



CHALMERS
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Contractor-supplier relationships in the construction industry

A case study

Master of Science Thesis in the Design and Construction Project Management Programme

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Department of Technology Management and Economics
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CHALMERS UNIVERSITY OF TECHNOLOGY
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Abstract

The supply chain in the construction industry includes several actors, influenced by the project-based nature of the industry. The majority of studies concerning the interactions and collaborations between actors to improve the supply chain has concerned contractors, subcontractors and clients and resulted in developed procedures, such as partnering. However, the relationship between supplier and contractor has generally not been mentioned in those cases even though this relationship has a substantial impact on the supply chain process. This thesis aims to analyze possibilities and suggest recommendations to improve the supply chain process with an enhanced collaboration between supplier and contractor, by studying the relationship based on high-involvement relationships. The empirical findings are based on a case study of the relationship between a supplier and a contractor in the construction industry. A total of 11 interviews, distributed between the companies, has been conducted and constitutes the data on which the case study is based on. The studied relationship possesses several aspects of a high-involvement relationship without a formal mutual strategy. It was found that the fundamental feature of the relationship was social bonds through personal relations. Additional bonds such as knowledge-based bonds, technical bonds and legal bonds should be increased to enhance the high-involvement relationship. In order to implement a long-term orientation and commitment mutual long-term agreements should be created. Those agreements should be formalized in accordance with intermediate partnering in long-term, but in short-term partnering is not realistic to implement in the examined relationship. By increasing the influence of the supplier, through adding services and procedures to the range of their supply, the relationship and thereby the supply chain could be improved.

Keywords: Construction, contractor-supplier relationship, high-involvement relationships, partnering, supplier relationship management

Entreprenör-leverantör relationer i byggbranschen
En fallstudie

Examensarbete inom masterprogrammet Design and Construction Project Management

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Sammanfattning

Logistikkedjan i byggbranschen involverar många aktörer, influerat av att branschen är projektbaserad. Majoriteten av studierna som beskriver interaktioner och samarbeten mellan aktörer för att förbättra logistikkedjan har berört entreprenörer, underentreprenörer samt beställare och resulterat i utvecklade procedurer, så som partnering. Förhållandet mellan entreprenör och leverantör har dock i allmänhet inte berörts, trots att den relationen har en betydande inverkan på logistikkedjan. Den här uppsatsen syftar till att analysera och föreslå rekommendationer för att förbättra logistikkedjan med ett ökat samarbete mellan leverantör och entreprenör, genom att studera förhållandet baserat på 'high-involvement relationships'. Empirin är baserad på en fallstudie av förhållandet mellan en leverantör och en entreprenör i byggbranschen. Totalt har 11 intervjuer genomförts, fördelade mellan företagen, vilket har renderat i data som fallstudien baserats på. Det studerade förhållandet innehåller flera aspekter av ett 'high-involvement relationship' utan en formell gemensam strategi. Förhållandets fundamentala egenskaper var sociala band genom personliga relationer. Ytterligare band som kunskapsbaserade band, tekniska band och legala band borde ökas för att förbättra dimensionerna av 'high-involvement relationship'. För att implementera en långsiktig riktning och förpliktelse bör gemensamma långsiktiga överenskommelser skapas. Dessa överenskommelser borde formaliseras i linje med 'intermediate partnering' på lång sikt, men på kort sikt är partnering inte realistiskt att implementera i det undersökta förhållandet. Genom att lägga till tjänster och procedurer till leverantörens utbud kan leverantörens inflytande öka, vilket skulle förbättra förhållandet och därmed logistikkedjan.

Nyckelord: Byggbransch, entreprenör-leverantör relation, hantering av leverantörsrelationer, high-involvement relationships, partnering

Preface

This study constitutes a master's thesis as the final step of the Design and Construction Project Management programme at Chalmers University of Technology. The thesis was conducted during the spring semester of 2016 at the institution of Technology Management and Economics. Both of the authors have an academic background in civil engineering. The thesis consists of a case study exercised at Woody Angered and Serneke. Additional supervision was carried out by Prolog.

This master's thesis has been conducted with support from several individuals to whom we would like to express our appreciation. First, we would like to thank our supervisor at Chalmers, Gunnar Stefansson, for contributing through valuable discussions and inputs which have enabled a sound working process for finalizing this thesis. Second, we would like to thank Ellinor Hastler, sales manager at Woody Angered, for her interest and commitment to the subject in matter, for contributing with her expertise and contact information for the interviews. Thank you the whole Woody Angered organization for your hospitality during our visit at your office. Third, Marcus Hansson, management consultant at Prolog in Gothenburg, thank you for contributing with your expertise on supply chain management, logistics and contractor-supplier relationships. Lastly, we would like to express our gratitude to the interview respondents for taking their valuable time to answer our questions. Without you, there would be no thesis to finalize.

Gothenburg, May 2016

Roham Nikinosheri & Filip Staxäng

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1 Introduction

This chapter will be initiated with logistics and supply chain management in order to unravel the concept. Also, the construction process will be explained since different segments of the process will be referred to in this thesis. Furthermore, a background to the subject in matter will be presented as well as the purpose and research questions. Finally, scope and limitations, and an outline of the thesis will be emphasized.

1.1 Introducing Logistics & Supply Chain Management

The concept of logistics, as an activity, is thousands of years old. However, as a field of study, the concept gained recognition during the early 1900s, and it had a crucial factor during World War 2. The ability to effectively and efficiently distribute and store supplies and personnel were the key to success for the U.S. Armed Forces (Lambert et al., 1998). Furthermore, the authors (1998; 6) stated that "*logistics was one of the last real frontiers of opportunity for organizations wishing to improve their corporate efficiency.*"

But what is logistics? Ballou (2004) defines it as an integrated management study. Other authors, such as Bowersox et al. (2007; 4), define logistics as "*the work required to move and position inventory throughout a supply chain.*" However, what seems to be the most commonly used definition, is the one developed by the Council of Logistics Management – a professional organization for logistics personnel (Lambert et al., 1998) - which is expressed as following:

"the process of planning, implementing and controlling the efficient, effective flow and storage of goods, services and related information from point of origin to point of consumption for the purpose of conforming to customer requirements."

The Council of Logistics Management, 2013; 117

Supply chain management is, compared to logistics, a relatively new concept, emphasizing the inter-organizational perspective of logistics. The concept comprises usage of resources of the involved companies in the supply chain in the most efficient and effective manner, in order to meet customer requirements (Jonsson, 2008; Olsson, 2000). According to Lambert et al. (1998), the term supply chain management is used by many people as a synonym for logistics. However, the authors define SCM as following "*Supply chain management is the integration of business processes from end user through original suppliers that provides products, services, and information that add value for customers*" (Lambert et al., 1998; 504).

Consequently, supply chain is a broader concept than logistics, comprising manufacturer, suppliers, transporters, warehouses, retailers and customers (Chopra & Meindl, 2004; Lambert et al., 1998). Typical key processes within SCM are (1) *procurement*, (2) *manufacturing flow management*, (3) *order fulfilment*, (4) *demand management*, (5) *product development*, (6) *commercialization*, (7) *customer service management* and (8) *customer relationship management* (Chopra & Meindl, 2004). This thesis will have a relationship-oriented perspective, with its focus on the supplier-contractor relationship for the benefit of the construction supply chain as a whole.

1.2 The construction process

According to Olsson (2000), the terminology "process" can be of confusion from a logistical point of view since it is not clearly defined. However, in this thesis, the construction process

will be defined as the performance of achieving customer requirements, from the point of a product idea to the usage of the product. This subchapter will emphasize the different phases in a project process in the construction industry, which can be explained with following division; *project idea*, *project investigation*, *project design*, *production* and *maintenance*, as illustrated in *figure 1.1*. Although the maintenance phase is mentioned, it will not be further explained here.

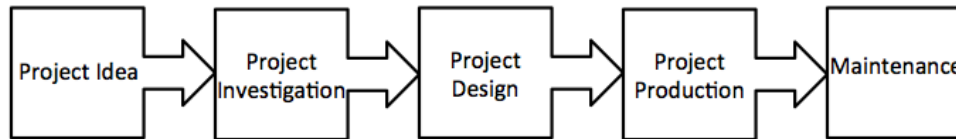


Figure 1.1: The different phases of a construction project, developed from Nordstrand (2008).

Project idea and project investigation

A construction project emerges through a demand, where a client undertakes the work of initiating what is to become a realization of the product idea, according to Nordstrand (2008). The client can be a private person as well as an organization or administrative authority. When the client has determined to continue with the idea, the next phase is to make further investigations on prerequisites for the project in order to obtain a more solid condition for further development. Examples of prerequisites are analysis on the business (what kind of activity/activities will be performed in the new building?), technical specifications (functionality and other requirements), localization (topography, accessibility and geometrical formation), economy and time schedule (Nordstrand, 2008). Such prerequisites will then result in a set of specifications, a program, for the construction project, and function as the customer's requirements that are to be achieved.

Project design

After the settlement of the program, the design phase will be undertaken, where the construction have to be realized on blue prints and in descriptions (Nordstrand, 2008). Hence, many disciplines are involved, i.e. projects managers, architects, structural engineers, geotechnicians, and various other engineers with different specializations. Blue prints, descriptions, and a more in-depth time schedule and cost-estimations will function as a foundation for production (Nordstrand, 2008).

Production

The construction industry is characterized by its site-based production process (Koskela, 1992). With the usage of resources, i.e. craftsmen, materials and machines, the initial product idea will be realized on site. The production phase is intense where any mistake may have major consequences in terms of time and cost (Nordstrand, 2008; Cigen, 2003).

1.3 Background

The construction industry has been criticized for its low efficiency compared to other businesses. In the 1990s reports from both Great Brittan (Egan, 1998) and USA (CII, 1991) suggested that industrial procedures used in other industries should be implemented in the construction industry in order to improve the efficiency. Bygghandboken (2002) made similar suggestions in regards to the Swedish construction market. Even though this critique is established and well known within the industry, the efficiency has not improved at an appropriate pace (Statskontoret, 2009). The project based nature of the construction industry is commonly used as an obstacle of implementing procedures from e.g. the more efficient and

less project based manufacturing industry. Another characteristic of the construction industry is the large dependency of suppliers and subcontractors. In general, over 75% of the contractors' total costs consist of bought supply and service (Gadde & Dubois, 2012). This figure has increased gradually as the industry has tended to use outsourcing to a larger extent over the last decades. The trend of outsourcing has enhanced the importance of collaboration between different companies such as contractor, subcontractors and suppliers. In recent times partnering has been implemented to a high extent between different actors in construction projects as a mean of creating a collaborative and competitive working environment (Gadde & Dubois, 2012).

The relatively new partnering contract has been implemented in projects between the client, contractor and sub-contractor, and has showed advantages with respect to knowledge and experience being exchanged. A partnering contract's purpose is to improve communication between the involved parties and harness the competence of each actor within the different organizations. Hereby, the chance of the project being finished at the appointed date will increase and costs will be reduced. Using partnering contract between client, contractor and sub-contractors in a project could potentially improve these aspects (Bresnen & Marshall, 2000):

- Increased productivity and cost savings
- Shortened design times by early involvement and collaboration of suppliers
- Increased quality by learning and improvements
- Increased resource utilization by using long-term perspective
- Better preparedness of adapting to changes
- Increased customer satisfaction as a result of mentioned advantages

Potential profits and losses are divided amongst the actors involved in the contract, where the latter serves as an incitement for achieving overall success, instead of each organization striving for their own success at the expense of the others'. However, this kind of contracts that enables an increased collaboration has not yet been implemented between the contractor and the supplier to the same extent (Bygballe et al. 2010; Cox, 1996; Ingemansson, 2012). More generally Ingemansson (2012) states that no overall innovation has been implemented in the interaction between the supplier and contractor. Furthermore, in most cases partnering is used as a short-term commitment rather than a long-term collaboration (Bygballe et al., 2010). Which indicates that partnering is not yet used in a refined manner by the construction industry since it is originally meant to be used as a long-term commitment (Beach et al. 2005; Bresnen & Marshall, 2000; Bygballe et al., 2010). The short-term perspective obstructs efficient long-term solutions such as an efficient delivery chain (Shamas-Toma et al. 1998). Hence, there is a need to study how an increased collaboration, through partnering or other practices, using a long-term perspective regarding those actors could affect the overall process performance. Gadde & Dubois (2010) defines six dimensions of high-involvement relationship, namely longevity, adaptations, interactions, interdependence, relationship atmosphere and mutual orientation, which can be used to analyze the relationship from a holistic perspective rather than a specific procedure, such as partnering.

There are several extensive difficulties regarding the supply chain of material, which involves the influence of the supplier. For example, the large flow of material in the construction industry is a challenge both for the contractor and supplier in order to create a cost optimized process. The material cost stand for between 40-45% of the total construction cost which further highlights the density of managing the flow of material (Agapiou et al., 1998). The construction site is generally a crowded and limited area where a lot of material is stored in

an unorganized manner, which leads to costs concerning e.g. damage, theft and waste. Josephson and Saukkoriipi (2007) estimates that waste could represent 30-35% of the total construction cost. The problems concerning deliveries along with the high flow of material within the industry highlights the possibilities of an increased collaboration between those actors.

1.4 Purpose & research questions

Logistics and supply chain management are a set of processes that integrates businesses, from supplier to the end consumer, in order to achieve improved result both for each business but also, and foremost, for the overall process in order to satisfy the customer. The overall process will be regarded in terms of the parameter of collaboration.

The purpose of this thesis is to analyze possibilities and suggest recommendations to improve the supply chain process with an enhanced collaboration between supplier and contractor, by studying the relation based on high-involvement relationships.

Following research questions have been formulated in order to fulfil the purpose of this thesis, and to make a connection between the theoretical framework and the empirical study:

- *What characterizes the contemporary relationship between the contractor and the supplier?*
- *What procedures could be implemented in the relationship in order to improve the supply chain activities related to this collaboration?*

1.5 Scope & Limitation

This thesis has been conducted at Chalmers University of Technology, in collaboration with Woody Angered, Serneke and Prolog in Gothenburg. The thesis is supported with literature on supply chain management and logistics in construction, and on supplier relationship management. The empirical study is based on total of eleven interviews and a refurbishment project as a reference for practical concerns.

It is solely the supply chain activities that are in connection to the collaboration between the supplier and contractor that will be examined. The relationship is analyzed with respect to different forms of partnering and a high-involvement relationship model. It is therefore important to observe that other collaborative models can result in other conclusions than what is expressed here.

1.6 The outline of the thesis

The thesis comprises seven chapters, and is outlined as illustrated in *figure 1.2*.

