Total contractor	Tender manager, construction manager within several other companies	Long (23)	Rotterdam	4

Table 5.4 depicts the Swedish interviewees. They come mainly from Gothenburg. Only the interviewees 5 and 9 come from Skåne and Stockholm respectively.

Table 5.4 Construction and site managers – Sweden

Company	Function	Experience (in years)	Location	Nb.
Construction company, S	Construction manager; architect	Long (30)	(mainly) Skåne and USA	5
Construction company, M	Site manager	Short (4)	Gothenburg	6
Construction company, XL Total contractor	Site manager (including infrastructural projects)	Medium (16)	Gothenburg	7
Construction company, XL Total contractor	Site manager of several smaller construction sites (including infrastructural projects)	Medium (15)	Gothenburg	8
Construction company, XL Total contractor (multinational)	Site manager	Medium (8)	Stockholm area	9
Construction company, XL Total contractor (multinational)	Construction manager	Long (25)	Gothenburg	10

Table 5.5 shows the expert interviewees. Hereby it should be noted that the company of interviewee 12 is a German company, the other two experts are from Gothenburg.

Table 5.5 Expert interviews

Company	Function	Experience (in years)	Location	Nb.
Consulting company, M	CEO; engineer, project leader	Long (10 20)	Gothenburg	11
Architecture office, M	Site manager/ leading architect; Accounting	Short (1 2)	between Bremen and Hannover	12
Consulting company, M	Project management consultant (including infrastructural projects)	Short (1)	Gothenburg	13

5.3 Context

5.3.1 Introduction: The Construction Industry

Paragraph 5.3 describes the context within which the companies are situated. Both the Dutch and Swedish construction industries are presented, to provide a background for the interview study and the further discussion. There are significant differences between the countries which will be explained here.

This study has a particular scope regarding the construction sector. It should be mentioned that there are different typologies of construction, namely “housing, non-residential building, heavy, highway, utility, and industrial” (Sears et al. 2008, p.2). This study focuses on all construction types, except infrastructural building. There are so called speciality contractors, who specialise on a particular trade and some work with different trades (Sears et al. 2008).

The construction sector – within the above outlined scope – should be characterised a bit more. According to Dainty et al. (2007) there is a structural fragmentation in this sector: a wide diversity of employment practices and a follow-up of short-term projects.

On a project basis, different people are grouped to work together for a short time and are often hired with different conditions (Dainty et al 2007).

5.3.2 The Dutch Construction Industry

Table 5.6 Key facts Dutch construction industry (CBS 2016; Bouwend Nederland 2016)

Key facts	Dutch Construction Industry
Growth Rate	2,60% (2016)
Employees	99.172 (2015)
Global Economic Crisis	2008/2009

The Dutch construction industry has been in a deep crisis and reached its lowest employment rate in September 2015 with 99.172 employees, whereas in 2009 there were 169.101 employees (Werkgelegenheid, Bouwend Nederland 2016). Due to the global economic crisis the market decreased and consequently the employment fell rapidly between the year 2009 and 2015 (Werkgelegenheid, Bouwend Nederland 2016). In November 2015 there was a growth in the statistics with 100.448 employees and the forecast is that the employment will increase slowly (Feiten en Cijfers, Bouwend Nederland 2016). The Dutch construction sector was a dwindling sector with 5 per cent in 2013. Figure 5.2 illustrates this development between 2005-'15. The new trend is growth, but no big growth is expected any more compared with other sectors. Between 2015 and 2019 there is an expected growth rate of 4 per cent per year (Ibid.). This growth is mostly related to the construction of new housing. Maintenance has not been as much affected by the economic crisis. Also, the growth after the crisis has been forecasted to be small. The prognosis of growth is unsure, when it comes to timing and the intensity of the growth (Feiten en Cijfers, Bouwend Nederland 2016).

The growth trend makes it important for the sector to recruit new employees. Apart from this quantitative challenge, there is also a qualitative challenge, meaning that the industry is changing as a result of the client, changing products and methods, changing policies (Werkgelegenheid, Bouwend Nederland 2016). These changes trigger that new employees will work in the sector and they need education; “Bouwend Nederland” or “Building Netherlands” invests for this (Werkgelegenheid, Bouwend Nederland 2016).

The construction market as a whole is pressed and has different challenges. Due to the financial crisis, the demand for new housing has declined, investments of housing corporations are under pressure and customers have only limited possibilities for investments (Bouwend Nederland 2016).

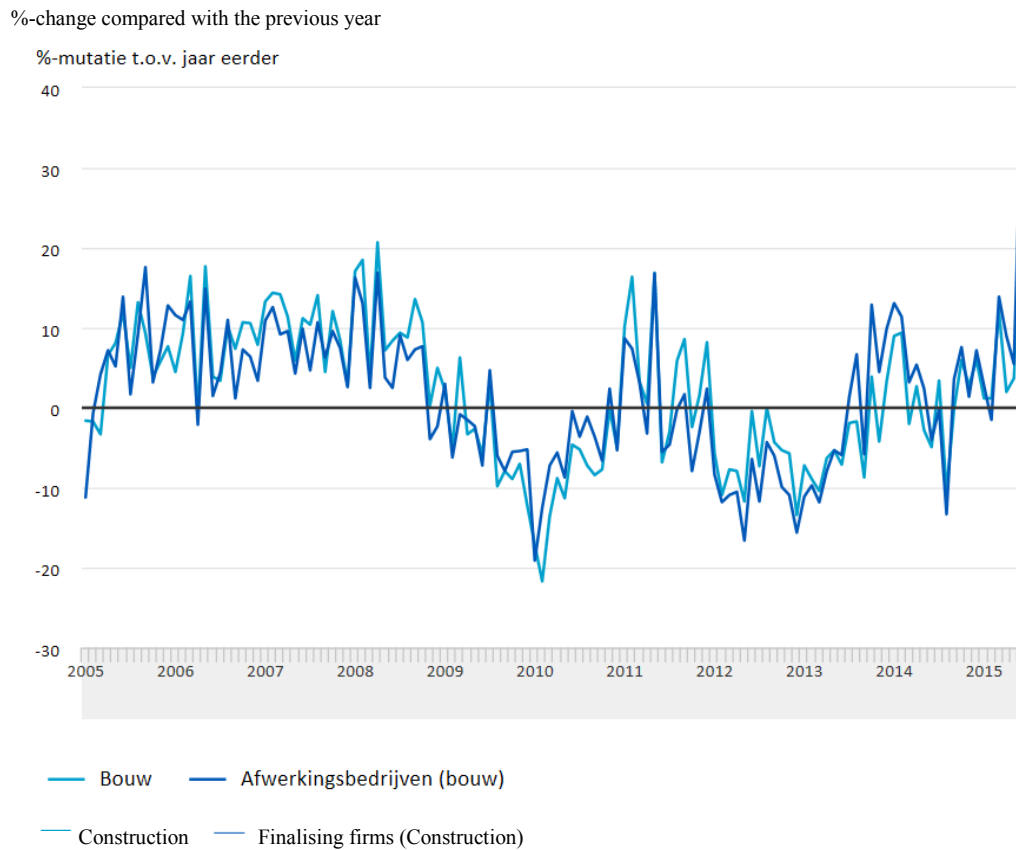


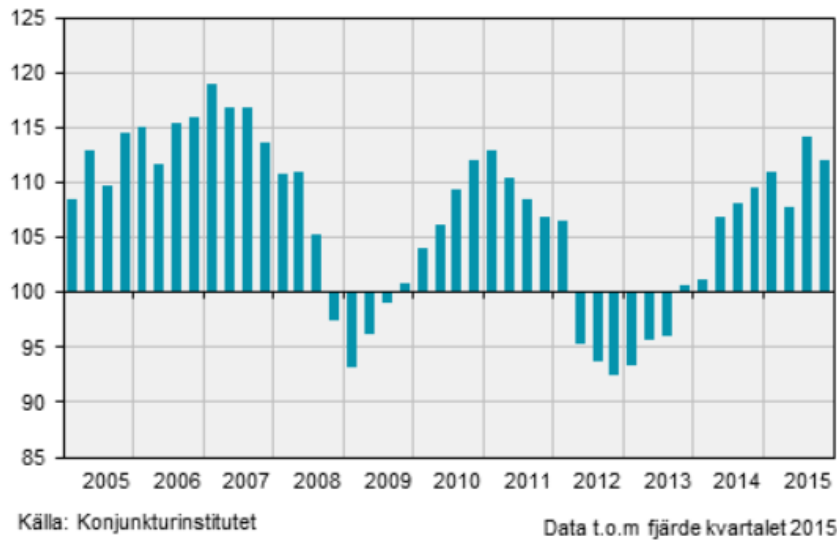
Figure 5.2 Monthly sales performance construction between 2005 and 2015 (CBS 2016)

5.3.3 The Swedish Construction Industry

Table 5.7 Key facts Swedish construction industry (CSB, 2016; Sveriges Byggindustrier 2016)

Key facts	Swedish Construction Industry
Growth Rate	10,70% (2016)
Employees	311.000 (2016)
Banking Crisis	1990s

As reported by the newspaper ‘The Local’ (2015), the Swedish construction industry grew with 9.4 per cent in the period from February 2014 to February 2015. Thereby Sweden has the second largest construction industry in Europe (The Local 2015). The Swedish industry deals with a need of housing in the bigger cities of the country (Ibid). It is common knowledge (in Sweden) that there is a housing crisis in Sweden’s largest three cities. There is a long cue time for finding an apartment etc.