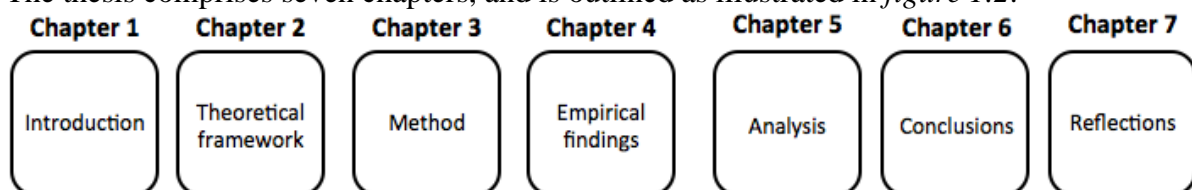


Figure 1.2: The outline of this thesis.

Chapter 1: The introduction presents the background, purpose and research questions to this thesis. The chapter is initiated with a brief introduction to the concepts of logistics and supply chain management, and the construction process.

Chapter 2: Theoretical framework presents theories connected to the subject in matter, with the purpose of supporting the analysis of the empirical findings.

Chapter 3: The method comprises the procedure for how this thesis has been developed. It includes the disposition of this thesis, which method that have been used for collecting data and developing theory, interview technique and selection, ethical consideration, data analysis and interview data analysis.

Chapter 4: Empirical findings present results from the interviews that have been conducted in the case study.

Chapter 5: In the analysis, with support from the theoretical framework, the results in the empirical findings will be analyzed.

Chapter 6: The conclusion answers the research questions with respect to what have been analyzed in the previous chapter.

Chapter 7: Reflections discusses aspects that are not related to the purpose of this thesis, and further research is suggested.

2 Theoretical framework

This chapter comprises the underlying theory to support the analysis of the empirical study, in order to enable a fair discussion and conclusion of the topic in question. The structure of the theoretical framework has two distinct segments, as illustrated in figure 2.1. The first segment emphasizes the characteristics of the construction industry, construction logistics, supply chain management in the construction industry challenges in the construction industry. The second segment emphasizes relationship categorization, partnering, high-involvement relationship and supplier segmentation.

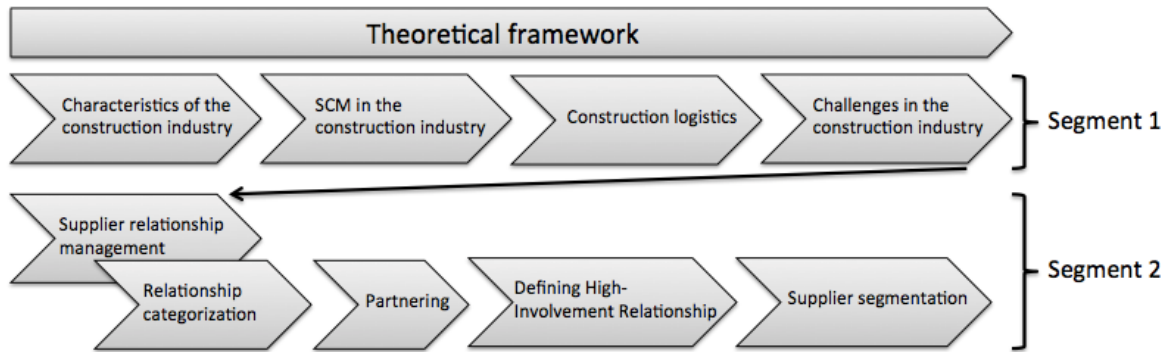


Figure 2.1: The structure of the theoretical framework divided in two segments.

2.1 Characteristics of the construction industry

The construction process is highly complex (Baccarini, 1996), involving different parties in projects with the aim of creating value by fulfilling customer requirements (Bertelsen & Koskela, 2002). Baccarini (1996) further stress the fact that the construction industry even could be considered as the industry containing the most complex processes. The performance of construction processes are not clearly defined in literatures (Olsson, 2000), however, there are authors that have defined some characteristics of construction processes (Baccarini, 1996; Fernàndes-Solís, 2007; Ballard & Howell, 1998; Olsson, 2000). In addition to the complexity brought up by Baccarini, the nature of construction is a dynamic process, where the contractor's interpretation of the product may not be aligned with the client's vision, making the process even more complex (Fernàndes-Solís, 2007). Furthermore, Koskela (1992) state that projects carried out within the construction industry can be defined by (1) uniqueness, (2) site production and (3) temporary multi-organizations. These characteristics will be further developed below.

2.1.1 Uniqueness

It has been a common statement that construction is different from other industries with respect to the uniqueness of projects. However, Egan (1998) does not agree with such statement, arguing that many buildings (e.g. houses) are essentially repeated products, and moreover, that the construction process itself is repeated from project to project. Furthermore, he presents figures from research, estimating that 80% of inputs into buildings are repeated. In contrast, Ballard and Howell (1998) formulate the uniqueness of projects as a relative matter, where one end of the spectrum represents mass production of prefabricated components, and the other end represents customization. Although the spectrum has a side of standardization, depending on the location of the construction site, different preconditions will emerge, e.g. logistical constraints, soil and ground conditions, the weather, and the relationships and interrelationships in each project undertaken (Dainty, Moore & Murray, 2006; Koskela 1992). Moreover, different clients have different requirements to be fulfilled

in order to achieve customer satisfaction - affecting the work to be undertaken, such as the architectural design (Koskela, 1992).

2.1.2 Site-based production

The character of site production can be divided into further categories – namely (1) *fixed position manufacturing* and (2) *rootedness-in-place*. The former category considers manufacturing of products that eventually become too large to move through workstations, which changes the conditions of developing the end product. Instead, resources (e.g. craftsman) have to move through the product. With the evolvement of prefabrication, much construction activities can be made in factories, with a more stable environment, compared to construction sites, resulting in a higher degree of efficiency. However, the final assembly must be made on site, where planning and control are two important aspects in order to achieve an efficient flow of materials and work (Ballard & Howell 1998). The latter category emphasizes risks and uncertainties that come along with the construction object being rooted in place. As mentioned above, soil and ground conditions are preconditions that vary depending on location, which are difficult to determine prior to production. Other risks and uncertainties are the weather conditions (precipitation, wind loads and seismic), physical surroundings (space limitation), and codes and regulations that may constrain any further development of the project (Ballard & Howell 1998; Koskela 1992). Furthermore, due to the decentralized nature of the production phase, improvements are difficult to implement into new projects (Koskela, 1992).

2.1.3 Temporary multi-organizations

Construction is a project-based industry, involving a range of companies and disciplines, working together to achieve fulfilment of customer requirements within the constraints of time, cost and quality. It is a disparate industry, with disciplines that have not necessarily worked together (Dainty et al., 2006; Koskela 1992). Problems that may occur in such environment can be related to communicating data and to sharing design solutions and knowledge across organizational boundaries (Koskela, 1992). Bresnen et al. (2004), have made a similar statement, arguing that the fragmented nature of construction aggravate to capture and share knowledge across projects. In addition, it is also difficult to establish a shared understanding in a fragmented environment (Lindkvist, 2004). As a solution, procurement can be made amongst organizations with long-term cooperation, and moreover, involved parties in a project can interact in a team building session (Koskela, 1992).

2.2 SCM in the construction industry

Supply chain management in the construction industry can be explained with three characteristics. First, it is considered to be a converging supply chain where the assembly of the object is made on site. Second, the supply chain has a temporary lifetime, resulting in instability and fragmentation, especially due to the separation of the design and production phase. Third, construction is a typical make-to-order supply chain, where the object is designed after customer requirements (Vrijhoef & Koskela, 2000). Moreover, Vrijhoef and Koskela (2000) present four roles of supply chain management in construction, as illustrated in *figure 2.2*, which are dependent on whether the focus is on the supply chain, the construction site, or both. The first role has its focus on the interface between the supply chain and the construction site. By decreasing the number of disruptions in the workflow, costs and durations of site activities can be reduced. Hence, the authors made following statement:

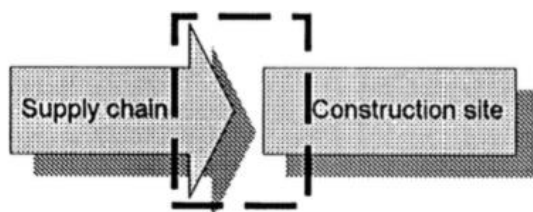
"Here, there has been a focus on the co-operation between suppliers and contractors for improving the total flow of material, whereas traditional treatment of construction logistics and material handling has predominantly concentrated on activities occurring on site."

Vrijhoef & Koskela, 2000; 172

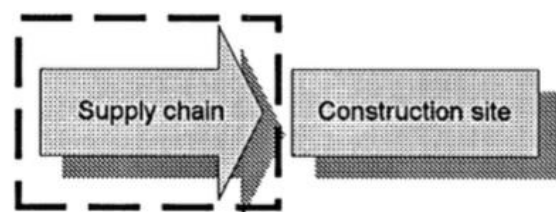
Due to the fragmentation in the industry, many buildings are poorly constructed in terms of sustainability, maintenance and operating costs, and flexibility of use (Egan, 1998). In manufacturing, by inviting suppliers and subcontractor in to the design phase, efficiency and quality have been enhanced. An equivalent arrangement is of need in the construction industry.

The second role emphasizes the supply chain only, with the goal of reducing costs related to logistics, inventory and lead-time. The third role has its focus on transferring activities from the construction site to the supply chain. An example of such transfer is prefabrication of concrete elements, which are partly assembled in a factory, and where the final assembly occurs on site. The fourth role considers integration of the supply chain and the construction site. Here, the goal is to transform construction's temporary chains with permanent supply chains (Vrijhoef & Koskela, 2000).

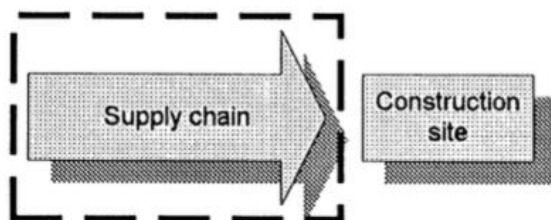
Role 1: focus on the interface between the supply chain and the construction site



Role 2: focus on the supply chain



Role 3: focus on transferring activities from the construction site to the supply chain



Role 4: focus on the integrated management of the supply chain and the construction site

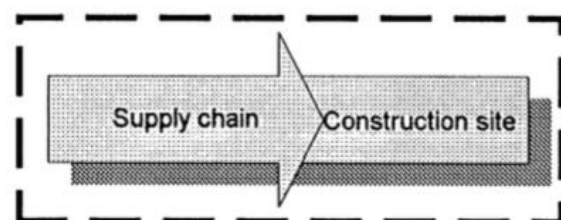


Figure 2.2: The four different roles of supply chain management in construction, defined by Vrijhoef and Koskela (2000).

2.3 Construction logistics

The ad hoc nature of construction logistics has been recognized in academia (Agapiou et al., 1998; Jang et al., 2003; Karlsson & Josephson, 2012). In addition, it has been recognized that the most commonly used form of delivery system is the express delivery, due to the rare occasion of scheduled material deliveries to construction sites (Karlsson & Josephson, 2012). Construction logistics is covered by the operational efficiency perspective of logistics management. It regards day-to-day decisions, where operations are typically reflected upon two weeks ahead. Competitive strategy and firm-focused tactics are additional perspectives,

where the former regards long-term decisions on an organizational level, and the latter regards shorter time frames, with a more tactical approach. Although operations on construction sites are influenced by its nature of day-to-day decisions, it is important to consider logistics as a senior-level decision (Jang et al., 2003).

According to Jang et al. (2003), the construction supply chain can be divided in two segments – namely *supply logistics* and *site logistics* (figure 2.3). Activities in the supply logistics segment regard supply resources, i.e. equipment, materials and manpower, planning of supply, and transportation to construction sites as well as delivering the supplies. On-site processes, such as controlling, coordinating, organizing and planning are covered in the site logistics segment. The interface between these two segments creates disruptions in the value-adding activities, resulting in waste (Karlsson & Josephson, 2012).

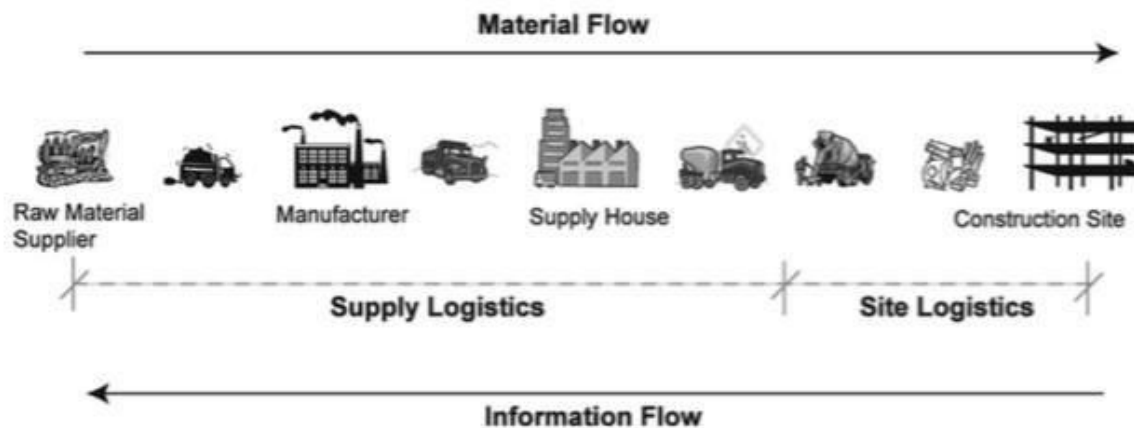


Figure 2.3: Construction logistics defined as supply logistics and site logistics (Jang et al., 2003).

2.4 Challenges in the construction industry

The construction industry has much to learn from other sectors of the economy in order to minimize waste and maximize value for the end customer (Egan, 1998). The concept of lean production has its origin at Toyota's manufacturing, where the production system was extensively restructured (Koskela, 1992). One well recognized method of lean production is just-in-time (JIT), with its main purpose to reduce, or at best, eliminate inventories. This generated other connected activities to be improved, such as lot-size reduction, layout configuration, supplier-cooperation and set-up time reduction. A fundamental principle of JIT is waste, which can be defined as "*any activity which absorbs resources but creates no value*" (Josephson and Saukkoriipi, 2007; 15). Typical identified categories of waste are transporting, waiting, unnecessary movement, storage of materials (inventories), overproduction, over-work and defects in materials (Koskela, 1992; Josephson & Saukkoriipi, 2007).

Josephson and Saukkoriipi (2007) has developed a research on waste in the construction industry where they divide a workday into three segments, *work that directly increases value*, *preparations* and *waste*, depending on the degree of value it added to the product. *Work that directly increases value* comprise work that directly add value to the customer. From the Josephson and Saukkoriipi's (2007) observations, it was found that only 17,5% of the work time directly added value to the product. *Preparations* comprise work that is necessary in order to be able to add value to the product, but do not directly add value. Examples of such activities are material and equipment handling on the construction site, temporary arrangements, transportation of material to the construction site, and planning of work. This

segment responded to 45,4% of the total work time (Josephson and Saukkoriipi, 2007). It is important to stress the fact that some activities within this segment were performed due to defects. Hence, a proportion of this segment is actually waste. The third segment comprises *waste*. These activities can, preferably, be eliminated without affecting the product. Activities included in this segment are interruptions, waiting, reworking and unutilized time. This segment responds to 33,4% of the work time. In addition to this, Josephson and Saukkoriipi (2007) also highlighted the occurrence of materials wastage. From the middle of 1990s, the volume of materials wastage has decreased from a span between 4-21% to 2-10% in 2007. The investigation comprised 12 commonly used building materials, as illustrated in *Figure 2.4*.

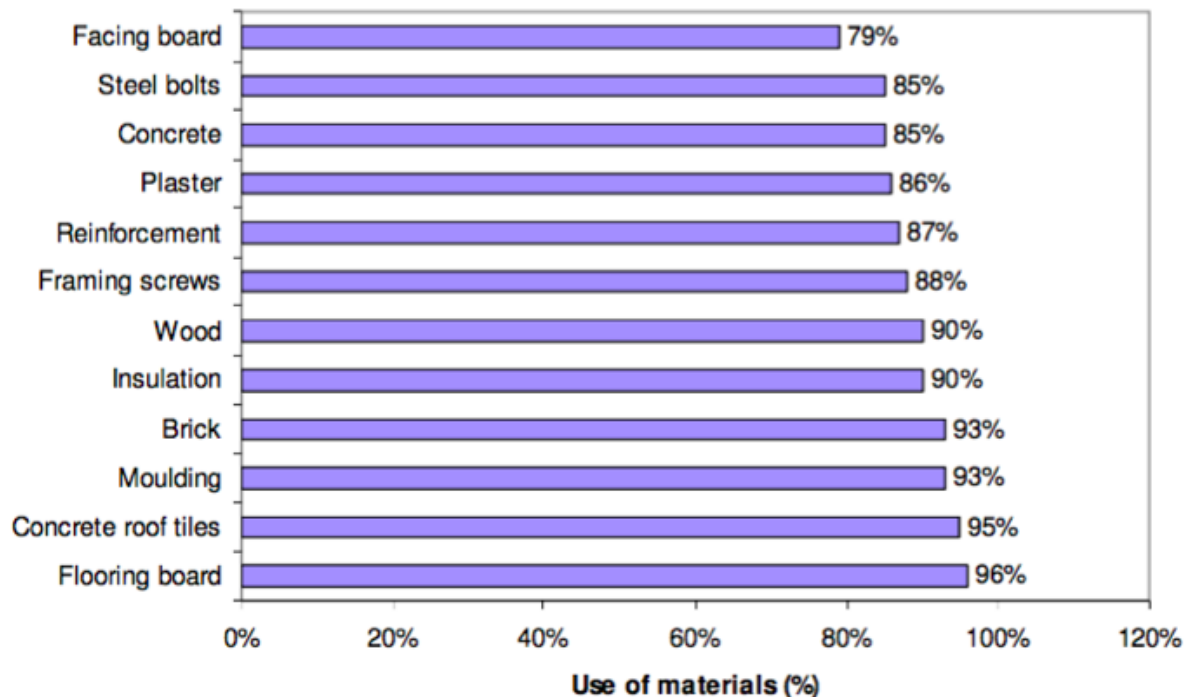


Figure 2.4: Statistics on waste of the most commonly used materials in building projects from the middle of 1990s. The percentage of waste is between 4% (flooring board) and 21% (facing board) depending on the material examined (Josephson & Saukkoriipi, 2007).

As for the flow of material in the construction supply chain, the control is segmented, or, in other words, the responsibility of the flow is divided between different individuals (Koskela, 1992). Each individual acts with the purpose of minimizing the costs of the work that is within in the frame of their responsibility. The purchasing department, for example, makes a purchase with regard to the costs for the materials and the transportation. However, Vrijhoef and Koskela (2000) have found, based on actual cases, that the lower the purchase price was, the higher the costs were for the site logistics. The increase in costs of site logistics was due to chaotic material deliveries and lack of organization on site. However, the complex of problems in this matter could be traced back to the procurement phase, where large batches of materials and goods were purchased with a discount. In other words, the costs that were avoided in the procurement phase were pushed to the production phase, making the project process in a whole even more expensive. Hence, the disadvantage of purchasing too large volumes of materials and goods are the space limitation on site, risk of theft and multiple material handling (Koskela, 1992).

As a solution for the ineffectiveness in the construction industry, Egan (1998) suggests an integrated project process where designers, suppliers and constructors work together in teams

through a series of projects with the aim to continuously develop and improve the supply chain. Furthermore, Egan suggests “design for construction”, a concept that recognizes the importance of involving subcontractors and suppliers in the design phase in order to deliver efficiency and quality. It is a concept developed from “design for manufacture”, which in practice has been proven to be a vital part of the supply chain in the manufacturing industry. Other than integrating processes, the construction industry must improve its performance by engaging in long-term relationships throughout the supply chain (Egan, 1998). The author (1998; 29) argues that "A team that does not stay together has no learning capability and no chance of making the incremental improvements that improve efficiency over the long term." Another attribute of the lean methodology is continuous improvements, where the idea is to minimize or, at best, eliminate wastes in connection to processes (Koskela, 1992). Implemented standards are thus maintained and improved gradually.

2.5 Supplier Relationship Management

The characteristics and challenges in the construction industry, described in *Characteristics of the construction industry* and *Challenges in the construction industry*, indicates the importance of managing the relations between the different actors involved in the construction process. Supplier Relationship Management (SRM) is a term used in different approaches by various authors. For some SRM is related to measurements and controls of suppliers and others relate SRM to strategic implementations (O'Brien, 2014). However, the general definition of SRM includes the determination of needed activity level in the relation between a company and its suppliers and the character and range suitable for a specific relation (Brown et al., 2013; O'Brien, 2014). In some cases the term SRM is not used when regarding supplier relations, e.g. Jonsson (2008) and Gadde & Håkansson (2001). By using the stated definition, additional concepts related to the relation between these actors will be included in the concept of SRM in this report. The process of handling and defining the relations with a supplier requires an iterative process including procedures determining the suitable relation continuously (Brown et al., 2013; Gadde & Håkansson, 2001; Jonsson, 2008; O'Brien, 2014).

2.5.1 Relationship categorization

The nature of relationships is categorized in different ways and to various extent. O'Brien (2014) for example categorize the relationship types in eight ways, from arms-length relationship to corporate company, depending on supplier's importance to the company and the intensity of the relation. Others choose not to categorize but use an overall perspective of the nature of the suitable relationship without standardizing the appropriate relationship types (Brown et al., 2013; Gadde & Håkansson, 2001). Moreover, arm's length relations are known as the traditional relationship type with supplier (Jonsson, 2008). In the construction industry this can be regarded in terms of short-term commitments and price based selections (Frödell & Josephsson, 2008; Gadde & Dubois, 2012). However, in recent times, with influence of e.g. JIT philosophy, partnership relations with suppliers have increased (Jonsson, 2008). Statskontoret (2009) claims that an increased development in the relationship between different organizations is needed in the construction industry in order to minimize the fragmentation. In this case the construction industry is not as successful in implementing partnership relations with the suppliers as for example the manufacturing industry. Since this report concerns enhanced collaboration in the construction industry the traditional relation type, arm's-length relation, and the more collaborative relationship type, partnership relation, will be examined.

Arm's-length relationship refers to the traditional approach of customer companies negotiating conditions as favourable as possible solely with their own interest in mind, and thereby keeping the supplier at an arm's length (Jonson, 2008). This approach uses a short-term perspective in the aspect of customer companies using a lowest price perspective rather than that of total cost and delivery quality. The focus on lowest price often generate parallel suppliers of a single item which generally leads to less contact between the supplier than using a single source supplier. Jonsson (2008) states three remarks characterising this traditional approach:

- Customer and supplier have a competitive relationship to each other
- It is a win/lose game for both parties
- Each party tries to reduce the opposing party's position of power.

In the case of arm's-length relations both parties are focused on avoiding dependencies within the relationship as well as reducing the power of the opposing actor. The major long-term risk of using this kind of relationship is described as the fragmentation and depletion of the supplier market (Jonsson, 2008). Even though this relationship may appear as contributing with mostly negative aspects Dyer et al. (1998); Jonsson (2008); Kraljic (1983); O'Brien (2014); Spekman et al. (1998) among others argues that suppliers should be evaluated and the relationship should be shaped by that evaluation. Consequently an arm's length relationship would be desirable for some actors which will be further studied in *Supplier segmentation*.

Partnership relationship has developed as an enhanced collaborative environment between the supplier and customer in order to improve the overall profitability and quality (Jonsson, 2008). The collaborative environment refers to closer and more intimate relations with and increased frequency in communication. In order to achieve sufficient partnership a limited number of suppliers are generally consulted. Instead of focusing on the two parties separately, an overall perspective is used with the objective of satisfying both parties. Jonsson (2008) points out three aspects characterising attitude in partnership:

- Customer and supplier have a partner relationship
- It is a win /win game for both parties
- The parties try together to increase the total competitiveness of the supply chain and in this way achieve improved profit margins for both.

This perspective of the relationship between the customer and supplier support a more holistic view and overall performance in the supply chain (Jonsson, 2008). Furthermore, the collaboration is able to create an increased innovation which is applicable in developing a more efficient logistic system. In partnership both parties seek to achieve a relation built on dependency, rather than avoiding it. This can be done by signing long-term agreements in order to reach long lasting relations. However, in terms of partnership relations, the dependability could be regarded as a risk since it would be difficult and time consuming to replace a poorly performing company in a partnership relation. This aspect further underlines the importance of choosing 'right' supplier to involve in a partnership arrangement.

2.5.2 Partnering

In the construction industry partnering commitments have been used as a mean of solving the problems related to arm's length relationships and achieving relationships comparable to partnership between different actors in the process (Gadde & Dubois, 2012). As in the case of many management tools such as kanban, JIT and 5S, partnering has also its origin in the philosophy of the Japanese manufacturing industry (Bower, 2003). It represents, alike partnership, an atmosphere of dispute prevention, win-win culture, good relationships, trust,

teamwork and cooperation. Bower (2003) argues that the contemporary style in which contracts are managed must shift from its “hard issues”, i.e. price, to “soft issues”, i.e. capability, attitude, culture and commitment. The latter formulation can be described as elements necessary in partnering. A partnering arrangement can be defined as following:

Partnering is a management approach used by two or more organisations to achieve specific business objectives by maximising the effectiveness of each participant's resources. The approach is based on mutual objectives, an agreed method of problem resolution and an active search for continuous measurable improvements.

Bennett & Jayes, 1995; 2

The benefits of partnering are many, i.e. enhanced productivity and cost savings, better quality and utilization of resources, and shortened project process, if the concept is not misconstrued (Bower, 2003; Bresnen & Marshall, 2000). It should not be considered as an excuse for not working hard nor as a system or method – it is about enhancing the opportunity for people to work more efficient and effective. Also, it should not be considered as a contractual requirement, but rather as a relationship with commitment (Bower 2003; Egan, 1998). Currently in the construction industry the main actors involved in partnering agreements are clients and contractors along with subcontractors (Gadde & Dubois, 2012). However, Gadde & Dubois (2012) suggests that involving suppliers in partnering agreements is an unused resource in the industry. The benefits may concern, among others, the opinions of the suppliers being acknowledged in the design phase and the opportunity to repeat business (Bower, 2003).

Partnering is not just positive though. Critique has been expressed in practice as well as in academia (Gadde & Dubois, 2010; Egan, 1998; Larsson, 1995). Arm's-length relationships are so deeply rooted in the culture of the construction industry that traits of such relationships can still be identified in partnering arrangements (Gadde & Dubois, 2010). For example, it has been observed that difficulties exist of converting strategic decisions regarding partnering into behaviour at operational levels (Gadde & Dubois, 2010; Bygballe, 2010). Barriers of this kind can be traced to the gap between the intention of corporate levels and the behaviour at construction sites, where operations are influenced by various factors. Furthermore, Larsson (1995) suggests, after studying project partnering in 280 construction projects, that the fundamental views of project partnering is not ground breaking but has been exercised over time. This viewpoint is illustrated through the sceptical opinion of one construction manager:

“Partnering is a new word for being reasonable, conscientious, and professional. Quite frankly, I am tired of people acting like this is some great new discovery. For people who have been lawsuit-oriented and discovered it does not pay, this may sound like new ground. For those who have always kept their goals in sight (i.e., on time, on budget, good work, etc.) it's not new, it's just effective project management.”

Larsson, 1995; 31

However, Larsson (1995) concluded that there was a significant difference between informal partnering projects and formal partnering projects, in terms of achieving technical performance, controlling costs and meeting customer needs and overall results.

There are different forms of partnering that can be implemented between two or more parties (Kadefors & Eriksson, 2015). Literature often distinguish between partnering delimited to a relatively short period of time, in this thesis referred to as project partnering, and long-term oriented partnering, in this thesis referred to as strategic partnering. The former kind of partnering constitutes a formal agreement on collaboration in occasional projects, where a project team strive for a common set of goals (Beach et al., 2005; Kadefors & Eriksson, 2015). Since project partnering usually involves two or more parties striving for short-term benefits for the project in question, it is unlikely that such short-term approach would lead to advanced coordination, cooperation or learning. Beach et al. (2005) further argue that doubt has been expressed on whether or not project partnering is suitable for an industry such as construction, which relies on repeated businesses. However, it may function as a promotion for closer relationships. Strategic partnering, on the contrast, constitutes a formal agreement on collaboration over several projects (Beach et al., 2005; Kadefors & Eriksson, 2015) and is preferable compared to project partnering according to Bygballe et al. (2010). It emphasizes a long-term commitment in the relationship with the aim to achieve specific business objectives by maximizing each actor's effectiveness with respect to their resources (Beach et al., 2005). The authors also stress the importance of trust in a relationship by arguing that "*Organizations that develop collaborative relationships have shown to achieve lower costs for as long as they maintain trust ...*" (2005; 613). However, Gadde and Dubois (2010) argue that project partnering should not always be further extended towards a more well-developed strategic partnership. It does not have to be necessary, feasible or desirable in the construction industry, where arm's-length, contractual relationships may be considered as legitimate due to the context of the operations in the business (Egan, 1998; Gadde & Dubois, 2010).

Gadde & Dubois (2010) expresses two requirements to achieve an extension of partnering. First, knowledge transfer between projects is one necessary requirement where the complexity of sharing knowledge lies within the decentralization of the industry. The second requirement is to shift to a more long-term oriented mind-set, instead of relying on short-term efficiency through competitive tendering. However, it is considered unrealistic to shift from project partnering to strategic partnering due to the major modification of the basic conditions in the industry that is required in order to develop a sustainable relationship that is healthy for the construction process as a whole. Hence, Gadde and Dubois (2010) suggest *intermediate level partnering* for the construction industry. If considering a spectrum with high and low degree of decentralization, the intermediate level partnering would be found right in the middle of the spectrum, with project partnering (high degree of decentralization) and strategic partnering (low degree of decentralization) on each side. An intermediate level partnering attains benefits from both project and strategic partnering with regard to the flexibility of a decentralized system and the dimensions of a high-involvement relationship (Gadde & Dubois, 2010). It constitutes agreements, between contractors and suppliers, on prefabricated systems and building modules such as bathrooms and kitchens. This approach transfers activities to an earlier phase in the supply chain, from the construction site to an industrialized environment. Hence, an intermediate arrangement enhances the interaction between the permanent networks in the firms, and as a result over time, it may foster joint product development and inter-organizational sense-making. The other dimensions of a high-involvement relationship, i.e. adaptations, dependence and mutual orientation – defined in the chapter below – are in turn fostered through the long-term and regular contacts with the suppliers (Gadde & Dubois, 2010).