Sveriges officiella statistik

Figure 5.3 Business tendency survey construction between 2005 and 2015 (CSB 2016)

There has been no crisis in the construction industry in Sweden, which is illustrated by figure 5.3 (CSB 2016). The trend is that the industry will increasingly grow. 1.100 billion SEK were earned in 2014. Included are construction, real estate and building materials industry, and architectural firms and engineering consultancies (Sveriges Byggindustrier 2016).

According to Boverket 416.000 new residences are needed in Sweden until 2020, which is based on figures from the CSB (Pettersson 2016). Boverket estimates that under 2016 53.500 new houses will be built, which is unprecedented since 1991 (Pettersson 2016). Given the investment of the government, this number will most likely only increase (Pettersson 2016). At the moment, the goal of the government is to build 250.000 houses until 2020 (Byggnyheter 2015). Boverket has a proposal for social housing, although the Swedish Government voted against social housing (Pettersson 2016).

6 Analysis of the Interviews

6.1 Introduction

Chapter 6 analyses the different interviews on seven performance indicators, which were found most important for project performance. The order of Dutch, Swedish and expert interviewees was consequently kept.

The first five performance indicators (1. time; 2. cost; 3. quality; 4. work satisfaction and 5. work environment) were brought together with reference to the earlier defined Likert scale in figure 6.1, firstly in a grid and secondly in circle diagrams in which the different proportions become clear. On three performance indicators, the interviewee answered with a value between the five scales. The higher value was chosen for the analysis. The different performance indicators are shown in table 6.1 with a brief description based on the literature review. Table 6.2 shows the supportive performance indicators from the HRM function. In large organisations there is a separate function for this and in smaller organisations it is part of the leading function (CEO, director etc.).

The motivations regarding all the performance indicators that were given by the interviewees were analysed and written down. Hereby there are regular references to the interview in form of quotations. Comparisons are made between the different outcomes of the interviewees. Hereby, the three groups are differentiated, even though all answers are brought together. It is not intended to compare the construction industries of the different nations. This would only make sense if more interviewees were involved. Instead it is to strengthen the results by having a more diverse data base on the subject of construction management. Both the literature review and the analysis are the base for the discussion chapter 7 and conclusions in chapter 8.

Almost no effect	Small effect	Medium effect	Large effect	Very large effect
1	2	3	4	5

Figure 6.1 Likert scale

The blue coloured areas in the tables show the performance indicators that are focused on in the rest of this study; they are either tangible or intangible resources or indicators. The main reason is to give the thesis more focus on those indicators, which were generally paid most attention to during the interviews. Moreover, the given answers show that tangible performance indicators are closely linked to human aspects that are intangible. So, for instance a shortage of time results in stress and a lower motivation for the work and work satisfaction of the construction worker. Communication is present everywhere and is really important for the whole process. Leadership is impossible without communication. The work environment should be sufficiently clean; otherwise it becomes an obstacle or even a danger for the work and the work environment, which increases the risk of accidents.

Table 6.1 Performance Indicators for the Middle Manager regarding Production

1. Time	It is key to have a good time planning. When the time of a project is exceeded, it will cost extra money, whereas building in shorter time reduces the money spend.
2. Cost	Cost needs to be tracked and estimated. This factor is dependent on the client's budget and the efficiency of the construction firm.
3. Quality	Quality needs to be according to the norm. Depending on the client's budget, there can be a larger or smaller budget available.
4. Work Satisfaction	Work satisfaction is the positive emotion a particular (work) task sets free.
5. Work Environment	Work environment is the site, including the site office. In the case of prefabrication in a factory, the factory is the construction site.
6. Leadership	The leadership model in this study is by Hughes et al. (2012) and is constituted of the 'leader', 'followers' and the 'situation'.
7. Communication	Communication is the whole interaction between the construction or site manager and in particular the construction workers. Also, communication with the higher management and the HR manager is to some extent included.

Table 6.2 Performance Indicators for the Middle Manager (Support Organisation) regarding Production

8. HR Manager	The HR manager supports the work on site. This is a separate function in larger companies and is otherwise the responsibility of the CEO, director etc.
9. Training	Training is organised by the HR manager, depending on the needs in the firm or changes in the sector, like an updated legislation, safety policy etc. There is both training for the leaders/managers and the non-managers.
10. Knowledge Management	Knowledge management is about managing lessons learned, i.e. sharing them with colleagues and documenting them as well as transferring them to other project groups.

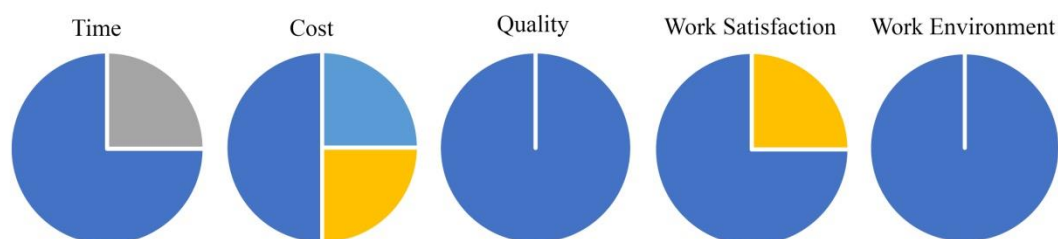
6.2 Analysis of the Performance Indicators

Table 6.3, 6.4 and 6.5 bring up the first five performance indicators as identified by the interviewees. Most of the performance indicators 1-5 have a very large effect (interviewee 2 and 4 stated also a large effect for cost and work satisfaction). Only on cost and work satisfaction there was one interviewee, who valued this as a medium effect and concerning 'time' there was one exception, who mentioned that it has a medium effect (interviewee 2). Interviewee 2 mentioned that the 'cost' does not have an effect on the construction workers' motivation, by arguing that the employment regulations (CAO/ collective labour agreement) have a fixed wage for the employees. Also, the construction tradesmen, are generally paid a lower wage than for instance bus drivers. So, if the payment was highly important to them, they were most likely in another operational profession, where wages are higher.

Table 6.3 Dutch interviewees - performance indicators 1-5

Interviewee	1 Time	2 Cost	3 Quality	4 Work Satisfaction	5 Work Environment
1. CEO & construction manager	5	5	5	5	5
2. Construction manager	3	4	5	5	5
3. Construction & site manager	5	5	5	5	5
4. Construction manager	5	1	5	4	5

Almost no effect 1	Small effect 2	Medium effect 3	Large effect 4	Very large effect 5
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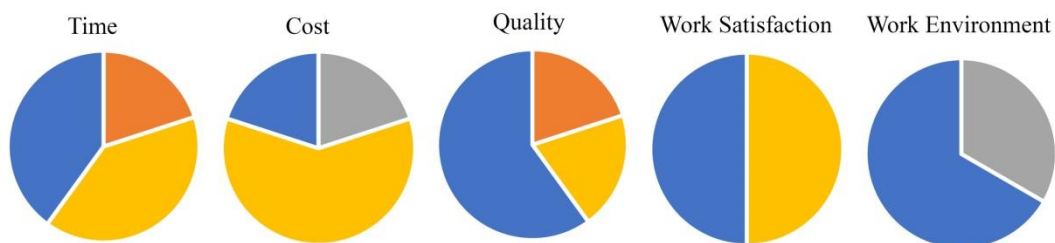
According to the Swedish interviewees, 40 per cent or more were of large effect or very large effect regarding performance indicator 1-5. No answer is below the Likert scale value of small effect. Interviewee 5 mentioned that the first 3 performance indicators depend on the client. Whereas ‘time’ and ‘cost’ got the lowest average grading, work satisfaction was ranked the highest.

Table 6.4 Swedish interviewees - performance indicators 1 - 5

Interviewee	1 Time	2 Cost	3 Quality	4 Work Satisfaction	5 Work Environment
5. Construction manager	*	*	*	4	5
6. Site manager	4	3	5	5	5
7. Site manager	5	5	3	5	3
8. Site manager	3	4	5	5	3
9. Site manager	4	4	5	4	5
10. Construction manager	5	4	4	4	5

* Dependent on the client

Almost no effect 1	Small effect 2	Medium effect 3	Large effect 4	Very large effect 5
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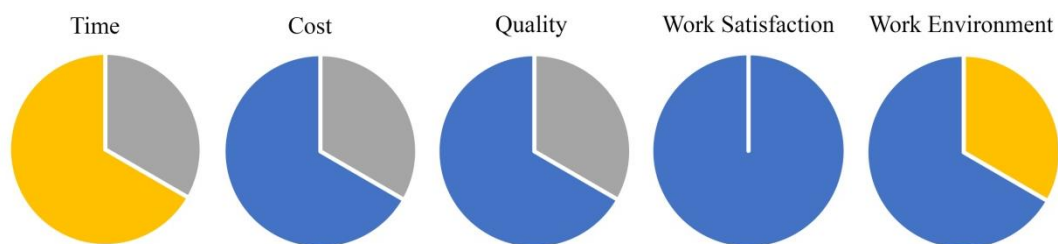


The expert interviewees answered on all performance indicators with a medium, large or a very large effect. Regarding TCQ there was each time another interviewee who valued time, cost or quality with a medium effect. Time got the lowest average value of all the performance indicators, whereas work satisfaction got the highest value with a very large effect only.