2.5.3 Defining High-Involvement Relationship

Gadde and Dubois (2010) investigated in problems and opportunities with partnering. In order to make a suggestion of an appropriate arrangement for the construction industry, they have identified six dimensions that have functioned as a prerequisite for partnering in other industries. An overview of the dimension is presented in *table 2.1*. These dimensions define a 'high-involvement relationship' (HIR).

The first dimension is reflected by longevity, which characterizes transactions between an organization and its loyal business partners over long time periods. The Ford Motor Company, as an example, has managed to develop a long-term relationship with its suppliers. More precisely, Ford is still in business with approximately 20 of their suppliers since the manufacturing of the Model T in 1908.

Longevity is a result of *adaptions*, which is the second dimension of a HIR. Adaptions are fundamental for elaborating combining resources between two actors with respect to effectiveness and efficiency (Gadde & Dubois, 2010). A substantial aspect of efficiency is to create a smooth running supply chain and by doing so it is of great importance to endorse a communicative and collaborative relation (O'Brien, 2014). To enhance the joint performance between two organizations, adaptions can be developed by e.g. strengthening technical, IT, time-related, legal, knowledge-based and social bonds (Gadde & Dubois, 2010; Jonsson, 2008). Technical bonds concern adaptions of production processes, production equipment or choice of materials (Jonsson, 2008). IT bonds concern investments in the same IT systems, such as EDI (Electronic Data Interchange), and time-related bonds imply supply chain and logistics activities with respect to timeliness. Legal bonds concern contractual forms and other agreements between the supplier and the contractor, which sometimes is developed with the purpose of ensuring a long-term commitment. Knowledge-based bonds emerges when the customer and the supplier develops knowledge of each other's problems and activities. Such knowledge-based bonds enables better adaptions between the firms and, in turn, facilitate mutual support when solving problems. Social bonds will be stressed below, in the paragraph of *interactions*.

In order to obtain the benefits of a HIR in terms of enhanced innovation and productivity, the involved organizations cannot avoid the third dimension – *interdependence* (Gadde & Dubois, 2010). Innovation can generate value that reforms the possibilities for an organization. When actual innovation occurs this can establish and build a brand, create differentiators, create and grow market share and drive business growth (O'Brien, 2014). But what does it mean to be dependent on another party? Frödell (2011; 383) defines interdependence as “*when one actor does not control all of the conditions necessary for achievement of a desired outcome, but a reciprocal dependence is present.*”

The fourth dimension, *interactions*, is a prerequisite for interdependence and adaptions. HIRs are characterized by intense and continuous interactions in various projects or other arrangements that are initiated with the aim to achieve a specific objective(s) (Gadde & Dubois, 2010). Any interaction between two firms is embedded in its context of time and space. The quality of the relationship in an interaction is affected by previous experience. Moreover, expectations on the future affect the current interaction. If a buying organization is important for the future market, the supplier will add more resources into the interaction in question. Through interaction under a period of time, social bonds are generated – enhancing the personal relationship (Jonsson, 2008). This, in turn, facilitates cooperation and trust between the individuals. As a result of developed trust between the parties, a long-term

oriented relationship can be attained which "*increases the buyer's confidence that short-term inequities will be balanced in the long run.*" (Jiang et al., 2011; 7) The space context refers to the organizations being involved in separate interactions with other organizations simultaneously.

Gadde & Dubois (2010) emphasizes the *relationship atmosphere* as a fifth dimension, and characterizes it as a combination of confrontation and collaboration. Confrontation comprises power and conflict, whilst collaboration entails trust and commitment. In the appearance of a conflict, if both organizations are jointly engaged in the problem, it is more likely for the outcome to be of higher quality since it reflects a win-win situation (Frödell, 2011). However, to maintain a successful long-term relationship, Frödell (2011) argues that trust is the most critical factor. It is developed through delivering what has been promised, and is further engendered through mutual experience.

Lastly, the sixth dimension is *mutual orientation* between two organizations, which is created through adaptations and continuous interactions. Both parties are at this stage aware and knowledgeable about the other organization's conditions, where a decision in one firm is taken with the other firm in consideration. Hence, interdependence and strong couplings are created.

Table 2.1: Summary of characteristics of each relationship dimension of HIR, based on Gadde and Dubois (2010).

Relationship dimensions	High-involvement relationship
Longevity	Frequent and loyal business exchange in long term
Adaptions	Collective adaptions to improve the overall performance
Dependence	Dependencies between organisations through settlements of technical complexities
Interactions	Vivid interactions between the parties which directs the current and future state
Relationship atmosphere	Cooperative factors facilitating conflict caused by contradictive interests of the parties
Mutual orientation	Generated by frequent interaction and adaptation, enhance the interdependence relationship development

2.5.4 Supplier segmentation

In order to harness ones resources sufficiently, a contractor should not treat every supplier equally but instead chose specific suppliers to engage in closer collaborations such as HIR (Dyer et al., 1998; Jonsson, 2008; Kraljic, 1983; O'Brien, 2014; Spekman et al., 1998). The process of differentiating the suppliers in levels is often referred to as supplier segmentation. Jonsson (2008) and O'Brien (2014) both use three levels of customer and supplier relationships. Those levels are visualized by a pyramid where the closer collaboration is represented in the top and traditional collaboration is represented in the bottom of the pyramid. This illustrates that partnership relations is suitable for exclusive suppliers with long-term approaches and conventional relations is suitable for several suppliers of solitary nature. Jonsson (2008) labels those levels as *Conventional suppliers*, *Associated suppliers* and *Partnership suppliers* as shown in figure 2.5.

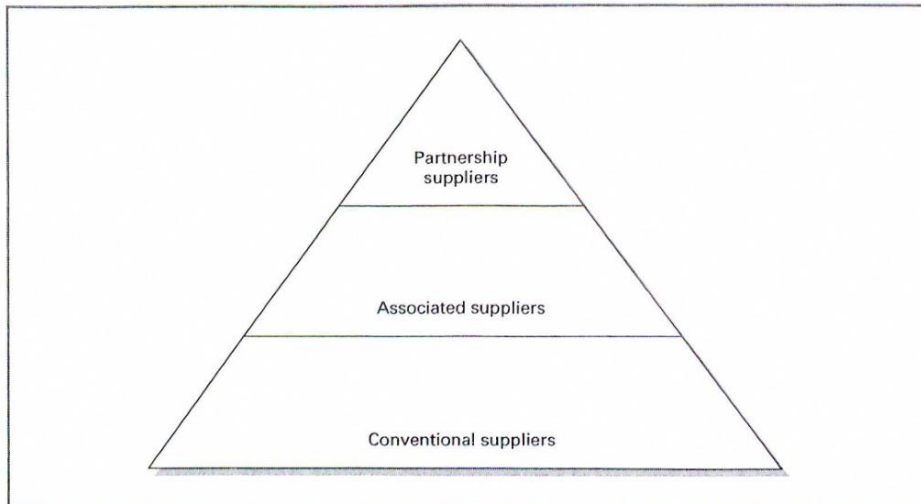


Figure 2.5: Three levels of supplier and customer relationship, according to Jonsson (2008).

Moreover, the actual segmentation is the procedure leading up to the categorization of suppliers. To achieve this adequately it is of importance to adapt a holistic approach based on specified criteria's with processes tailored in order to fit the needs of the organisation (O'Brien, 2014). A part of this procedure is to use tools to differentiate between suppliers.

2.5.4.1 Segmentation using the Kraljic's matrix

The Kraljic's matrix is a tool used to separate different suppliers based on significance and availability (Kraljic, 1983). The tool is commonly used in supplier segmentation to establish the importance of specific suppliers (Jonsson, 2008; Gadde et al. 2010). The suppliers are divided dependent on their provided product and in the matrix the items are labelled as Non-critical, Bottleneck, Leverage and Strategic (Kraljic, 1983). As shown in *figure 2.6*, Non-critical and Bottleneck items represent product with low significance to the company whereas Leverage and Strategic items is of high significance. Furthermore, Non-critical and Leverage items are highly available on the market whereas Strategic and Bottleneck items are not. In this case suppliers providing strategic items is of greatest importance to include in a long-term closer collaboration.

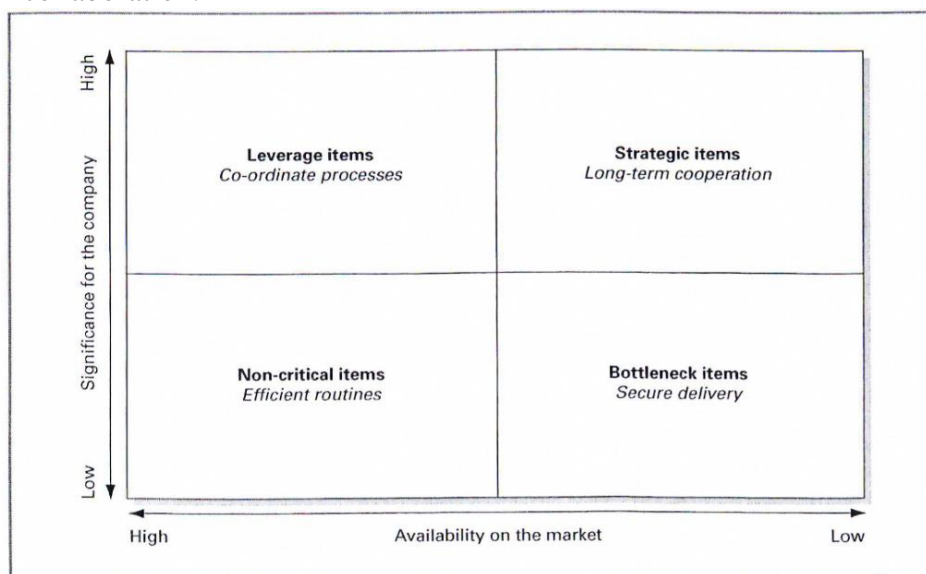


Figure 2.6: The Kraljic's matrix (1983) presented by Jonsson (2008) where items are reviewed in terms of significance and availability.

3 Method

This chapter presents the methodology of this thesis. It comprises the procedure of development, and strategies that have been applied, through a discussion on alternative approaches on academic research. The chapter is initiated with an overall perspective of the method considering 'Disposition', Research approach' and 'Research method' and finalised with methods regarding the case study through 'Case study selection', 'Interview technique', 'Interview selection', 'Ethical considerations', 'Data analysis' and 'Interview data analysis'.

3.1 Disposition

The method was used as a formula to answer the research questions and thereby fulfil the purpose of the thesis. The thesis consists of three main parts, theoretical framework, case study and analysis where the first two parts served as a foundation to complete the analysis.

The theoretical framework was based on a literature review and presents models and theories that was used when analysing the case. This literature review was based on scientific publications such as articles and books. Keywords used in the research where *Supplier, contractor, relation, closer collaboration, construction industry, supply chain, logistics, partnership, partnering, strategies, management*. Chalmers library and Google scholar where used as main sources to find relevant literature. The relevance of the literature where sorted out with the purpose of the thesis in mind by regarding the abstract, introduction and conclusion of the articles. In addition, the number of citations and the publication date where also considered.

The case study was used to contextualize theories and models presented in the theoretical framework and by that reinforce the results in the analysis. In this case the relation between Woody and Serneke was examined through a specific project, which is elaborated in 'Case study selection'.

The analysis combines and uses the theoretical framework and case study to create results. This is further illustrated in *table 3.1* where the aim of the different parts is stated.

Table 3.1: The purpose of each section of this thesis is presented.

Theoretical framework	Case study	Analysis
Aims to:	Aims to:	Aims to:
Declare the characteristics of the supply chain and logistics in the construction industry	Present the existing modus operandi in the relation between supplier and contractor	Analyze the existing modus operandi in the relation between supplier and contractor
Define and examine a closer collaboration	Clarify the views of different actors involved in the process	Present feasible procedures and improvements to improve the supply chain process
Present existing procedures to improve relations	Generate material to analyze the relation between supplier and contractor	Generate suggestions of new research
Generate material to analyze a relation between supplier and contractor		

3.2 Research approach

The relation between a theoretical framework and an empirical study can be explained with three alternative concepts – *deduction*, *induction* and *abduction* (Patel & Davidson, 2011) (*figure 3.1*). The concept of deduction has its point of departure in theory. Hypothesis made from the theory studied are then empirically examined in the case study. In contrast, an inductive study has its point of departure in the empirical study without any abutment in a recognized theory. A theoretical framework is then formulated. The third alternative can be explained as a combination of the previous two concepts, with two phases. The first phase is characterized by a theory that is formulated with respect to a specific case – an inductive approach. This theory is then used as a foundation for verifying new data – a deductive approach. In the second phase, the theory is elaborated.

According to Patel and Davidson (2011), a deductive approach will enhance the objectivity of the research with regard to the starting-point in the theory, which provides information that can be used when collecting, processing and analysing data. However, the theory will affect what to be examined when performing the empirical study - observations that could be of interest for the research may be undiscovered. In other words, the author will obtain knowledge in the field of study prior to the empirics. With an inductive approach, on the other hand, the author will establish an understanding of how to develop a theory with respect to observations, interviews or other methods used for collecting data (Patel & Davidson, 2011). Hence, there is a risk that the researcher will become a subjective part of the process, influencing the theory that is to be produced. Both deduction and induction can have the negative aspect of having the risk of constraining the researcher, where abduction, on the other hand, serves the freedom of elaborating data and theory. However, in the case of abduction, researchers may choose a field of study with regard to experience and, furthermore, developing a theory that excludes other alternative interpretations.

Chosen research approach: The alternative chosen for this thesis was the abductive approach. At first, it enables a fair understanding of the objective of the research. This can subsequently function as a guideline for developing a theory, which was necessary in order to formulate relevant questions for the interviews. The abductive approach also enables continuous elaboration of both the collected data and the theory, where potential improvements and/or modifications can be applied to the research. The research process when conducting this thesis has been threefold. First, literatures were reviewed in order to form an understanding of the subject and a foundation for the first segment of the interviews. The first segment regarded interviewees that were in direct contact with activities on the construction site. Second, the theoretical framework was further developed with respect to the respondents' answers, and new theory was developed for the second segment of the interviews – individuals that were in indirect contact with activities on the construction site, and that have a more strategic position in respective organization. Lastly, the theoretical framework was further developed and finalized with respect to the interviews.