Table 6.5 Expert interviewees - performance indicators 1 - 5

Interviewee	1 Time	2 Cost	3 Quality	4 Work Satisfaction	5 Work Environment
11. CEO	4	3	5	5	5
12. Site manager	3	5	5	5	4
13. Project management consultant	4	5	3	5	5

Almost no effect 1	Small effect 2	Medium effect 3	Large effect 4	Very large effect 5
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6.2.1 Time, Cost and Quality

Regarding the performance indicators 1-3, the answer of interviewee 12 (site manager) can be used for a direct comparison with interviewee 1-10. The other experts are from consulting firms, where you have different time, cost and quality (TCQ) standards, which make it more difficult to compare.

The answers given by the expert interviewees are somewhat in between the values given by the Dutch and Swedish interviewees, whereby the Dutch had higher values than the Swedish managers.

6.2.1.1 Time

When construction workers need to make over-hours, this should be communicated early on, so that they can adapt to this, as interviewee 13 pointed out. Generally over-hours should be avoided by making a realistic planning, because they negatively affect the motivation of the workers, which will result in a lower performance. Interviewee 8 mentioned how a lack of 'time' and stress can inhibit the performance:

“Often this is related to time. The construction workers get not enough time. This leads to stress and a lower work quality. Time and stress belong to the biggest problems.”

All managers have regular meetings with their employees (daily to monthly). The meetings are important to keep track of the progression and for reminding the construction worker of what should be done.

6.2.1.2 Cost

To keep the cost planning, the construction workers should preferably do the work immediately right. If there are deviations from the cost planning, adjustments needs to be made.

Interviewee 2 mentioned that the 'cost' does not have an effect on the construction workers motivation, by arguing that the Dutch employment regulations (CAO/ collective labour agreement) has a fixed wage for the different non-managers. For interviewee 9 and 10, the payment does not play a significant role, since they already have a good payment standard. Also, interviewee 6 explained that there exist a minimum wage and that it is a financial incentive. Giving positive feedback is stimulating for the employees on site. It shows that the construction or site manager can be involved in the work of the construction worker and take care about the production. “I divide my co-workers in teams' of two. The faster they work, the more effective they are, the more they get paid. This is an incentive for them to become better. There is a lowest level of paid.” Also giving positive feedback; was said by the same interviewee as essential for his workers' motivation: “Positive feedback, getting everyone involved in the work. Positive feedback means thereby praising the workers, for good work.”

6.2.1.3 Quality

On 'quality' there was a variance from small effect to a very large effect on the performance. All the Dutch managers gave it a very large effect.

Interviewee 1 replied that the quality standards must be strictly followed:

“The sector has changed a lot. Today everything is prepared in an office. This has a lot to do with guaranties and law. Deviations are not accepted any longer,

quality is highly prescribed. The work has become more black and white. The advantage is that you get what you ask for. A disadvantage is that there are many more sole traders that you contract for the construction work. It is a real challenge to coordinate all these parties. We continuously develop, because there are still too many contradictions.”

Interviewee 2 gave a different answer on the autonomy of the construction worker, which is somewhat contradicting with what interviewee 1 said. Interviewee 2 explained the interrelatedness, by saying:

“Quality is a resultant of the performance indicators time, cost and work satisfaction.

1. The workers themselves do the planning in detail. They have their own experience.

2. When you have enough budget, then they have time to do the work and can perform the work.

4. I always have a chat with the workers, I am involved, I give them some attention. This is important for a good atmosphere and it is key for a smooth production (you win roundabout 95 per cent). When you create a good atmosphere on site and celebrate when reaching the goal (order a fish market or have a dinner). This has a strong effect on the whole process and increases the performance of the workers. As soon as other workers come on site, they experience this and will have to share particular standards, like a clean work surrounding.”

It is understandable that alcohol is not tolerated on site, because it will harm the quality of the work. Interviewee 10 alluded to the fact that a bad atmosphere can be caused, which obviously effects performance:

“We are in groups. It is not good to be together all the time. You can get rumours and back bite or talk shit. This is a big problem. If I feel this coming, I take the personal directly to address the issue; so it doesn’t grow.”

Interviewee 5 answered that TCQ are dependent on what the client wants. The variables can be differently ranked. Interviewee 8 pointed out that the quality of the work is not directly related to the size of the firm.

The quality on the work floor is closely linked to motivation and work satisfaction. Interviewee 7 answered on the triple constraint:

“The construction workers already do the job according to the norm/planning. We use the ‘Ackord’ (TP: a time measurement system) to see if we are good in time and where we can become more effective. There are also many limitations. When the client comes with a new assignment, for instance, you need to negotiate for more time. (Small effect – medium effect). The sub-contractors have their own time-planning. When they don’t follow the contractual time, they have to pay a fee. Cost: we control this. It is a directing parameter (large effect – very large effect). I think our workers or carpenters are really skill-full and we have a very high quality. They may not perform the work most effective. (Very large effect)”

Both interviewee 11 and 12 positioned this performance indicator as a very large effect, whereas interviewee 13 gave it a medium effect. It is difficult to compare and discuss

the consulting firms with construction firms. It does not surprise that the interviewee 12 mentioned that quality has a very large effect, since the tradesman in Germany have high quality standards. Finally, different sub-contractors have different standards as interviewee 8 explained. He mentioned that Skanska, Peab and NCC are the best companies to have as sub-contractors from a work quality level point of view. It cannot be assured though, that this is always the case.

6.2.2 Leadership

How leaders motivate the crew is different from their position. It was found that interesting projects or tasks play an important role (interviewees 2, 4 and 7). The first interviewees mentioned that intrinsic motivation is key. The second interviewees mentioned that everyone should be treated equally, which supports motivation. The same interviewee found it important for the manager to live according to your value system. Also, when the construction workers know ‘why’ they do the work, their motivation is supported. The fourth interviewee emphasized that it is important to celebrate successes. Interviewee 4 and 5 mentioned that giving positive feedback increases motivation. Interviewee 5 further alluded that motivation and the execution of the work is directly related to profit and positive feedback. Also, positive feedback, confidence and having particular expectations was said to raise the motivation (interviewee 5). Interviewee 5 stressed the importance of having an expectation of the construction workers:

“The most important aspect I think is knowledge of teaching the workers of what is expected of them. I think it through education. I think, as long as you know what is expected of you and then you need to reach this. The same counts for me in relation to the client. You have to know as a designer or producer what the client expects.”

Similarly, interviewee 9 alluded that the boss needs to be honest as a boss and have clear expectations of the construction workers.

Interviewee 5 and 6 mentioned that involvement in the planning is good for the workers’ motivation. Inspiring and motivating construction workers’ results in “a higher time-efficiency, autonomy and confidence are improved.” (Interviewee 8) Interview 9 stated that an open discussion results in motivation and performance. Finally, interviewee 10 mentioned that for a higher performance, the right management and information are required.

The interviewees had in common that leadership is about mobilising a work-force for a particular goal and communicating that goal. Also, it is about facilitating and controlling the work. Hereby, everyone should be respected equally. Everybody should support each other, when executing the work, as interviewee 9 said. Moreover, interviewee 10 mentioned that the leader should trust the work of the construction workers and support this with the right planning etc. Coaching was mentioned by interviewee 2 as part of the leadership. Interviewee 5 mentioned that leadership is about directing the construction work, communicating vision and mission. Interviewee 7 added that leaders are the integrating link between the design (phase) and the execution (phase).

It was acknowledged by more managers that it is important to treat the different employees equally, irrespective of their function. According to interview 7, some site

managers prefer to lead more top-down than others. He reflected on the leader's role by saying: "The leader's role is very important. She/he needs to respect the employees equally, no matter what function (we have a flat structure). This way you can easier influence the construction workers."

Regarding leadership interviewee 11 mentioned that the interviewees found that there is a relationship between leadership and performance and good leadership is needed. Moreover, he mentioned that: "I take care that the section leaders work well. We do not have a top-down leadership here." Leadership is about the coordination of the trades according to the site managing architect (interviewee 12), who answered: "Sustaining a good relationship with the sub-contractors is key. Even with tensions, it is important to keep a good atmosphere on site. Conflict solving is not about who was right or wrong." Finally, the consultant (interviewee 13) mentioned that the managers should have a guiding or facilitating role.

Furthermore, interviewee 10 mentioned the fact that some people do not work well within the team. They have to be replaced to not inhibit the performance: "If there are problems (personal problems for instance), it is most important to address it directly. Sometimes a person, who is not working right in the team stays in the company. That is not good."

Interviewee 3 summarised which human factors affect the higher performance: "Less openness, low respect, very top-down and better coaching leadership. There can be a lack of autonomy, which could have implications for the result. Too much specialisation may lead to a lower performance." Additionally, he mentioned that the cost argument lost its relevance: "In former time, there was the incentive of the salary for the workers. Important is that the workers feel that they have an effect for the final product, so sense-making."

Interviewee 4 mentioned a human challenge, which should be dealt with to raise the performance:

"Take care that the construction workers are not causing conflicts/barriers, like for instance locking the elevator. Different executing directors respond differently to this. His/her main focus is that the group works as a team that works for the same goal. If it doesn't work, she or he knows what to do in order to motivate the workers. There is no particular formula to get it right: it is about knowledge, trust and improvement."

The conflicting situations as described in the quote needs to be addressed by the managers, the earlier the better. To lock the elevator, so that other workers cannot do the work, is definitely a hindrance. It is a barrier for the performance. When a worker does not fit in the team and causes deliberate barriers, the person should be replaced, when this contra productive behaviour sustains. The quotation sheds also light on the fact that leadership is context dependent and that no recipe can be given.

Moreover, interviewee 8 mentioned how the manager should conduct, in case of conflicting situations related to the rules on site:

"There were not many conflicts on my construction sites. Nothing bad happened. When there was a conflict, it happened two times. One time it had to do with alcohol, with a construction worker who had an alcohol problem. The 'Arbetsmiljöplan' (TP: "the environmental plan") has no tolerance for alcohol on site."

No exception can be made with alcohol, because once you allow it, it will happen more

often and the rule is not a rule any more.

Finally, interviewee 7 mentioned that “Friday meetings are good for team building and reflecting on the work as well as setting the goals for the week to come.” Interviewee 9 and 10 had different answers, even though they are from the same company. It seems to be related to the project, the leadership style etc. Interviewee 9 mentioned that it is sometimes needed to direct the workers, when they do not want to participate in the weekly meetings.

6.3 Organisational Support

6.3.1 Human Resource Management

Human resource management (HRM) was found to be different between the interviewees, i.e. the different company sizes. The medium and extra-large companies usually have a HRM department, whereas in the smaller companies the HRM is done by the director(s). Interviewee 1 mentioned that the company could improve, when hiring more employees with a different background. Interviewee 2 and 10 acknowledged that construction work is a male dominated profession and that diversity influences the performance. The same interviewee added that there will be a lack of construction workers in the near future. Sole trader specialists (in Dutch: Zzp-er or zelfstandige zonder personeel) are rather common in the Dutch construction industry. They are hired on a project basis. It would be an improvement to share the freelancers with a group of companies, so that they are more bound to the company, as interviewee 4 explained. Interviewee 6 mentioned that the HR manager is not cooperating much with the site manager, which lowers the performance. Also, more motivated employees are needed. As interviewee 7 explained, the effectiveness is to some extent related to the quality level of the own sub-contractor and the construction workers of your own company. In the firm of interviewee 7, the HR manager has too much work to do. Given the size of company of interviewee 9 and 10, there are HR departments connected to the different regions in Sweden, where the company is active in. The HR manager has a supportive function regarding the employees who work on site, as interviewee 9 explained. New employees are carefully chosen and the construction or site manager is supposed to give the HR manager feedback on how well the new employees work. Interviewee 10 emphasised that cooperation with the HR manager is important. He acknowledged that still nowadays; the site is dominated by men. In addition, it was said that it would be better to have a higher diversity (sex, age, nationality etc.), because it is related to different competencies.

Interviewee 9 answered therefore how important the relationship with the HR manager is to get the right, competent people:

“When we are employing new workers, the site-manager is involved in their testing period. [...] When they work only with a good performance during the test phase and you give them a fixed contract, then you cannot fire them. This is where we help the HRM!”

Interviewee 10 stressed how important a good relationship with the HR manager is: “I use my experience and knowledge to help my staff here. That is my work. I must have time for the HRM, to help them in small questions. The better I can help on the day, the better I get information. It is important to invest in the relation.”

Interviewee 7 described that when the HR manager, or construction worker has a too high work load (and have to make over hours), this may lead to a lower work performance.

Attracting skilled construction workers and managers seems to be a challenge. The Dutch construction and site managers noticed that there is a problem of hiring skilled workers. Interviewee 8 noticed that there is a lack of experienced managers and workers in the age group of 35 to 65 years old in Sweden. This is the result of job changes triggered by the construction crisis in the 1990s. “The experienced people of my age, who will retire in a few years, mean a considerable loss of experience, which is already a problem.” (Interviewee 8)

This HRM challenge as a lack of skilled workers on site or construction managers was also alluded to by interviewee 1, this time from a Dutch perspective:

“Lack of skills, lowered standard of the profession. Limited amount of construction workers is still fact after the crisis. The trade has lost its attractiveness for many, meaning that it is difficult to find enough skilled construction workers in the near future. There is a competition with construction workers from other countries, because they have more competitive prices. The construction sector is represented by many different cultures. Often many workers don't speak Dutch. There is always one ‘group leader’ [...] explains it to the rest.”

In the aftermath of the global economic crisis, the lack of skilled workers is clearly described. The effects of this crisis on the Dutch construction industry are certainly not less than the effect of the banking crisis on the construction industry in Sweden. However the present Swedish industry has more than three times as many employees as the Dutch construction industry and therefore many more experienced middle managers are needed. The problem seems to get even bigger, since very large projects are to be executed like for instance the West Link project in Gothenburg. These projects directly compete on the human resources: “with our and other projects of the company”, as interviewee 10 explained. This is in line with what interviewee 8 said regarding the competitiveness between firms for their human resources in the Gothenburg area. This lack of experienced workforce could be solved by hiring staff from abroad, which already happens by companies like Skanska.

Expert interviewee 11 mentioned that most of the employees come from Chalmers University or other universities. In the application process the grades play a large role, as well as the ability to work in a team. Also, potential growth is looked at. The recruitment process has the goal to recruit employees, who can stay at the firm for a longer time. Informal visits of friends, who would like to work at the company, are promoted. The site manager/interviewee 12 answered that the chief architects or directors are in charge of the recruitment. Apart from education, the personal traits play a role. A general disadvantage is the location of the firm, which is in a small village. They are also responsible for contracting particular workers from sub-contracting firms. At the consulting company, the head of each department is in charge of the HRM. A HR manager or HRM department is promoted by the consultant, because when you hire someone, it is difficult to fire the worker in case the worker is not as good as presumed. Furthermore, the managers have an essential role to play in the performance of the work. It is acknowledged that most construction workers are men and that the performance

would increase, if the diversity of the labour force increases.

6.3.2 Training

Training on the job is something very common. Internal and external courses can be done. Education is said to be an important part and takes place regularly. Interviewee 3 mentioned that it is very unlikely that you stay within the same job; more common are various job changes until retirement. For instance, at the company of interviewee 4, external courses from “Bouwend Nederland” are supported (the equivalent of “Sveriges Bygginndustrier”). Especially this company stimulates horizontal growth, so that employees become better in their actual position. Possibilities for training and promotion are related to size. When more employees would work for the company – which is expected – then we will have a HR manager. Interviewee 6 mentioned that employees are free to choose courses and project wise promotion is stimulated. Interviewee 7 mentioned that there should be enough experience, to avoid mistakes. He added that the HR manager is in charge of furthering promotion and training. At the company of interviewee 9 and 10 there is a school for site-managers and promotion is possible. Interviewee 10 mentioned that vertical growth depends on the interest and capabilities of the employee.

Training and promotion is found to be important by the experts. It is taken very serious in the engineering company and the CEO/interviewee 11 speaks about this with his employees. Training or courses are done on the latest development regarding building technology and legislation. Moreover, they pay for study trips. Internally, the more experienced workers help the less experienced workers, as interviewee 11 pointed out. Within the architects firm, two further education courses from the Chamber of Architects of Lower Saxony are obligatory and supported. Also, their employees go to presentations or gatherings on the latest developments.

The consultant/interviewee 13 shares the opinion that training and promotion are nurtured at his firm. Every month there are courses on offer. They also read literature together during certain meetings. In terms of human factors, the CEO/interviewee 11 mentioned that it is important that the person fits well within the company, also socially. Then it is important that they want to achieve a high competence level (fast and precise) and want to become better. Engagement is also very important.

6.3.3 Knowledge Management

Knowledge transfer could be improved according to some interviewees and often does not take place. Interviewee 7 alluded that knowledge transfer or management is a general weakness in the Swedish construction sector. Sharing of knowledge often takes place informally. Interviewee 2 mentioned that the weekly meetings are used for knowledge sharing. When using the white board documentation is made (Interviewee 2). Interviewee 3 mentioned that knowledge development and documentation are very important within the company. Interviewee 4 mentioned that knowledge sharing takes place during the day-start meetings. Furthermore, interviewee 4 mentioned that problem solving should preferably be done by the construction workers themselves, whereas interviewee 2 stressed that problem solving should be done within the group, in order to get the best solution. Interviewees 5, 6 and 7 mentioned that no formal structure exist for knowledge sharing. Interviewee 6 added that there is a database at

the company, but no one wants to use it, because they are not motivated to do so. In contrast, interviewee 8 mentioned that knowledge transfer takes place at the company between project groups, but no documentation is made. It was said by both interviewee 9 and 10 that the company should better learn to transfer knowledge. At the moment, there is more or less only a focus on the own, current project and no knowledge is transferred to the next project. However, interviewee 10 mentioned that knowledge exchange with other project groups occurs.

Documentation is sometimes made of what has been discussed. However, interviewee 6 mentioned that his construction workers are not motivated to use the documentation. Consequently, the documentation is not contributing to learning at a later stage for a new project and therefore it is a loss of resources. Interviewee 8 mentioned that the result is similar to his company, in which no documentation is made at all. Both site managers 9 and 10 expressed that they wish to become better on knowledge management, as transferring knowledge from one project to another project. Whereas in the company of interviewee 9, no knowledge transfer takes place at all, interviewee 10 mentioned that they are already active in terms of sharing knowledge with other project groups.

It was said by the 'expert interviewees' that knowledge transfer takes place. In the engineering and consulting firms, the most advanced and experienced help the less experienced. Furthermore, the consultant/interviewee 13 alluded that the company is open for people who bring the company new perspectives, like for instance master thesis students. Finally, site manager/interviewee 12 said that knowledge sharing takes place and that they have a discussion on developments, like norm changes, new materials etc.

7 Discussion

Based on the analysis it was first possible to see what is most important and most interesting to be discussed. In the 'Discussion', the data from the interview study are discussed with content from the literature review. In the 'Conclusion', the deductive approach of the research finds its open end with the answers on the research questions and possibilities for future research.