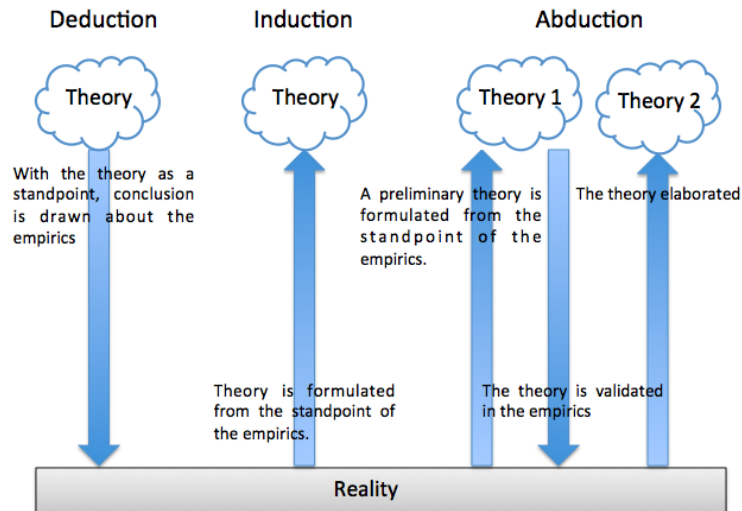


Figure 3.1: A model of the three research approaches presented (Patel & Davidson, 2011).

3.3 Research method

There are essentially two methods on how to systemize, compress and elaborate collected data in academia - namely *quantitative* and *qualitative* method. The first method comprises mathematical and statistical analysis while the latter comprises elaboration of gathered information, through e.g. interviews and observations (Patel & Davidson, 2011).

According to Bryman & Bell (2003), there are fundamental differences between the quantitative and qualitative method. The relationship between theory and empirics in a quantitative research is considered to be developed through a deductive approach, where the theory is tested on real life scenarios. Moreover, the method entails positivism since it relies on practices and norms of the scientific model of nature, and it contemplates the social reality objectively. The relationship between theory and empirics in a qualitative research is, however, usually developed through an inductive approach, where the theory is developed with basis from a specific case. Rather than emphasizing practices and norms of the scientific model of nature, it entails human individuals' interpretations on the social world, hence, a subjective contemplation of the social reality (Bryman & Bell, 2003). However, Bryman (2011) suggests that the subjective nature of the qualitative method could become overly impressionistic. Furthermore, the results of a qualitative study could be difficult to transfer to other situations.

Research method approach: The empiric of this thesis was based on interviews with the intention to map the relation between the two organizations in question. By applying a qualitative method, a more in-depth knowledge was obtained, in contrast to the fragmented knowledge that could be acquired through the quantitative method (Patel & Davidson, 2011). Also, it allowed the interviewees to contribute to the research with their own opinions on a specific matter.

3.4 Case study selection

In order to contextualize the theories and models declared in the theoretical framework a reference case was chosen to serve as a case study. Bryman (2011) defines a reference case as a generic case applicable in universal situations. The case studied in this thesis was the

relation between Serneke and Woody Angered by observing the project at Näverlursgatan, including the actors both directly and indirectly involved.

Woody Angered is a supplier of building material founded in 1997 and currently posse's three locations around Gothenburg. It is an independent organisation with a total revenue of approximately 285 million SEK and is a part of the nationwide corporate group Woody (Woody, 2016). The organization has a wide range of contractors as customers, and supplies material to both small and large construction projects. In order to be competitive on the supplier market Woody Angered aims to be market-leading in logistics and service supply. However, currently the most common modes of delivery are a traditional manner without additional services or logistic reliefs (S3, 2016 [see table 3.2]). The size of the company, the variety of customers and the involvement in a large corporate group was motives to why we chose to study Woody Angered. The ambition to expand and develop as a company was also a factor in the decision.

The contractor company, with a revenue of about 3 billion SEK at the time of 2015, was founded in 2002 and are currently a nationwide contractor with its headquarters and main operation in Gothenburg (Serneke, 2016; S2, 2016). Several complicated projects, in terms of logistics and supply chain management, have been executed by Serneke such as Prioritet Serneke arena. Furthermore, Serneke plans to conduct additional complicated projects, such as Karlatornet, in the future which requires sophisticated logistic solutions (C1, 2016). Serneke generally uses traditional procurement strategies (C1, 2016), which could be resembled to an arm's length relation, with the supplier. The size, traditional strategy in terms of procuring the supplier and the need of sophisticated logistic solutions was factors in choosing Serneke as a reference company.

Woody and Serneke have a recurring collaboration where Woody gets to deliver to about 80% of Serneke's projects in Gothenburg (S3, 2016). Still they do not have any particular long-term agreements. Thereby this relation can be described as a traditional, arm's length, but frequent which is significant to the industry (Egan, 1998). Hence, the connection between these two companies was considered as suitable to exemplify the collaboration between supplier and contractor in the construction industry.

As a reference project Näverlursgatan was chosen. This project consists of refurbishment and extension of an apartment complex and was worth about 80 million SEK (Serneke, 2016). The agreements between the supplier and contractor in this project were carried out in a common fashion, namely arm's length agreements (Egan, 1998). However, since the actors in this case have had a recurring relation, the collaboration could be described as frequent. Moreover, services have been delivered from the supplier to the contractor in addition to the delivered material. This made this project suitable to resemble an increased involvement of the supplier with regularly used agreements. Furthermore, alike projects will occur in the neighbouring properties, which made this research increasingly relevant to the involved actors as well as convenient for future studies.

3.5 Interview technique

Interviews can be designed differently depending on what degree of facilitation for analysing the gathered information from the respondents the interviewers prefer, and, foremost, depending on what is suitable for the research (Bryman, 2011). However, the three most widely used designs are *structured*, *semi-structured* and *unstructured interviews*.

Structured interviews is characterized by interview questions that have a pre-decided structure, where the questions are asked in an order of priority, and similarly. The questions are usually specific and have a restricted spectrum of alternative answers, facilitating comparable analysis of the answers received from the respondents (Bryman, 2011). Structured interviews are a preferable tool for gathering information since it eases the actual formulation of the questions during the interview, and the registration and the categorization of the respondents' answers. Unstructured interviews comprise a theme or more general frame of questions. These function as a guide, rather than a scheme. Moreover, the questions are formulated informally, and the order of priority varies between the interviews.

The third design comprises semi-structured interviews, and is characterized by having a scheme of questions, but without an order of priority, in contrast to structured interviews (Bryman, 2011). Also, the questions are formulated more generally, where there is a tendency of attendant questions to the respondents. Semi-structured interviews is an alternative that enables easier categorization of the answers than unstructured interviews, and at the same time enhancing the possibility to include the opinions of the respondents to a much greater extent than in the case of structured interviews.

Interview design approach: In order to include the opinions of the respondents about the relationship between the two organizations, and to ease the process of collecting and analysing the data, a semi-structured design has been applied. Their opinions are a crucial factor in forming an understanding of the contemporary relation, and to find the gap that may need to be covered in order to develop a sustainable increased collaboration. The interview questions can be found in Appendix B. The interviews have had duration of approximately one hour, and took place at the respondent's office. The authors of this thesis where both present during the interviews – one was responsible for asking the questions while the other had the responsibility of documenting the answers. These responsibilities where alternated between the interview sessions. The decision of not recording the interviews is further elaborated in 'Ethical considerations'.

3.6 Interview selection

Bryman (2011) argue that goal-oriented selection is a strategic technique for conformation between research questions and the selections. The interviews are selected based on their relevance for the research. The theoretical sampling method is a kind of goal-oriented interviewee selection suitable to be combined with grounded theory (Bryman, 2011). Such technique implies selection of interviewees with respect to the theoretical framework. When the collected information from the interviews corresponds to the theory, a new selection is made based on the direction of development the theory will take. This technique has recurrently been labelled as "iterative", due to its work of procedure. In this thesis, a goal-oriented selection through theoretical sampling was used when selecting interviews.

The selection of respondents was based on their direct and indirect involvement in project Növerlursgatan. To develop a fair understanding of the relationship between the two organizations, respondents were selected from different divisions – from production and sales to the strategical positions in both of the organizations. A frequently used contact person at the supplier company contributed with potentially relevant respondents for the thesis. However, in order to avoid a biased selection, from the supplier company perspective,

respondents were also selected with consultation from the external supervisor for this thesis. The selection of respondents is available in appendix.

3.7 Ethical considerations

There are interview sessions that have a clear purpose and definition for the respondent, i.e. when a doctor asks questions to a patient in order to provide a proper treatment, or when an employer interviews a candidate for an employment (Patel & Davidson, 2011). However, in the case of this thesis, the respondents contribute to the research voluntarily, why it is necessary to explain the purpose of the interview, and why their contribution is important for the research.

Since the interviews comprise questions about the organizations' relation to each other, a strategic decision was made not to record the interviews. Hence, the respondents can feel more comfortable answering the questions by heart, rather than formulating their answers diplomatically in order to avoid the risk of exposing their real concerns. This has, however, stressed the importance of the interviewer to be fully focused on the information received from the respondent. Prior to the interviews, the respondent has been informed about their anonymity in the thesis.

In order to secure the anonymity of the respondents in the thesis each respondents were given a code comprised of a letter and a number. The letter indicates if the respondent belonged to the supplier (S) or the contractor (C), the list of interviewees can be found in Appendix A. Furthermore, the titles of the respondents were not exposed but instead the respondents are labelled as part of strategic level (SL), intermediate level (IL) or/and operational level (OL) in the organisations. By separating between the levels of the companies and placing each respondent in different levels, the significance of the respondents can be evaluated without revealing the identity of the actors. The strategic level includes leading actors in the organisations who were involved in strategic decisions throughout the supply chain. Actors at the intermediate level were involved in the pre-production phase of the process whereas the operational level comprised actors engaged in the production phase. The distribution of the actors in the different levels is presented in *table 3.2*.

Table 3.2: The respondents divided in different levels in accordance with their positions in the organizations.

Respondents	Level
S1, S2, S3; C1	Strategic Level
S3, S4, S5; C2, C3, C4	Intermediate Level
S4, S5; C4, C5, C6	Operational Level

3.8 Data analysis

There are several analysing strategies in a qualitative study but the two most frequently used strategies, according to Bryman (2011), is analytic induction and grounded theory. Both strategies is used iteratively which means that the analysis and data collection coexists and influences the process. The analysing strategies can also be seen as a strategy to collect data, since the analysing strategy will greatly influence the data collection.

Analytic induction is initiated with a rough definition of a scientific question formulation, followed by a hypothetical explanation, subsequently data is collected to prove the theory (Bryman, 2011). If the data in any way differs from the hypothesis, the hypothesis is

redeveloped in order to fit the case and the data collection continues. This means that a single case that deviates from the hypothesis has to be recognized which makes this method very strict.

Bryman (2011) presents grounded theory as the most common approach of analysing qualitative data. The main features of grounded theory are the theoretical sampling, coding, theoretical saturation and constant comparison. The process is initiated by research questions and followed by theoretical sampling and thereafter data is collected and coded as it is collected. Coding refers to categorizing the data in order to differentiate between different aspects of the study. During the process the different phases is performed iteratively until both theory and coded categories is perceived as saturated. The hypothesis is developed during the process and tested in order to create a substantive result. However, even though Bryman (2011) presents this method as the most influential he also delivers criticism. Inter alia, Bryman (2011) claims that it is arguable if this analysis in most cases leads to a theory but rather presents different concepts.

Data analysis approach: In this thesis, grounded theory was used as analysing strategy since this was found suitable in a qualitative, abductive study. Furthermore, the data analysis deriving from this kind of strategy was relevant in the chosen case. Respondents were likely to disagree in some way since they belong to different companies and positions, which is why an analytic induction would be too strict to use as a strategy. Hence, the authors of this thesis found that the categorization and integrated iterative process of grounded theory was the most appropriate choice.

3.9 Interview data analysis

The qualitative semi-structured interview technique along with grounded theory strategy causes interpretation in the data analysis. In order to interpret and categorize the data sufficiently analysing models should be used (Bryman, 2011; Kvale 1997). Kvale (1997) presents five analysing models namely sentence concentration, opinion categorisation, narrative structuring, intention interpretation and Ad hoc. Foremost sentence concentration, opinion categorisation and ad hoc was found suitable for the structure of this thesis which is why these three methods will be further explained.

Sentence concentration refers to rephrasing citations from respondents to more compact statements (Kvale, 1997). Whereas opinion categorisation imply that different statements is structured into categories in terms of existence and intensity of a phenomena. These categories could be organised before, during or after the actual interview. By opinion categorization an interview can be summarized in for example figures or tables which would be easier to analyze. Opinion categorisation could, in that aspect, be resembled to Bryman's (2011) coding in the process of grounded theory. Ad hoc is a combination of different analysing models developed in order to fit the specific case (Kvale, 1997). Hence, this method can be used in several versions including various analysing models. Kvale (1997) states that ad-hoc probably is the most commonly used analysis method.

Interview data analysis approach: By using an ad hoc combination of sentence concentration and opinion categorization the collected data has been coded in order to be manageable. This method enables the collected data to be connected to the theoretical framework and thereby the analysis by means of the chosen research methods, strategies and interview techniques. The result was a fluent text describing the gathered data from a holistic perspective.

Furthermore, statements were referenced to specific respondents when a single respondent presents an opinion or respondents from different levels of the organisation have mutual opinions. When several respondents shares an opinion, and shares levels in the organisation, the statement was referenced to the level in which the respondents belonged. When an opinion differed between the levels of the companies the level and company was clearly stated. Depending on the frequency of an opinion or statement the reference was clarified by stating if all or the majority of the respondents or organisational level agreed.

4 Empirical findings

This chapter presents the findings of the case study of the collaboration between a contractor and a supplier in the construction industry. The case study has been executed by regarding a reference project and interviewing actors directly and indirectly involved in the project. Additional information considering the studied companies and project can be found in 'Case study selection'. All interviewees has been allocated a code and divided into levels in the organisations in order to maintain the anonymity of the actors. The distribution of the respondents is presented in 'Ethical considerations' and 'Appendix A'. The focus of the findings is based on the theoretical framework along with previous observations from interviews, in accordance with the abductive method. Three dimensions of the studied relationship are presented 'Modes of procedure', 'Relationship characteristics' and 'Long-term orientation'. The motive of those headings is further elaborated in the introduction to each section.

4.1 Modes of procedure

Modes of procedure describe the existing and desired procedures in the collaboration between the studied companies in order to answer the research questions substantially. This section is related to all parts of the theory regarding 'Characteristics of the construction industry', 'SCM in the construction industry' and 'Supplier relationship management'. The section comprises three subheading namely 'Process of collaboration', 'Early involvement' and 'External and internal knowledge transfer'. 'Process of collaboration' comprises an overall view of how the existing collaboration works and serves as an introduction and fundamental feature in order to comprehend the existing relationship. This section is mainly connected to the theory through 'Characteristics of the construction industry'. The second section, 'Early involvement' is related to 'SCM in the construction industry' in the theoretical framework and presents the respondents opinions regarding involving actors early in the construction process. The transfer of knowledge, both between and within the companies, is described in 'External and Internal knowledge transfer'. This section is foremost connected to the last part of the theory consisting of 'Supplier relationship management'.