The TCE by Williamson (2010) is about production and transaction costs. Companies have transaction costs, when transferring a good or a service in the free market. The RBT by Peteraf and Barney (2003) is about resources and explains how their efficiency relates to performance and business success. This theory is based on the TCE by Williamson (2010), which includes that people have limited knowledge (bounded rationality) and there is a possibility for opportunism and lastly the asset specificity of the product or service. The RBT by the author's shows that a sustained competitive advantage exists, founded on the resources and the capabilities of the firm. The more efficient the resources, the more economical they are, which leads to a higher customer satisfaction. Efficiency is not only seen in relation to cost, rather it is seen in terms of value or net benefits (Peteraf and Barney 2003). The ultimate goal is to get better than your competitors. The inside-out perspective of the RBT means that a focus is on the company's own tangible and intangible resources. Both types are needed. Regarding the human aspects, the emphasis is on relational resources and competences (intangible resources), as was defined by Wit and Meyer (2014).

The managers interviewed use their planning to measure the performance or to check if the project progresses; i.e. to check how much time has been used to generate a particular value (for a certain budget). No interviewee mentioned that the company has some time measurements for particular tasks. The planning can be done with the help of the tradesman. They know how much time is needed to do a particular production task. The manager, who is the final responsible, has some norms from literature and based on experience he/she can control and estimate the time needed for particular tasks.

The study shows that more performance indicators need to be taken into account, when reflecting on performance in production. Hereby, communication has been found to be critical. The interview study affirms the statement by Harris and McCaffer (2001) that there are direct lines of communication between the middle manager and the non-managers in the construction industry. Also, depending on the project size, different ways of communication exists. The leader/manager should not be bossy in his or her communication. On the construction site it is preferred to have no hierarchy, which increases possibilities of communication.

Before the performance indicators. **Time, cost and quality** (TCQ) are tangible resources according to Wit and Meyer (2014). For a project to be successful, there needs to be a good planning and cost control and the middle manager is the final responsible for this. The same counts for quality: it needs to be checked against the norms. These hard factors are defined for a project, as described by the interviewees as being very important. The time frame is set, and on this basis a planning is made. The client has a particular budget, which is related to the quality he/she is willing to spend. When more time is available, a higher quality can be realised for a higher costs. It is not unusual that changes come (from the client or other stakeholder).

The interviewees confirmed what was found in literature, namely that TCQ are described as interconnected and key to project management success. When a project takes more time and is of higher quality, then the cost will be higher too. It becomes clear that this tangible resource is directly linked to intangible factors related to people, like motivation, work satisfaction etc.

Time is directly related to money and quality. Cleland (2004) argued that time, cost and technical performance needs to be checked by a control system. From the interviewees it was found that the workers sometimes need to be pushed a bit by the manager to work quicker. This incentive is even stronger than just controlling, as was mentioned by Cleland (2004) and Clough et al. (2008). After all, longer work means more costs for the client. However, as was expressed by some interviewees, stressful construction workers are less productive, so a good level of pushing to work quicker is needed. Furthermore, it was said that the construction workers can become faster when working parallel and having a better understanding of the other tradesman's work, so they don't hamper them and might be able to support each other; synergies will positively influence the performance. Also, it was mentioned that the middle manager can execute the work more efficiently, when he/she can concentrate on his/her core tasks. Having the right planning software can support throughout the making of the planning. It was seen from the data that client and designer have particular expectations of the building and so should the manager have certain expectations or goals of the construction workers. This helps to do the work right the first time and thus reduces resources and it raises the performance. It becomes clear that this tangible resource is directly linked to intangible factors related to people like motivation, work satisfaction etc.

Every construction project has a certain budget or **cost** and the costs needs to be controlled during the execution phase. Regarding the cost factor, the interviewees answered, that either there is no effect, a medium effect, a large effect or a very large effect. It is very important that the production is within budget. The literature review and the interview study supports each other on this issue.

The interviewees expressed that the manager is essential for maintaining the quality standards. This is in accordance with what Laszlo (1999) described as **quality** assurance, which includes people and activities. The construction worker is supposed to follow the prescriptions. The autonomy of the construction worker is bound with the function of the job.

Bannerman (2008) mentioned that there should be a continuous project improvement. Unfortunately many construction workers work more and more like mechanics, since many building parts are prefabricated, which was found in the interview study. It does, however, not exclude mistakes. When the quality deviates from what has been asked for by the client, this will lower the payment or the work that needs to be redone, with the possibility that the time exceeds. In the literature review it was stressed that the waste should be reduced as much as possible (Bond 1999). Herewith, the quality of the final product will be higher. Quality of the outcome is a tangible measure, but the quality of the work process is intangible. For instance, the reputation of the workers and the relationships (relational resources) and knowledge, capabilities and attitude (competencies) are all intangible.

Leadership is described by Hughes et al. (2012) as a process, constituted of the 'situation', 'followers' and the 'leader'. On leadership, all interviewees answered that their leader or manager position is of significant importance. Herewith they underscore their own role in the leadership process. In the end, what all interviewees share is that leadership is needed for production, and all factors, that constitute the process are needed. Leadership has been generally said to be about bringing employees together for the same goal, which is in line with the literature on leadership (Bolden 2011; Hughes et al. 2012; Winch 2010). The leader is the final responsible and needs to be sure that the rules on site are followed. These rules are partly prescribed by governmental agencies and partly by the company itself.

The site manager needs to have skills in order to do the specific project management work, like for instance particular computer programme skills. Those employees who get promoted from construction worker to a management position, need to have some management skills. A site manager school (internally or externally) could be a solution for building up competencies. The questions regarding competence seem to be relevant here, since it really depends what background the middle manager has. When the management has fewer capabilities, it will result in a lower efficiency and a lower competitiveness according to the RBT by Peteraf and Barney (2003).

Those site or construction managers, who involve the construction workers in the planning, have a better understanding of the whole process and not only their task in production. This leads to less mistakes on site and a higher efficiency, when the followers help the leader in the planning. In turn, the site or construction manager will have more time to spend on other management activities instead.

The organisational support factors have a specific relevance for the actual project and more generally for the development of the firm. It is mostly about the relational competences which are intangible resources, as Wit and Meyer (2014) defined this. Again, it is about strengthening the resource base of the company to become more efficient as an organisation.

In the literature it was found that **HRM** is needed in companies, because it decides who will work for the company, organises training, decides about promotion etc. Clough et al. (2008) stated that the project manager should check who is needed for a project and therefore cooperation with the HR manager is key. Several interviewees affirmed this by saying that they are also involved in the mobilisation of the workforce and giving feedback to the HR manager.

Diversity of the construction workers is important, because of the different capabilities. This was acknowledged by some interviewees. In fact, the answers given by the interviewees show the different resource bases of the firm. Some companies do not have enough skilled or motivated people, others have a lack of the HR manager or the HR manager is not as involved as needed, or the HR manager has a too high work load, so that parts of the job cannot be done. If the workload is too high, it could make sense to hire an extra HR manager. It could also be a help to split the tasks of the HR manager into two functions or have a flexible HR manager, who can help when there is a higher work load.

Small companies hire relatively less new employees. It is most economical to hire by those who are in strategic position and are responsible for how the company should

develop and hire new employees. However, interviewees from the larger companies mentioned that the relationship with the HR manager is essential for leading the right competent employees. The construction or site manager should really try to see if the construction worker is motivated (preferably intrinsic), who has the right competencies for the job and who work well within the team (if needed).

Generally it was found that a higher diversity on site, different gender, age, backgrounds etc., improves the production. This is confirming the RBT, according to which valuable resources give the company a competitive advantage (Peteraf and Barney 2003). Mostly, the HR manager is responsible for this. The feedback of the construction or site managers may however be needed, because Clough et al. (2008) describe that he/she is the closest to the non-managers and knows if there is a need for extra construction workers. So, the middle manager has a key role to play in the HRM.

When the construction worker likes to stay at the company for a longer time, a trustful relationship can be built (relational resource). Similarly, the construction or site manager should give feedback to the CEO or higher management on how well the construction worker of the sub-contractor or sole trader does the job. A competent sole trader or sub-contractor is needed, who works smoothly together with the other tradesmen on site, without causing conflicts, keeping the site clean and respecting the rules applicable (environmental plan).

Diversity of construction workers (diverse nationalities, cultural background, age, sex etc.) adds to the capabilities and competitiveness of the firm, which leads to a higher performance (Peteraf and Barney 2003). When the HR manager makes sure that different experienced professionals are hired, it can have a positive effect on the performance. However, diversity may also become a hindrance for the work. For instance a language barrier can be a problem. This can easily be overcome with a group leader, who gives a translation to his construction workers.

From the interviewee study it was found that possibilities for growth (promotion) within the company are related to motivation and job satisfaction. **Training** is needed to keep up with the demands and developments of the profession. Training seems to be a fundamental part of the companies, to keep up with developments in the market and keep on building up skills. It was recognised that this is needed. Some training may be obligatory and some training may be free to choose. Training can be on learning new standards, on new technology, new legislation etc. Training can be done within the company or outside at an institute. Project based learning is learning from executing a project. This can include that the experienced and most skilled employees help the less experienced employees.