4.1.1 Process of collaboration

The construction company gets involved in a project either in the project idea phase or project investigation dependent on which contract form is used (the construction process is further examined in 'The construction process'). Usually the construction company leaves the process when the production phase is executed but in some cases they are also involved in the maintenance phase, (C1-C6). The respondents at SL and IL at the contractor state that their involvement is highly dependent of the needs and desires of the client. About 80% of the project's budget is allotted subcontractors and suppliers, but the vast majority of that figure is allocated to subcontractors (C1 –C2). The contractor's main focus considering external companies is towards the subcontractors (C1-C6). In the studied relation, between the supplier and contractor, the supplier is usually involved in small scale in the project investigation but is not able to influence the process until the initiation of the production, according to most respondents. Thus the supplier is commonly not involved in the design phase.

All respondents have stated that the supplier's involvement in the project investigation is connected to the contractors offer to the client. At this point the involvement of the supplier is delimited to foremost price quotations but also brief information exchanges considering

material characteristics. (C2-C3). The supplier is unable to influence the tendering in most cases, instead the main task of the supplier is to assist with the mentioned information (IL). However, the supplier company does provide the contractor with an attachment of services that can enhance the productivity, efficiency and effectiveness of the site activities (S3). The contractor generally assigns these tasks to 3-4 suppliers where a single supplier is given the task of delivering the inquired material (C2-C3). This process of choosing a supplier is initiated when/if the contractor wins the tendering process and is executed by the project management along with the purchasing department (C1). When evaluating the suppliers the main focus is on the lowest price because of the low margins in the industry, but previous experience and evaluation of the supplier companies are also reviewed (C1). If the supplier is not given the task of exclusively delivering material, they could still be able to deliver some of the material to the construction site, according to S4.

The involvement of the supplier in the production phase is initiated by a start up meeting, according to all respondents. This meeting involves actors from both companies relevant to the project (IL, OL). However, the construction foremen are usually not present during those meetings even though the majority of communication in the relation is between them and salesmen at the supplier in the production phase (OL). Respondents with experience of start up meetings verify that price is discussed and further pressured by the contractor (S3 & C4). C1 claims that pricing could differ from the tendering process to the production phase since circumstances can change and the process can be time consuming. All respondents from IL and OL argue that additional meetings during the production phase are uncommon. However, C4 and S3 have experienced middle meetings, to check-up on the collaboration, and evaluating meetings after the project is finished.

4.1.2 Early involvement

All respondents are positive to involve actors, including the supplier, early in the process. In fact a majority argues explicitly that the earlier an actor is involved in the project the better. As been presented in 'relation background' the supplier is, to some extent, already involved in the project investigation by contributing to the tendering process. However, all respondents at OL in both companies mean that this involvement is strictly connected to contributing with price and that additional contribution from the suppliers are very uncommon. C2 suggests that this is due to the necessity of the client to approve changes in the design at the project investigation. Furthermore, participation from the supplier is not considered until the production phase is initiated, leaving out the supplier to contribute in the design phase, according to all respondents at IL. S5 expresses that s/he does not believe that the contractor want to involve the supplier in the design phase but that it would probably be better if they did.

Several reasons are presented as to why early involvement is preferable, where an increased commitment is expressed by a majority of the respondents. In addition, S3 argues that it is of importance to involve the supplier in the design phase in order to harness and exchange the competences among actors. By doing so s/he further claims that the abilities of the supplier can be used to a wider extent, especially in terms of contributing with services. The respondent claims that it is hard to sell services, such as delivering material to a certain spot in the building, in the production phase since staff agreement are already settled in the design phase (S3). Most respondents in IL argue that it is rare, but increasingly more common, that a contractor is considering services before the construction phase. All respondents from the contractor's OL is positive in terms of buying services, even though they show little knowledge about what services the supplier provides. Moreover, the necessity of the

supplier's knowledge in the design phase has been questioned from both companies. S4 and S5 imply that they do not desire to contribute with more knowledge earlier in the process in the case with the studied supplier, since they suspect that this contractor has enough knowledge in their own organisation. This attitude towards the knowledge connected to the design phase of the studied contractor is shared by C4. When dealing with a smaller contractor the knowledge of the supplier is needed to a higher extent according to a majority of the respondents at the supplier. The respondents connected to IL and OL at the contractor indicates that knowledge concerning lead times and characteristics of material is important to get from the supplier. All respondents from the contractor at OL are self-critical when it comes to foresight in ordering material, C5 describes this as panic-orders. Furthermore, C5 argues that early involvement and increased knowledge transfer could improve this situation.

4.1.3 External and Internal knowledge transfer

Knowledge transfer between projects is considered as an important element for evolving more efficient and effective processes (SL, IL & OL). However, not much effort is put on documenting information from projects. According to respondent C5, the contractor company does not have meetings that reflect documentation of project specific information. This is due to lack of time at the end of each project, where the next project should be ready for start as soon as possible (C5 & C6). Respondent C4 argued the opposite, that the company have meetings at the end of each project with all the involved parties at their organization – from the purchase department to the foremen. However, C4 does not know where the documentations are archived, and has not been in need of it since it is seldom that the information is necessary for the next project due to the uniqueness of each project. In addition, the respondent argues that participants shift from a project to another – making it even more difficult to transfer knowledge between projects.

The contractor company does not pursue their activities as they probably should do, with regard to updates on market conditions and tendencies (C1). The respondent further argues that they have too few feedback meetings with the supplier company, and that it may depend on their already established relationship. The respondent (C1) wishes to continue the relationship with the supplier company as it is today, but with more frequent intervals of feedback meetings in order to enhance the understanding of each other's organization. This has not yet been established due to lack of proper priority, since actors in the construction industry often have busy schedules and have perceived other tasks as more important (C1). It is even considered to be easier to transfer knowledge in the cooperation with Woody than with other suppliers, since there is continuity in their relationship (C2). Moreover, respondent C4 has experience of feedback meetings with suppliers and has a positive attitude towards it, and welcomes the supplier company to interact in such occasions. S/he further states that the supplier has been the instigator of the meetings in those cases.

The respondents of SL at the supplier emphasize the importance of contributing with additional services in a project – both in order to increase the value of the provided product and increase their profit. C3 argues the importance of the supplier to be perceived as a logistic partner in addition to supplying material. However, the respondents at OL at the supplier verify that they prefer to work in a traditional manner and underline the importance of the core activity, namely supplying material. Furthermore, the main channel for internal knowledge transfer is during the weekly meetings, according to all respondents at the supplier.

All respondents at SL and IL at the contractor verify that purchasing price has been and still is the main factor when procuring suppliers. Moreover, C1 and C2 argues that additional aspects, such as previous collaborations and delivery precision, has an increasingly enhanced impact but service supply has not yet influenced the procurement. At OL at the contractor, all respondents are positive towards using services in order to facilitate the work of the carpenters at the construction site. C5 argues that it is obvious, from his perspective, that a more expensive option should be used if the result would be improved. S/he further deliberates that if one actor is satisfied, in their organisation, another will probably be dissatisfied since different departments has slightly different priorities. The major channel of knowledge transfer of working with the supplier at the contractor is the stated agreements of what procedures to use in the relationship (C1).

4.2 Relationship characteristics

The main attributes and characteristics of the relationship between the studied actors is presented in this section. Hence, the first research question is mostly considered since the existing relationship is examined. Furthermore, the 'Supplier relationship management' section in the theoretical framework of most relevance to this dimension. The section is separated into three subheadings 'Personal relations', 'Trust' and 'Dependency'. The selection of labelling a subheading 'Personal relations' derives from the frequency of which this aspect is presented by the interviewees. In addition, personal relations are connected to personal bonds and thereby the definition of HIR in the theoretical framework. 'Trust' and 'Dependency' are important aspects of an efficient collaboration (Frödell, 2011) and has been a part of the interview guides, Appendix B. These two aspects are, alike 'Personal relations', also connected to the definition of HIR. The 'Trust and 'Dependency' sections present the respondents' views of each aspect.

4.2.1 Personal relations

The importance of strong personal relations between interacting actors in the different companies is stressed as fundamental by all respondents. The most frequently mentioned positive aspects of personal relations are an increased knowledge and understanding of the needs and ambitions of each other's work. This is often referred to as related to the fragmentation in work method in the industry. Respondent C5 expresses this fragmentation by stating that everybody has their own way of working. Several actors from both organisations stresses the importance of exclusively working with one person, in order to obtain and preserve a personal relation and thereby overcome the problems related to the fragmentation such as a tedious workflow. Furthermore, most respondents verify that a strong personal relation leads to an increased commitment in the collaboration and improved results. In addition, respondent S4 remarks the personal relation as vastly important to them. S/he further elaborates that there are several suppliers on the market competing with roughly the same price, which imply that they need other means, such as personal relations, to be competitive.

The personal bonds in the existing relationship between the studied organisations are many, which is verified by several actors in both organisations. In fact, C2 expresses that "*you almost see them as colleagues*" referring to his/her contact person at the supplier. The personal bonds are spread out in the organisations from leading positions to production level. S2 expresses the importance of personal relations in all levels of the organisations in order to sustain a sufficient collaboration, but stresses the production level as the most crucial in this matter. The importance of personal relations in the production phase is further highlighted by

respondents at SL, IL and OL in both organisations. All Respondents at OL at the contractor highlights the tense schedule as a difficult feature when working with new actors, since establishing a new personal relation is time consuming. Furthermore, the personal relation between actors in leading positions is presented, by actors at SL in both companies, as a huge factor when the relationship was initiated.

Even though most opinions about personal relations is positive, some risks and downsides is brought forward regarding building relationships on personal relations. One negative aspects of working solely with one actor is the increased dependency of that specific actor. This aspect is remarked by respondents in all levels of the supply chain. Respondent S4 describes that this dependency is evident during holiday periods by saying *"It makes it easier if you schedule in accordance with that persons (the contact person) vacation so you get your deliveries before s/he is unavailable"*. The strong bond connected to specific individuals in the organisations are seen as a long-term risk, claims all actors at SL at the supplier. By investing strong personal bonds in individuals, instead of the company in general, these actors see a risk that the bonds between the companies decrease as the individual relation increase. In that case, if the individual would for example retire, the construction company could chose to work with another company rather than establishing a new personal relation at this specific supplier. Examples are presented by a majority of the respondents that transitions from a well-established relation to a new relation is difficult and sometimes it does not work at all due to the personal relation. C1 further elaborates the importance and risk with personal relations by stating *"If the conflict resolution and personal chemistry does not work you stop working with them. The business is kind of self-sanitizing in that way."* Furthermore, most respondents means that a personal relation takes long time to develop but can be ruined in a short period of time.

4.2.2 Trust

All the respondents had a mutual opinion about the level of trust being high between the organizations. Respondent C5 and C6 argued that they could sense the feeling of trust towards the sales personnel at the supplier company with respect to their knowledge on building materials. The respondents at the contractor company's OL argue that errors in connection with the supply process are rare. However, if an error occurs, it is not often it is of a major characteristic. Respondent C5 stresses the frequently occurrence of impulsive purchase at the construction site, with the underlying reason of lack of foresight amongst the carpenters. S/he further argues that in occurrence of a problem, the supplier company is more than willing to cooperate for the benefit of the project. Such reliance evolves a sense of comfort in having the sales personnel as a support function to solve problems. According to respondent C2, other factors that are important to consider in order to obtain trust is that the price and information in the tender document is correct and that it does not differ in major from when the actual payment occurs. Furthermore, with respect to earlier agreements in a project process and the time schedule, it is important to deliver the right materials at the right time. Hence, as respondent C1 stated, the level of trust will be strengthening if each actor holds on to their promises. The respondent also shared his concern about the importance to evaluate the collaboration during harsh times, since that is the most rewarding time to validate the relation in her/his opinion. Respondent S2 had a similar concern, arguing that good customer treatment when receiving a complaint can even enhance trust. As an example of such occasion, the supplier company received a complaint about their delivery being late (S5). The sales personnel contacted truck driver A to gain information on his location. Truck driver B was sent to that location, unloaded the material from truck A and loaded it on truck B, and delivered it to the contractor at 9 o'clock a.m. If truck driver B would have not been

sent to fix the late delivery, the contractor could have risked receiving the materials at 3 o'clock p.m. The respondent further argue that if a delivery is late with one working day, a supplier company will be placed in a bad position since the trust may be at risk. In addition, respondent C1 argue that it is during harsh times, when problems occur, that the relationship is thoroughly evaluated.

4.2.3 Dependency

When in a conflict, both companies are aware of that the problem must be resolved in such that both parties are satisfied (S3). When the problem has been resolved, an investigation is initiated to find the root cause of the problem. The respondent further argues that nobody wants to take the blame since it enhances the costs. However, as a supplier, they are in a higher degree of position of dependence to the contractor than the opposite case. Hence, they do not have much saying in a conflict, but there is always relevance in how to put forward arguments. If the supplier would have acted strictly in accordance with ABM07 (General agreements for purchase of construction materials), they would have had much more saying in conflicts (S3). However, the supplier wins a lot on "goodwill" by taking responsibility when a problem occurs, even though the right of acting in another manner is on their side (S3). In addition, the respondent argues that this is a natural relation between a seller and a buyer regardless of industry.

All the respondents at the supplier company are aligned with the argument that the position of dependence is in favour of the contractor. The contractor company responds to the majority of the supplier's volume of materials and is therefore an important customer. The SL actors at the supplier company argue that the contractor has been a fundamental condition in the operations of the supplier over time, caused by the large amount of bought materials. However, the dependence of the contractor has decreased to some extent in recent times, since large volumes have been bought by additional contractors. Hence, the supplier no longer faces the risk of bankruptcy if the contractor would end the collaboration, according to all SL respondents at the supplier.

All respondents from the contractor argues that they would not be affected to a large extent if the relationship with the supplier would end since there are several actors able to supply the material and volumes that the studied supplier provides. The contractor is mostly dependent of the material and knowledge of a supplier but not specifically the studied supplier, according to all respondents at the contractor. However, the substantial factor of dependency towards this specific supplier is the relationship and trust that has been created over a long period of time (C1). The dependency of this supplier is further stressed by C2 who argues that the contractor is dependent of the supplier in projects with low margins since they know that they offer low prices. Moreover, C4 argues that a change of supplier during a project is not preferable and will consume valuable resources but to replace a supplier in between project is not an extensive conversion.

The contractor's core activity is the construction phase, which is dependent on the craftsmen being supplied with materials (C1). If a delay occurs in a delivery, the whole project may be delayed, which in turn will increase costs. A respondent at the contractor company (C4), with many years of experience from production, stresses the importance of cooperating with suppliers with high delivery precision. Regular contact with the supplier is therefore important in order to enable a smooth production process. The more the production phase can run without distractions regarding deliveries, the more the contractor is willing to pay for the service. The respondent further argues that mistakes are a part of being a human, however, if

mistakes are constantly repeated it will emerge chaos on the site. The ability to resolve problems is therefore a characteristic that is important for the supplier to have.

"A supplier that performs well is not noticeable. However, a supplier that lacks in its performance is of notice."

Respondent C4

Respondent C1, with years of experience from purchase, shared his/her concern about the variety of companies that can supply them with the same materials. The supplier company is therefore not exclusive, which puts them in an underdog position. An important factor for the relation between these two actors is the trust that has been evolved through a long time period, since it is not interchangeable.

4.3 Long-term orientation

The importance of a long-term orientation is presented in the theoretical framework, mainly in 'Supplier relationship management'. This chapter mentions the respondents' views of such arrangements divided into three sections 'Mutual development', 'Long-term agreements' and 'Perception of partnering'. The aspect of 'Mutual development' is frequently mentioned by respondents as a fundamental feature of the long-term relationship. In addition, mutual development correspond to the definition of HIR through Mutual orientation and partly answers both research question. Thus, this aspect was allocated a section in this chapter. Moreover, 'Long-term agreements' and 'Perception of partnering' are foremost connected the last research question considering improvement of the process. Those aspects were included in the interview guides, Appendix B, based on the theoretical framework considering benefits of long-term agreements and partnering which is elaborated in 'Supplier relationship management'.

4.3.1 Mutual development

The studied supplier and contractor have a far-reaching background of collaboration, starting when the contractor was founded. In this period of time both organisations have developed a lot, from being relatively small actors into actors significant to the local industry, and in the case of the contractor, a significant actor to the nationwide industry. Furthermore, the relationship between the companies has been a factor in the development of both companies, according to all respondents at SL. To reach a mutual orientation it is of utmost importance to have an understanding of each other's procedures and strategies (SL). Respondent C1 expresses the importance of understanding and mutual orientation as *"You want to find a supplier who has an understanding of how we operate as a company...You want to reach consensus with the supplier"*. This aspect is presented by most respondents from both companies as an essential factor to the successful relationship they are experiencing today and have experienced over time. However, in the case of mutual development, the unbalance in dependency can indirectly be observed since most respondents from the supplier shows a greater will to adapt than most respondents from the contractor. A respondent at SL at the supplier, S2, expresses that they need to be perceptive towards the contractor. Furthermore, an interest of implementing new solutions, either developed in order to fit the specific relation or deriving from external relations, is expressed by S1 and S2.

Most respondents involved in SL stress that it is of importance to have comparable future strategies and plans in terms of expansion and vision. For example, C1 stresses the

importance of the supplier to be established, or planning to develop, in the same areas that the contractor plans to expand. However, the supplier and contractor have not collaboratively stated mutual strategies but each company has developed their strategies individually. The mutual orientation, which is perceived by most respondents, instead derives from the far-reaching relation along with a positive view of the collaboration according to all respondents in SL.

4.3.2 Long-term agreements

According to all respondents, the personal relationships that have been evolved are considered as a positive factor for future businesses with each other. However, the risk of only relying on personal relationships is too high (S3). Such relationships take long time to develop, and if an employee quits his/her placement, the bonds to that firm will be disconnected through that specific channel, which at the worst case scenario may be the strongest bond, according to all SL respondents at the supplier company. Therefore, the relationship with the contractor should be strengthening with an agreement (S3). The respondents on the SL at the supplier company are aligned with the opinion on a long-term agreement being a benefit for their business as well as for the supply chain as a whole. The agreement must though, for both parties, be evolving and not a frame of constraints (SL). Hence, It is important that the parties can develop mutually (SL). In order for a long-term agreement to work, it is important to always strive for excellent performance and to express presence in the relationship (S2, 2016).

On the customer side of the relationship, the opinion of a long-term agreement is however not as preferable as on the supply side (C1-C6). According to respondent C2, an agreement which states "we will buy from you" is not preferred, since it may risk the supplier to slack in their performance. Furthermore, it decreases the contractor's flexibility in selecting suppliers. The respondent further argues that they cannot find any reason for why to develop exclusive agreements with their suppliers, since they already have a sound transfer of knowledge and transparency. According to C1, a long-term agreement should help to define a relation and also function as a guideline on how to cooperate for those who are not engaged in the relationship. Other than that, it is not necessary. A positive aspect is, according to C2, that a higher demand can be put on both parties when entering an agreement. However, as a customer, a high demand can be put on the supplier without an agreement as well.

4.3.3 Perception of partnering

A majority of the respondents has a negative or indifferent approach towards partnering agreements between the supplier and contractor. However, the SL at the supplier company has a positive approach towards partnering. According to respondent S2, partnering could be most beneficial for their organization when entering a large construction project due to low profit margins. On the contrary, according to C2 & C3, partnering with a supplier is considered as an agreement where the contractor has not much to benefit from. However, according to C2, the benefits of partnering in the relation with the client are comprehended. The client may be more open for propositions – increasing the participants' motivation to cooperate – and errors can be eliminated by communicating in an earlier phase of the construction process. The respondent (C2) further argues that the trend towards partnering with the client is increasing in construction. However, respondent C1 argues that the definition of partnering is unclear which has led to a resistance towards it. Furthermore, there is a lack of partnering experience in both organizations (OL), where only respondent C6 have experience from one partnering project. Respondent C1 further argues that it is the presence

of transparency that is important in a relationship, not an agreement. Some elements of partnering, i.e. knowledge transfer and transparency can already be found in their relationship with the supplier company (C1). An agreement in the form of partnering is therefore not considered to be necessary.

5 Analysis

This chapter comprises an analysis of the empirical findings based on the theoretical framework. The purpose is through analysis compose sufficient data to complete the conclusions and thereby fulfil the purpose of the thesis. The structure of the analysis is based on the conclusive part of the theoretical framework 'Supplier relationship management' since the research questions can be linked to this segment. Additional parts of the theoretical framework is used when suitable in the chapter, thus the chapter should not be seen as analysis solely of 'Supplier Relationship management', merely as a structure. In accordance with this structure the chapter is divided into three areas 'The Six Dimensions of High-involvement Relationship', 'Partnering in the examined relationship' and 'The process of supplier segmentation'. The most emphasis is put on analysing 'The six dimensions of HIR' since this aspect composes a substantial part of the purpose of the thesis.

5.1 The six dimensions of high-involvement relationship

There are four different roles of a supply chain in construction, where the first emphasizes the interface between the supply chain and the construction site (Vrijhoef & Koskela, 2000). The focus is therefore on the cooperation between the suppliers and the contractors – enabling a sound flow of material without disruptions. The relationship between the chosen organizations for this thesis will therefore be analyzed with respect to the six dimensions of a high-involvement relationship, developed by Gadde and Dubois (2010).

5.1.1 Longevity

The relationship between the studied supplier and contractor has a history of business exchange since the start-up of the contractor company, indicating the presence of *longevity* in their relation. Fundamental principles for their longevity, according to the empirical findings, are loyalty, trust, commitment and social bonds. The loyalty is apparent in connection to an occurrence of a problem, which is managed in such that the resolution is satisfying for both parties. Furthermore, the long-term relation has pillars of trust and commitment, resulting in successful conflict resolutions in this relationship. The social bonds were initiated at the strategic level in both companies, and have since then been developed further down in the organizations. Through proper customer treatment by the supplier, the relationship has managed to be maintained. According to the theoretical framework, agreements between two parties can be engaged with the purpose of elaborating a long-term relation (Jonsson, 2008). However, this relationship has not been evolved through any agreement, rather through continuity of business exchange and strong personal bonds.

5.1.2 Adaptions

According to Gadde and Dubois (2010), longevity emerges through *adaptions* between two organizations, with the purpose of elaborating efficient and effective resources. The joint performance between two organizations can be enhanced by developing e.g. *technical, IT, time-related, legal, knowledge-based* and *social bonds* (Gadde & Dubois, 2010; Jonsson, 2008). Jonsson (2008) argue that *technical bonds* concern adaptions of production processes, production equipment or choice of materials. An attachment with services is provided to the customer in the tender by the supplier company, where the contractor has the opportunity to be a part of contributing to a more efficient and effective construction process by buying the services. In relation to the price on each material, services are not considered as an important factor by the contractor. Vrijhoef and Koskela (2000) found that the lower the purchase price

was, the higher the costs were for site logistics. Too large batches of goods and materials were purchased in the procurement phase in order to receive a discount. The total cost became thus higher. Multiple materials handling was a major challenge in project Näverlursgatan, with the underlying reason of both purchasing too large volume of materials and due to the space limitation on the construction site. The supplier company wishes to be included earlier in the project process to support decisions regarding choice of materials and services to enhance the quality of the end product and the effectiveness of the project. However, this is not possible due to how the procurement phase is managed today.

Time-related bonds are developed in the temporary network and far too late in the project process, most commonly in the beginning of the production phase. The supplier must therefore act according to the time schedule of the production, and the delivery precision can thus decrease if the supplier's material storage does not correspond with the contractor's purchased volume. As stated by Karlsson and Josephson (2012), express delivery is the most commonly used form of delivery system in construction. The empirical findings indicate the risk of purchasing impulsively, since it can result in multiple handling, which is aligned with Koskela's (1992) argument on disadvantages of purchasing too large volumes of materials. It can therefore be important to consider the argument put forward by Jing et al. (2003) – that logistics can preferably be considered as a senior-level decision.

Jonsson (2008) argue that long-term agreements can preferably be entered with the purpose of developing a long lasting relation and dependency over time. However, the empirical findings indicate that a long lasting relationship can be developed without a long-term agreement, if there is a presence of strong social bonds. *Legal bonds*, such as an agreement, could function as a guideline for those who are not familiar with the relationship, but it is not necessary for the already involved individuals. By only relying on personal relations is however a risk due to the fact that conflicts can emerge, and also because there always is the risk of personnel giving notice to leave the company for another employment. Legal bonds can thus function as complement for the social bonds and, in turn, secure the relation. Such setup is more attractive for the supplier company with respect their interdependence on the contractor company – an imbalance in the relationship that will be further analyzed below in 'Dependence'.

The fragmented and decentralized characteristics of the construction industry are a challenge for transferring and capturing knowledge between projects (Gadde & Dubois, 2010; Bresnen et al., 2004; Lindkvist, 2004). The empirical findings of the case study correspond well to that statement. The respondents have all different experience regarding feedback meetings and documentations and it is therefore obvious that neither of the organizations have standardized routines on how to capture and transfer knowledge after each project. Continuous improvement is at heart of the lean concept, and if transfer of knowledge and experience is constrained due to lack of standardization, the relationship can miss out of maximizing the improvement potentials.

In the empirical findings, the importance of personal bonds is indicated. The findings are aligned with the argument developed by Jonsson (2008) - that *social bonds* are evolved through continuous interactions under a long period of time. As a result of such interaction, cooperation and trust is facilitated, and a long-term relationship can be attained. Respondents in the case study stressed that personal bonds enhances the knowledge and understanding of the counterpart's preferences on how to work. This is further analyzed in the paragraph *Dependence*, referring to Egan's (1998) statement on efficiency. However, personal relations

without legal bonds, as stated above, do constitute a risk in the relationship, as stated both in the empirical findings and in the theoretical framework by Jonsson (2008).

The supplier in the examined relationship shows an enhanced will to adapt compared to the contractor. This is evident in the empirical findings, for example since the supplier is willing to deviate from ABM07 in order to satisfy the contractor. In addition the supplier shows a desire to adapt new solutions in the collaboration with the contractor to improve the process. However, the contractor focuses on finding a supplier suitable for their needs rather than adapting their procedures to suit the supplier. In a partnership relationship an overall perspective should be used instead of focusing on the two parties separately according to Jonsson (2008). Because of the lack of desire to adapt by the contractor the relationship in terms of adaptations cannot be resembled to a partnership relationship from this perspective. However, from the perspective of the supplier's behaviour it could be compared to a partnership relationship. This imbalance in adaptations is most likely connected to the distribution of dependency, which is further elaborated in 'Dependence'.

5.1.3 Dependence

According to Gadde and Dubois (2010), in order to obtain benefits of a HIR in terms of enhanced innovation and productivity, the organizations cannot avoid *interdependence*. The contractor company's dependency on the supplier company is not of a major characteristic. Referring to the Kraljic's matrix, *figure 2.6*, the items provided by the supplier company can be found in the northwest corner – *leverage items*. The availability on the market is high and the items are of high significance for the contractor company. The contractor has therefore great power in the relationship, since the supplier company can easily be replaced. However, the personal relations between the employers in the two organizations constitute strong social bonds. The supplier company is thus treated accordingly, with the purpose of maintaining the healthy bonds. With respect to Egan's (1998) statement on the relation between learning capability and efficiency improvements, both organizations benefit from caring for the relationship. If the parties stay together and continue to cooperate, the learning capability will increase and the team will become more knowledgeable about how each individual function, and about each other's businesses. In turn, activities in the collaboration can become more efficient. The fragmentation of the industry which is highlighted both in the literature by e.g. Egan (1998) and the empirical findings through different modes of procedure dependent of individual behaviour, further illustrates the importance of the importance this aspect of social bonds. Hence, the dependency in the studied relationship is greatly connected to social bonds.

The empirical findings indicate a perceived imbalance of dependency in the relationship between the contractor and the supplier since the contractor suggests that they would not be affected to a great extent if they were to change supplier. On the contrary the supplier argues that they would be affected to a large extent if the studied contractor would stop using them as a supplier. The previous analysis based on Kraljic's matrix shows that suppliers of building material able to produce the volumes of the examined supplier is labelled as leverage suppliers and thereby relatively easy to replace. In addition, the suppliers of building material constitute a small part of the external actors involved in construction projects and consequently a minor actor in the overall process. Whereas the supplier's core activity is to sell products specifically to contractors which makes the contractor the suppliers first priority. Hence, the imbalance in dependency could be regarded as a natural feature of the relationship between supplier and contractor. Moreover, in the examined relationship the significance of the contractor is further enhanced, and thereby also the dependency, since the contractor constitutes the most important customer of the supplier.

Jonsson (2008) state that partnership relationships seek to achieve dependencies from both parties. In the case of the studied actors the dependency is clearly misallocated in favour of the contractor. This even though the strong social bonds constitutes dependencies of the contractor towards the supplier. Furthermore, Jonsson (2008) argues that the dependencies in a partnership relation could be seen as a risk since the contractor would have to rely on the performance of the supplier. This composes a connection between dependency and trust since the contractor needs to trust that the supplier is able to execute the procedures in accordance with their requirements. The empirical findings show that the far-reached relationship has achieved this kind of trust between the companies. Hence, this kind of trust could be regarded as bonds in order to develop and maintain dependency.