Continuous learning has been found to be a trait of maturity (Bushuyez et al. 2014). It needs to be mentioned that those firms, which do not have the degree of maturity, should start to work on continuous learning to become better. Bennet (2003) mentioned that training for forepersons and supervisors is often lacking. More generally, Bushuyez et al. (2014) mentioned that project based learning is for most companies not successful. From the interview study it became clear that some companies have continuous learning and others don't. It would be beneficial to have training possibilities, within the company or elsewhere. Even though capabilities are acquired during the execution, it is not sufficient. Often the work on site is hectic and the right climate for training and

reflection does not exist. It was noticed that during the education of the non-managers, it should already be made clear, what the benefit of knowledge management has for themselves, as well as for the overall result.

Since the project team is the true asset of the company (Cleland 2004), there is a need to build up a strong team. The analysis further revealed that having the right competencies is essential.

Similarly to training, it was found that knowledge management needs to be organised, meaning that a system for documentation and knowledge transfer should be in place. Often, documentation and knowledge transfer are lacking in the companies, which were analysed.

Bosch-Sijtsema and Postma (2009) mentioned that 'knowledge' is the first strategic factor in companies. However, in many companies, the **management of knowledge** is not paid enough attention to. The middle management should motivate this by allocating the right resources for this (time, documentation system etc.). In the end, like with training, it will lead to a higher performance. It reduces the repetition of mistakes and increases work 'efficiency' by adopting better methods.

Knowledge transfer occurs in the companies of the expert interviewees. Hereby, it was said to be common that the most experienced help the less experienced. This happens more often informally, which was also confirmed by some other interviewees. It can take place during regular meetings, sub-meetings or during the work.

Time, cost, quality, leadership, human resource management, training and knowledge management are found most important for the performance of middle management on site. The performance indicators time, cost and quality are the tangible resources and the rest are intangible resources. Atkinson (1999) and Cleland (2004) described that it is not enough to only take time, cost and quality into account. This led to the identification of several other factors of which leadership as a process (Hughes et al. 2012) is found to be crucial to the execution of a project. The relationship between the leader and the follower is an example of a relational resource. Good relationships within the project group are key for a good work atmosphere and increase the performance in production. If the middle manager has a good reputation, this has a positive influence on the project. It may be the result of successful finished projects. Competences (knowledge, capabilities and attitude) of both the middle manager and the construction workers are critical for the performance on site. All resources of a company combined, result in a certain performance. The RBT showed that the more efficient the resources are, the higher the performance output is, which contributes to the company's profitability (Peteraf and Barney 2003). To increase the competitive advantage, the company has the organisational support factors to hire new employees and extend the resource base for both the actual and future projects. Training and knowledge management for middle managers and non-managers, finally has the aim to become better and has therefore a more long term impact. These support factors are finally needed to secure the company's development in the competitive construction sector.

8 Conclusion

The research questions of this master thesis are about performance indicators regarding the execution of construction projects. Research question (RQ) 1 - the main question – is broad and is supported by two sub-questions RQ2 and RQ3 for a more nuanced answer. RQ3 reduces the number of performance indicators to get the discussion more focussed.

“What are the main indicators that are important for performance of the workers on site?” (RQ1)

“How can the performance indicators improve the construction workers’ performance during a construction project?” (RQ2)

“Which performance indicators are most important from RQ2?” (RQ3)

The sub-questions about improvement of performance led to the identification of some areas that can be improved and to which more attention should be paid to, in order to get a higher performance. These elements can be used by construction firms to see whether or not the performance indicators are relevant to their context and projects. As the above discussion shows, the different performance indicators are highly interlinked. Companies that take the resource base serious throughout the process, will have the highest competitiveness.

The framework of the study is given with the TCE and the RBT. The resource based view led to the identification of several performance indicators from the literature. The interviewees, who are or have a background as construction or site manager, were asked these questions. Expert interviewees were done to collect additional perspectives from a CEO, a site manager from Germany and a consultant in construction management.

The TCE is, in short, about the costs of transferring a good or service on the free market. Transactions are influenced by the frequency, asset specificity and uncertainty. The RBT is about the resources and capabilities that a firm has and how these can contribute to a higher competitiveness. The higher the efficiency of the resources, the higher the performance is. Efficiency is not only seen in relation to cost, it is seen in terms of value or net benefits (Peteraf and Barney 2003). A firm is competitive when it either produces the same value for a lower cost or a higher value for the same cost (ibid).

In accordance with the narrower focus of the analysis and discussion, the conclusion relates to the performance indicators time, cost, quality, leadership, human resource management, training and knowledge management.

Based on the discussion, several conclusions can be drawn and the main and sub questions are answered. Ten main indicators were found in this study, which relate to performance in production. To answer RQ3, seven indicators were found to be most important, which are brought up as part of the conclusion.

Planning is key to keep track of **time**. Over hours should be avoided or announced as early as possible. Through a good planning, stress is reduced. Synergies can exist, when working together on site. It can be helpful to involve the non-managers in the planning process. **Cost** needs to be controlled during the progression of the project. The payment should be good, because payment is still a motivator to do the work, even though the

minimum amount is fixed by regulation (in both countries). **Quality** norms and regulations need to be followed. Quality standards of the construction work are important. Time, cost and quality are tangible performance indicators and are interlinked.

It can be concluded that **leadership** is found necessary in order to have a good performance on site. Setting the main goal and realistic sub-goals and controlling the process are tasks of the leader or manager. A leader should be involved in the work of the followers and control the situation. Leadership has both tangible and intangible aspects.

Some companies seem to underestimate the value of **HRM** and the HR manager does not cooperate enough with the construction or site manager. Diversification is a goal, which needs to be taken serious. This is very much needed, since the construction industry is still male dominated and thereby lacking certain female competencies. The experienced workers have mostly tacit knowledge. When they retire, it will result in a big loss of competencies. The HR manager should also support training and knowledge management.

Training is often organised by companies themselves. It can be programmatic or free to choose, and takes place either within or outside the company. It is essential to keep up with the developments in the market (technology, legislation etc.). Reflection and feedback are important for continuous learning, both for the managers and non-managers.

Knowledge management is very important for the firm and yet it is not taken serious (enough) by several companies. A documentation system is needed to sustain the positive effects of knowledge management.

Finally, human capital is crucial for the companies in their current state and for future development. Improving weaknesses in management, enhancing team culture, and offering education, will lead to a higher work performance. All in all, companies that want to continuously develop and improve, need to acknowledge that all performance indicators are important; especially, those which could be improved. Companies that take their resource base serious throughout the company and processes, will have a higher competitiveness.

The interviewees of this study were interested in the other way of working and learn from the other (Dutch or Swedish) managers. Therefore it can be concluded that they were not at all convinced that there is 'no other way of working', as a challenging assumption which was mentioned by Dainty et al. (2007) in the introduction.

8.1 Suggestions for further research

8.1.1 Main Suggestion

Based upon the discussion and the conclusion, a short guideline on the performance indicators (of RQ3) was written to share with construction and site managers. As the ‘Thesis Scheme’ on page 58 shows, this study can be repeated with a group of interviewees, who have applied the guidelines in their work. Consequently, the interviewees and the researcher can reflect on the work and possible improvements. Progress is expected to take place, founded on implementing these guidelines. It is expected, because the author of this thesis has identified different areas, which are in need of improvement; often explicitly mentioned by the interviewees. Already by seeing what others regard as important in their work, can be a real help, especially when this is a starting point for questioning the own habits and trying to work in a different way.

8.1.2 Further Suggestions

Interviews with women construction and site managers could be done in a future research to extend the scope and find out if they mention similar issues, as were brought up by their male counterparts. The difficulty could be to find women with more than ten years of work experience in the field, which several interviewees of this study have.

The research group for the interview study has thirteen interviewees, meaning that it is rather limited. A future study could involve many more participants from one or more countries.

It would also be interesting to find out how the performance indicators of this study apply for infrastructural projects or a very particular building type. This study is limited on buildings in general and higher context specificity could lead to different results.

9 Appendix

9.1 Guidelines for construction and site managers

Table 9.1 *The Classical Performance Indicators TCQ*

<p>Time is a scarce resource and a realistic planning is needed. The construction workers should be encouraged to do the planning themselves. Changes occur usually, because some factors are variable. In case over hours are needed, the middle manager should inform the non-managers as soon as possible. It needs to be considered if extra workforce can be attracted and the workload spread out and over hours avoided.</p>
<p>Cost is another scarce resource. During the execution process, the construction or site manager can be in charge of controlling the cost. The cost is dependent on the hours worked on site. Costs are saved when the work goes smoothly, right the first time and waste is reduced.</p>
<p>Quality should be at least according to the norm. If the client wants a higher quality, it needs to be assured that the tradesman are able to deliver this extra quality.</p>

Table 9.2 *Leadership as a Performance Indicator*

<p>Leadership. The leader should be involved with his or her workers, by giving them personal feedback and sometimes having a personal chat with them, also non work related. Bossy behaviour should be avoided. The leader should set the rules or the framework for the tasks to be executed. It is an advantage if they know how to coach. If higher management visits the construction site, they should not avoid the construction workers. Just saying 'hi' is already enough. When they don't do this, a bad atmosphere is created on site and will diminish the work performance.</p>
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Table 9.3 *Organisational Support as a Performance Indicator*

<p>HRM is directly responsible for hiring of new employees and therefore this function is of utmost importance for supporting the work on site with the right competences. New workers should not only be selected on performance, but also personal characteristics and demographics play a certain role. It is advised that the construction or site manager works closely together with the HR-manager and that feedback is given on how construction workers perform in their test phase, need for training, possibilities for promotion etc.</p>
<p>Training. It is advisable to have some course(s) for both the manager and the non-manager, to keep up with the developments in the field. These courses can be done within or outside the company. Reflection and feedback are important for continuous learning, both for managers and non-managers.</p>
<p>Knowledge Management. This is needed for improving the work executed and should therefore be a standard part in the organisation. It improves the performance by avoiding repetition of mistakes.</p>

9.2 Interview Guide - Dutch

1. Wat is uw functie/rol in het bedrijf waarvoor u werkt?

2. Hoeveel werkervaring heeft u binnen deze functie?

Prestatie kan worden beschreven als de totale standaard tijd gemeten en geschatte werk, gedeeld door de beschikbare tijd voor het werk (Harris and McCaffer 2001).

3. Wat zijn de grootste uitdagingen als het gaat om project management met betrekking tot een goede prestatie?

4. Wat zijn de hoofdelementen (indicatoren) die belangrijk zijn voor een verbeterde prestatie van de werkers op de bouwplaats? (dus zowel de uitdagingen als ook wat ze waarnemen wat goed gaat)

Tijd (work-measurement), kosten en kwaliteit zijn de klassieke prestatie indicatoren.

Positioneer deze aub. op de volgende Likert scala:

Bijna geen effect	Klein effect	Medium effect	Groot effect	Zeer groot effect
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5. Zet u prestatie management in om het werk te verbeteren? Zo 'ja': welke soort prestatie metingen gebruikt u om de effectiviteit van de bouwvakker te beoordelen?

6. Wat zijn de groeimogelijkheden binnen uw organisatie, zoals promotie en scholing?

7. Heeft u ook procedures of een praktijk om de geleerde lessen ('lessons-learned') te delen, zodat ze voor een toekomstig of ander project ingezet kunnen worden?

8. Hoe bevordert het personeelsmanagement de prestatie op de bouwplek?

9. Hoe is de communicatie met de bouwvakkers/ medewerkers, tussen de medewerkers en tussen het bouwteam en de bouwmanager? Heeft u bijvoorbeeld regelmatig bijeenkomsten?

10. Hoe motiveert u uw bouwteam op de bouwplek? Kunt u enkele voorbeelden geven?

11. Welke verhouding ziet u tussen de motivatie van bouwvakkers en de geleverde prestatie?

12. Welke menselijke factoren zijn het meest belangrijk voor het team, zoals openheid, vertrouwen, autonomie en engagement?

13. Welke menselijke factoren zijn de meest uitdagende voor de bouwvakkers en verminderen de prestatie?

14. Hoe belangrijk is uw functie als leider om de prestatie te verbeteren? Op welke manier?

15. Heeft u een voorstel om de prestatie van de bouwvakkers te verhogen, gebaseerd op uw ervaring?

16. Tot slot, heeft u enkele concluderende opmerkingen? Wat zou u willen benadrukken van wat gedurende dit interview ter sprake kwam?

9.3 Interview Guide - English

1. What is your function/role in the company you work for?

2. How much work experience do you have in this role?

Performance can be described as the total standard time measured and estimated work, divided by time available for the work (Harris and McCaffer 2001).

3. What are the biggest challenges in managing projects towards a good performance from your point of view?

4. What are the main elements (indicators) that are important for improving performance of the workers on site? (So both challenges as well as what they recognise works well.)

Time (work-measurement), cost and quality are the classic performance indicators.

Please position them on the following Likert scale:

Almost no effect	Small effect	Medium effect	Large effect	Very large effect
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5. Do you use performance measurements to help improve the work?

If 'yes': what kind of performance measurements do you use to assess the worker's effectiveness?

6. What are the opportunities for growth within the organisation, like possibilities for promotion and training?

7. Do you have any procedures or practices to transfer lessons-learned to future or other projects? How do you share knowledge with your colleagues on site?

8. Does the function of human resource management (HRM) support performance on site?

9. How is the communication with the workers, between the workers and between the site/construction manager and workers organized on site? For instance: do you have regular meetings?

10. How do you motivate your team on site? Could you give some examples?

11. Which relationship do you see between the motivation of construction workers related to performance?

12. Which human factors are the most important for your team to increase performance, like openness, trust, autonomy, engagement etc.?

13. What are the most challenging human factors that inhibit performance for your team?

14. How important is your role as a leader to improve performance? In what way?

15. Do you have any suggestions how construction workers performance could be improved based on your own experience?

16. Finally, do you have any concluding thoughts? What would you highlight as most important of what has been said and why?

9.4 Interview Guide - German

1. Was ist ihre Funktion/ Rolle auf der Baustelle?
2. Wieviel Arbeitserfahrung haben Sie in diese Position?

Die Leistungsfähigkeit kann beschrieben werden als die totale Arbeitszeit (für eine Aktivität) geteilt durch die vorhandene Arbeitszeit, wie beschrieben (Harris and McCaffer 2001).

3. Was sind Ihrer Meinung nach die größten Herausforderungen für die Projektleitung um eine gute Leistung zu erzielen?

4. Welche Hauptelemente (Indikatoren) sind Ihrer Meinung nach geeignet, um eine Verbesserung der Leistung zu erzielen? (Sowohl die Herausforderungen als auch was für Sie gut funktioniert)

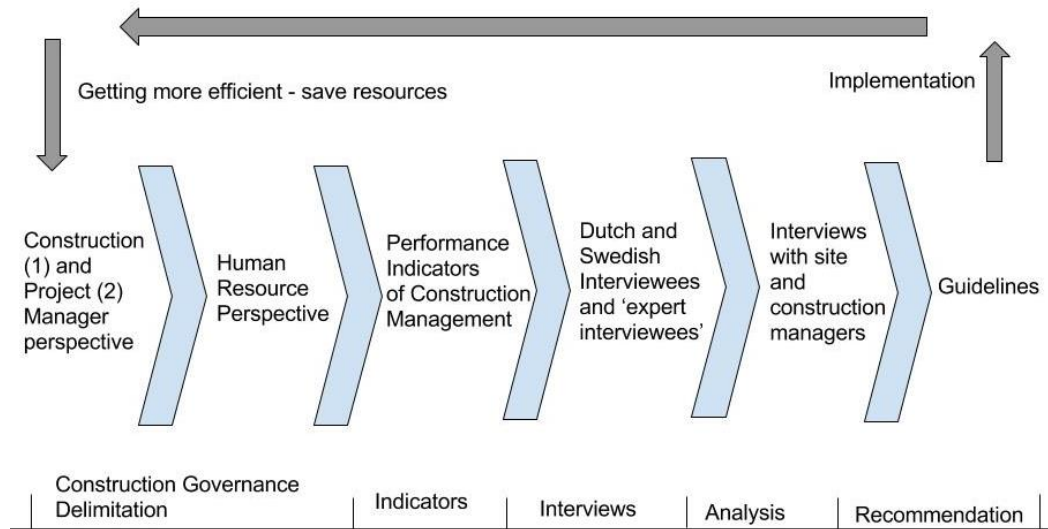
Die Zeit (work-measurement), die Kosten und die Qualität sind die klassische Leistungs Indikatoren.

Bitte positionieren Sie diese Elemente auf der sogenannten Likert Skala:

Fast keine Wirksamkeit	Geringe Wirksamkeit	Wirksam	Sehr wirksam	Sehr große Wirksamkeit
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5. Verwenden Sie Messungen der Leistung um die Arbeit zu verbessern? Wenn „Ja“ welche Leistungsmessungen halten Sie für relevant in Bezug auf die Effektivität der Arbeiter?
6. Welche Möglichkeiten gibt es innerhalb der Organisation zu wachsen, sowie Promotion oder eine Schulung?
7. Haben Sie Einrichtungen oder eine Praxis die einen Wissenstransfer ermöglicht?
8. Unterstützt die Funktion der Personalabteilung die Leistungsfähigkeit auf der Baustelle?
9. Wie ist die Kommunikation mit den Bauarbeitern, zwischen den Arbeitern organisiert?
10. Wie motivieren Sie die Baugruppe? Könnten Sie davon Beispiele geben?
11. Sehen Sie eine Beziehung zwischen der Motivation der Bauarbeiter und der erbrachten Leistung?
12. Welche menschliche Faktoren sind am wichtigsten für ihre Baugruppe, hinsichtlich der Erhöhung der Leistung, sowie Offenheit, Vertrauen, Autonomie und Engagement?
13. Welche menschlichen Faktoren reduzieren die erbrachte Leistung der Baugruppe und stellen damit eine Herausforderung dar?
14. Wie wichtig ist ihre Rolle als Leiter in der Verbesserung der Leistung? Wie sehen Sie dies?
15. Haben Sie, auf Grund ihrer Erfahrung, Vorschläge für die Verbesserung der Leistung der Bauarbeiter?
16. Haben Sie zum Schluss noch ergänzende Bemerkungen? Was würden Sie als besonders wichtig hervorheben und wieso?

9.5 Thesis Scheme

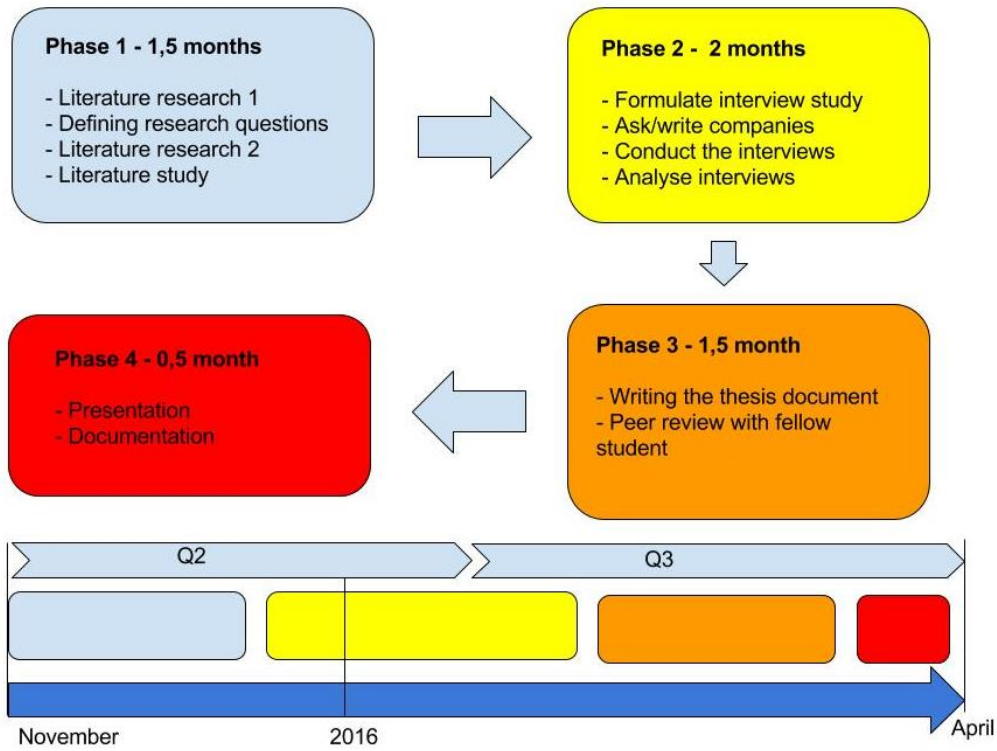


9.6 Learning Goals

The thesis work should:

- be a stepping stone towards a management profession.
- include thoughtful analysis and reflections.
- give a broad experience of both theory and real work life experience by connecting to the construction industry.
- get to know different management theories and the Competency-Based Approach in management.
- have some international management experience.
- learning from communication with the professor and student(s) who give feedback on the thesis.
- increase my own management competencies: self-management, strategic planning, international awareness, planning and administration and communication.
- approach the construction industry in a professional way.
- see what different management positions really are about to see what job applications I would like to undertake.

9.7 Time Planning



10 References

- Atkinson, R. (1999): Project management: cost, time and quality, two best guesses and a phenomenon, it's time to accept other success criteria, *International Journal of Project Management*, vol. 17, no. 6, pp. 337, 338.
- Barney, J.B. and Peteraf, M.A. (2003) Unraveling the Resource-Based Tangle, *Managerial and Decision Economics*, Vol. 24, No. 4, pp. 309-323.
- Bannerman, P. L. (2008): Defining project success: a multilevel framework, *Proceedings of the Project Management Institute, Research Conference*, pp.4, 5, 7.
- Bennett, F.L. (2003): *The management of construction: a project lifecycle approach*, Butterworth-Heinemann, Boston, Mass.
- Berg, B.L. (2009): *Qualitative research methods for the social sciences*, 7.th edn, Allyn & Bacon, Boston.
- Bergly, G. (2001): Productivity and efficiency in the construction industry, *Construction Economics and Organization*, Chalmers University of Technology, Göteborg. pp.221.
- Bolden, R. (2011): *Exploring leadership: individual, organizational, and societal perspectives*, Oxford University Press, Oxford; New York.
- Bosch-Sijtsema, P.M. and Postma, Theo J. B. M (2009): Cooperative innovation projects: Capabilities and governance mechanisms, *Journal of Product Innovation Management*, vol. 26, no. 1, pp. 59, 60.
- Bond, T.C. (1999): The role of performance measurement in continuous improvement, *International Journal of Operations & Production Management*, Vol. 19, No. 12, pp. 1325, 1326.
- Bouwend Nederland (2016): *Feiten en Cijfers*. <http://www.bouwendnederland.nl/feiten-en-cijfers/1080856/bouwactueel> (22-02-2016).
- Bouwend Nederland (2016): *Cao*. <http://www.bouwendnederland.nl/themas/cao> (22-02-2016).
- Bryman, A. (2012): *Social research methods*, 4th edn, Oxford University Press, Oxford.
- Bushuyev, S.D. et al (2014): Project success analysis framework: A knowledge-based approach in project management, *International Journal of Project Management*, Vol. 33, No. 4, pp. 772-774.
- Björkman, L. and Josephson, P.E. (2010): 31 recommendations for increased profit - reducing waste, Chalmers University of Technology, Göteborg, pp. 33-56.

- CBS (2016): *Bouw boekt grootste omzetstijging in tien jaar*. <https://cbs.nl/nl-nl/nieuws/2015/34/bouw-boekt-grootste-omzetstijging-in-tien-jaar> (20-03- 2016).
- Chaminda P. et al. (2007): Tacit knowledge and organisational performance: construction industry perspective, *Journal of Knowledge Management*, vol. 11, no. 1, pp. 115-126.
- Cleland, D.I. (2004): *Field guide to project management*, 2th edn, Wiley, Hoboken, New Jersey.
- Clough, R.H. et al. (2008): *Construction project management*, 5.th edn, John Wiley & Sons, Hoboken, N.J.
- CSB (2016): *Konjunkturbarometern Företag*. [http://www.scb.se/sv/_Hitta-statistik/Statistik-efter amne/22678/Allmant/Sveriges-ekonomi/Aktuell-Pong/31243/EK0206/64174/](http://www.scb.se/sv/_Hitta-statistik/Statistik-efter-amne/22678/Allmant/Sveriges-ekonomi/Aktuell-Pong/31243/EK0206/64174/) (20-03- 2016).
- Dainty, A.R.J. et al. (2003): A competency-based performance model for construction project managers, *Construction Management and Economics*, Vol. 22, pp. 887-886.
- Dainty, A.R.J. et al (2007): *People and culture in construction. People and Culture in Construction: a reader*, 1th edn, Taylor and Francis, Abingdon, Oxon, p.4.
- Flick, U. (2009): *An introduction to qualitative research*, 4., edn, SAGE, London.
- Flick, U. (2002): *An introduction to qualitative research*, 2., edn, SAGE, London.
- Harris, F. and McCaffer, R. (2001): *Modern construction management*, 5.th edn, Blackwell Science, Oxford, pp.137, 138, 313.
- Hellriegel, D. (2005): *Managing: A Competency-Based Approach*, pp. 384-386.
- Helfat, C.E. and Peteraf, M.A. (2003): The Dynamic Resource-Based View: Capability Lifecycles. *Strategic Management Journal*, Vol. 24, No. 10, pp. 997-1010.
- Hislop, D. (2013): *Knowledge management in organizations: a critical introduction*, 3.th edn, Oxford University Press, Oxford.
- Hughes, R.L., et al. (2012): *Leadership: enhancing the lessons of experience*, 7th edn, McGraw-Hill/Irwin, New York, pp. 15, 341, 342.
- McGeorge, D. et al. (2002): *Construction management: new directions*, 2th edn, Blackwell Science, Oxford.
- Månsson, O. (2015): *Regeringen missar bostadsmålet*.

- <http://www.byggnyheter.se/2015/09/regeringen-missar-bostadsm-let> (22-03-2016).
- Pathirage, C.P. et al. (2007): Tacit knowledge and organisational performance: construction industry perspective, *Journal of Knowledge Management*, Vol. 11, No. 1, pp. 115-126.
- Pessali, H.F. (2006): The rhetoric of Oliver Williamson's transaction cost economics, *Journal of Institutional Economics*, Vol. 2, No. 1, pp. 45.
- Pettersson, C. (2016): Ökad bostadsbrist i flyktingkrisens spår, *Hem & Hyra*, No.1, p. 48.
- Post, Van der M. (2016): *Werkgelegenheid*. <http://www.bouwendnederland.nl/themas/arbeidsmarkt/sub/werkgelegenheid> (22-02-2016).
- Qu, S.Q. and Dumay, J. (2011): The qualitative research interview, *Qualitative Research in Accounting & Management*, Vol. 8, No. 3, pp. 238, 239, 246, 252-254.
- Timmermans, S. and Tavory, I. (2012): Theory Construction in Qualitative Research: From Grounded Theory to Abductive Analysis, *Sociological Theory*, Vol. 30, No. 3, pp. 167-186.
- The Local (2014): *Housing crisis limiting Sweden's growth*. <http://www.thelocal.se/20141125/housing-crisis-limiting-swedens-growth-prospects> (02-03-2016).
- Trading Economics (2016): Sweden GDP 1960-2016. tradingeconomics.com/sweden/gdp (18-03-2016).
- Wernerfelt, B. (1984): A Resource-Based View of the Firm, *Strategic Management Journal*, Vol. 5, No. 2, pp. 171.
- Williamson, O.E. (2008): Transaction cost economics: the precursors, *Economic Affairs*, Vol. 28, No. 3, pp. 7-14.
- Williamson, O.E. (2010): Transaction Cost Economics: The Natural Progression, *The American Economic Review*, Vol. 100, No. 3, pp. 673-690.
- Winch, G. (2010): *Managing construction projects: an information processing approach*, 2.th edn, Blackwell Pub, Chichester; Ames, Iowa.
- Wit, B.d. and Meyer, R. (2014): *Strategy synthesis: managing strategy paradoxes to create competitive advantage*, 4th edn, Cengage Learning, Andover, Hampshire.