Several authors, such as Jonsson (2008) and Gadde & Dubois (2012), present long-term agreements as a method in order to achieve enhanced collaboration, which would increase the interdependence of different parties. In the studied relationship exclusive long-term agreements or partnering agreement are not applied, which means that the dependencies in the relation has emerged without this resource. This aspect is further elaborate in 'Partnering in the examined relationship'.

5.1.4 Interactions

Gadde and Dubois (2010) argue that the fourth dimension, *interactions*, is a prerequisite for interdependence and adaptations. The relationship in the case study comprises intense interactions in the temporary network through strong personal bonds, where trust functions as a solid foundation. These are considered as highly valuable since it is time consuming to develop such bonds with a new actor. Interactions in the temporary network are more intense and frequent compared to interactions in the permanent network. In order to strengthen the bonds in the permanent network, the supplier company has to provide services where activities from the construction site is transferred to the supply chain, as discussed in Vrijhoef and Koskela's (2000) third role of supply chain management in construction.

Interactions are embedded in its context of time and space, where the former emphasizes how both previous and future events affect the present interaction (Gadde & Dubois). The behavioural of the supplier towards the contractor indicates the impact previous and future events have on the relationship. Since the contractor is an important customer, and a company with bright future with interesting upcoming projects, the supplier company acts on "goodwill" in many occasions. The contractor's future is thus an incentive for the supplier to put more effort and resources into their interactions. In turn, this will form a positive experience of the interaction – enhancing the opportunity for further collaboration.

The fragmentation of the construction industry constitutes a barrier for knowledge transfer across organizational boundaries (Bresnen et al., 2004; Koskela, 1992). In terms of incrementally overcoming this barrier, organizations should be procured with respect to long-term cooperation (Koskela, 1992). Hence, the personal bonds that can be found in the studied relationship are of high importance to enable a more sound exchange of knowledge in the industry.

5.1.5 Relationship atmosphere

The fifth dimension constitutes the *atmosphere* of the relationship with respect to confrontation, power and conflict, and collaboration, trust and commitment (Gadde & Dubois, 2010). Frödell (2011) stress the importance of trust in order to maintain a long-term

relationship, and argues that it is developed through delivering what has been promised. This can be verified in the empirical findings where respondent C1 expressed that trust increases when the supplier holds on to its promises. Frödell's (2011) argument is also aligned with respondent C2's concern on the relation between trust and the information in the tender. If the price and information in the tender does not correspond to the actual price, quantity and quality when receiving the delivery, it will have a negative impact on the relationship. Moreover, if the same mistakes are repeated, a further cooperation with the supplier will not be an attractive alternative for the contractor.

As expressed in the empirical findings, the degree of commitment of each project participant is enhanced with an early involvement. The degree of commitment is high in the studied relationship, as indicated in the empirical findings. From the supplier's perspective, relatively large amount of resources and much effort is put in the collaboration with the contractor company. However, early involvement has not been implemented in the studied relationship, which can be explained with the fact that arm's-length relations are considered as a traditional type of relationship with suppliers (Jonsson, 2008). In addition, such relationships in construction are characterized by short-term commitment and a priced based nature (Frödell & Josephsson, 2008; Gadde & Dubois, 2012). Bower (2003) further stress the importance of shifting the contemporary management of contracts – from hard issues, such as price, to soft issues, such as commitment.

Power and conflict in the relation can be explained with interdependence, which in this relationship is more beneficial for the contractor. The contractor has therefore more power in the relationship compared to the supplier. As it has been stated above in *Interactions*, the supplier acts on "goodwill" in many cases, and a "win-win" situation is created with respect to the supplier evolving a sound reputation for themselves. The contractor's power in the relationship is also due to the fact that they are one of the most important customers to the supplier company. This is analyzed above under *Dependence*.

5.1.6 Mutual orientation

Mutual orientation is based on adaptations and interactions, which in turn creates interdependence and strong couplings according to Gadde & Dubois (2010). Thus, this dimension of HIR is to a high extent connected to the analysis of interactions and adaptations. The most influential aspects in the analysis of those dimensions were the impact of social bonds and knowledge based bonds. This means, in accordance with Gadde and Dubois' previously mentioned statement, that those aspects will also greatly influence the mutual orientation of the relationship. The empirical findings underline those aspects of the relationship as influential to the mutual orientation by stating the importance of understanding each other's procedures and strategies, in mutual development. In addition, former interactions are stated as highly influential to the current and future relationship in 'Interactions', which is aligned with the empirical findings of the significance of the far-reaching background in order to achieve mutual development. Thereby connections between adaptations and interactions, and mutual orientation are apparent both in the theoretical framework and the empirical findings.

The empirical findings indicate that mutual orientation has been created through bonds among individuals, which has produced bonds between the companies. This is demonstrated by the amount of personal relations in the far-reaching relationship along with the lack of mutually stated strategies. The social bonds created by personal relations, further analyzed in 'Interactions', have been influential in the past in terms of mutual development according to

the empirical findings. Furthermore, the companies have not developed strategies mutually, neither has long-term agreements, but still a mutual orientation is perceived in the results of the case study caused by adaptations, further analyzed in 'Adaptations'. This indicates that the mutual orientation has been strictly based on adaptation and interactions, in accordance with Gadde & Dubois (2010).

5.1.7 Strong and weak bonds in the relationship

Social bonds are constantly repeated in the dimensions of HIR in the analysis, and can thus be discussed as the most important attribute of the relationship. The longevity that characterizes this relationship is a result of interactions in connection to many business agreements, which in turn has generated social bonds. These social bonds are developed through personal relations, and function as the supplier company's leverage in relation to their competitors, since the price and materials that they compete with are roughly the same. Hence, without the personal relations between these two parties, the relationship could have been at risk of being ended at any time. Therefore, the personal relations have to be conducted with constant care. The other bonds that constitute the dimension of adaptations are not well developed in this relationship, except the project based time-related bonds. O'Brien (2014) argue that communication and collaboration are important attributes to consider in order to create an efficient supply chain process. However, Gadde & Dubois (2010) argue that organizations have to adapt to each other for developing efficient and effective processes. To improve the supply process from the supplier to the construction site is thus not a single solution problem. Strengthening bonds in combination of evolving a collaborative environment with high degree of communication can therefore be considered as a more beneficial solution for the supply process. Hence, the supplier and contractor company can with benefit strengthening their bonds in order to improve the processes in their collaboration.

The dimension of dependence constitutes social bonds as a fundamental foundation. Referring to Kraljic's matrix stressed by Jonsson (2008), with respect to the supplier's services solely, they can be found in the southwest quadrant with *bottleneck items (or in this regard, services)*. The availability on the market is relatively low and so is the significance for the contractor. However, with the increasing construction projects in the hub of Gothenburg, the contractor will have to put more effort in to their core business – building structures. Thus, with the services, the supplier company can profile themselves as having *strategic items/services*, the northwest corner of Kraljic's matrix, given that their competitors are not aligned with the need on the market at that time. The technical bonds can thus become stronger. Legal bonds, on the contrary, are more difficult to evolve in this relationship due to resistance from the contractor towards agreements that constrain them in the tendering process. It is therefore not realistic, in short-term, to implement agreements such as project, intermediate or strategic partnering in this relationship. As argued by Gadde & Dubois, it may not even be beneficial to implement such agreements in construction, since the arm's length culture is so deeply rooted in this industry. A shift in the culture of the market is needed for partnering to function as it is expected. In the end, it is the mind-set of the people working in the industry that decides the direction of the development. Lastly, another soft spot in the relationship is the knowledge-based bonds, where there is a lack of standardized routines for how to closure projects for the benefit of future projects. An important aspect of the lean methodology is continuous improvement, and the two studied organizations want to cope benefits of manufacturing, the process of transferring knowledge and experience have to be improved. As a solution, it can be stated in the description of management positions that it

is required to end projects with a feedback session and to document experiences. Improvements regarding the construction process can thus be managed more efficiently.

5.1.8 Summary of HIR

The dimensions of HIR can all be obtained in the relationship between the studied contractor and supplier. However, the bonds that connect them to each other are mainly based on social bonds and, on project level, time-related bonds. The presence and absence of the dimensions along with the bonds are illustrated in *table 5.1*. The foundation of the relationship of the studied supplier and contractor is the personal relation that initiated their first business transaction. Since then, continuous interactions have generated social bonds deeper in both organizations, which in turn have created longevity. Without the social bonds, the contractor company could much more easily switch to another supplier since the availability on the market for construction materials is high. Hence, the social bonds also constitute the interdependence in the relationship. The relationship atmosphere comprises trust and commitment as a result of rare occasions of joint conflict resolutions. Finally, the mutual orientation dimension is based on adaptations and interactions.

Table 5.1: The presence and absence of each dimension in the studied relationship.

Dimensions	Present	Absent
Longevity	x	
Adaptions	x	
<i>Technical bonds</i>		<i>x</i>
<i>Time-related bonds</i>	<i>x</i>	
<i>Legal bonds</i>		<i>x</i>
<i>Knowledge-based bonds</i>		<i>x</i>
<i>Social bonds</i>	<i>x</i>	
Dependence	x	
Interactions	x	
Relationship atmosphere	x	
Mutual orientation	x	

5.2 Partnering in the examined relationship

Gadde & Dubois (2012) claims that partnering between contractor and supplier is an unused resource in the construction industry. The empirical findings underline the absence of partnering agreements between those parties. Furthermore, the empirical findings indicate that such arrangements are not requested to a high extent especially not by the contractor. Partnering agreements between client and contractor along with subcontractors has been used more frequently according to Gadde & Dubois (2012). This aspect is presented in the empirical findings as increasingly more common. However, the result from the case study shows that the interviewed actors lack in experience of partnering agreements in any form.

The different partnering forms stated in the theoretical framework are strategic partnering, project partnering and intermediate partnering. Strategic partnering refers to long-term partnering orientation based on long-term agreements and transfer of knowledge and experience between projects (Gadde & Dubois, 2010). In the contemporary relationship between the supplier and contractor exclusive long-term agreements are missing, which is shown in the empirical findings. Instead the existing long-term agreements focus on what procedures should be used in the collaboration. Furthermore, the knowledge transfer between the parties is missing a standardized method, further analyzed in 'Adaptions'. Thereby the present relationship lacks fundamental features of strategic partnering even though a long-

term perspective of the relationship can be found in the empirical findings. However, in regards of partnering agreements respondents refers to partnering in relation to projects rather than long-term commitments. This suggests that project partnering is mostly considered by the respondents since project partnering refers to a short-term orientation, focused on particular projects according to Gadde & Dubois (2010), Kadefors & Eriksson, 2015 and Beach et al., 2005.

Intermediate partnering is considered as a development of project partnering by Gadde and Dubois (2010) were positive aspects from both strategic and project partnering is attained. Furthermore, Gadde and Dubois (2010) argues that is more realistic to develop project partnering into intermediate in the construction industry, rather than implementing strategic partnering. However, project partnering is not implemented to a high extent in projects today according to empirical findings. In addition partnering between the supplier and contractor is not implemented at all in the studied case. Thus, this results in obstacles to implement intermediate partnering through development of project partnering. Furthermore, Gadde & Dubois (2010) argues that intermediate partnering enhance the dimensions of HIR. However, as been showed in *table 5.1*, several dimensions of HIR are already present in the contemporary relationship. This suggests that positive aspects of intermediate partnering are fulfilled without using partnering. Larsson (1995) concludes an increased result in formal partnering projects, compared to informal partnering projects, which indicates that the positive aspects of partnering could be enhanced if partnering was used formally. Moreover, Gadde & Dubois (2010) also states that the six dimensions of HIR is a prerequisite for partnering which suggests that it is suitable to implement partnering in the current relationship.

5.3 The process of supplier segmentation

It is presented in the theoretical framework that all suppliers should not be treated equally but instead suppliers should be separated and treated in accordance with their importance to the purchasing company through supplier segmentation. Jonsson (2008) separates between partnership supplier, associate supplier and conventional supplier as shown in *Figure 2.5*. The empirical findings indicate that the contractor focuses on external actors in the segmentation process rather than focusing solely on suppliers. This is highlighted as respondents from the contractor expresses that the suppliers only comprise a small part of the external actors in projects when long-term agreements are discussed. The contractor also presents the lack of complexity in the provided products as an argument to decrease the importance of enhanced collaboration with the supplier. By analysing suppliers from the perspective as a part of external actors the substance of the supplier greatly decreases compared to analysing the suppliers separately. The theoretical framework only considers suppliers in the segmentation, which suggests that subcontractors should be considered separately. When regarding the supplier from this aspect the impact of the studied supplier increases dramatically, since subcontractors comprise approximately 80% of the external actors according to the empirical findings. As been analyzed in 'Summary of HIR' there are several aspects of HIR present in the relationship between the parties. HIR is connected to partnership relationship through enhanced collaboration and intimate relations. Hence, the aspects of the present dimensions of HIR can be associated with partnership. However, most of those aspects derive from contributions of the supplier, which suggests that the contractor is not convinced that a partnership relation is preferable in this case. This is further underlined by the procurement phase where the supplier is procured mostly in terms of lowest price, in line with arm's length relationships.

6 Conclusions

This final chapter intend to answer the research questions with support from all the previous chapters, but foremost from the empirical findings, analysis and discussion. This chapter will also present suggestion for future research.

The purpose of this thesis was to analyze possibilities and suggest recommendations to improve the supply chain process with an enhanced collaboration between supplier and contractor, by studying the relation based on a high-involvement relationship model. Each research question will be answered below.

6.1 Research question 1

*What characterizes the contemporary relationship between the contractor and the supplier?
What dimension of the relationship is of most significance?*

The studied relationship can be characterized as a high-involvement relationship with strong social bonds, which have emerged through personal relations, business exchange and continuous interactions through a long period of time. It was initiated with a personal relation in the strategic level at both organizations, and in connection to projects, social bonds also emerged in other divisions of the organizations. Without the strong social bonds, the relationship would not have anything else to rely on, e.g. an agreement. It is therefore of great importance for the supplier company to involve new staff in the relationship as quickly as possible in order develop a new bond. Trust has to be developed and commitment has to be expressed for a social bond to become strong and long lasting.

6.2 Research question 2

What procedures could be implemented in the relationship in order to improve the supply chain activities related to this collaboration?

Each evaluated procedure is presented recommendations from a short- and long-term perspective with the feasibility of short-term implementation in mind.

Partnering

Formal partnering agreements generally improve the results in projects. However, it is not realistic in the contemporary relationship to implement partnering in any form in *short-term*. Instead absent aspects of partnering are possible to implement instantaneously. Processes of knowledge transfer should be standardized through recurring feedback meetings.

From a *long-term* perspective an intermediate partnering approach should be aimed at, either through development of project partnering or direct implementation of intermediate partnering.

Long-term agreements

Long-term agreements increase all dimensions of HIR. In *short-term*, the long-term agreements should be developed mutually and involve requests from both parties. It is not considered feasible for those agreements to be exclusive in short-term.

There are several obstacles to attain exclusive long-term agreements in the relationship. However, in order to improve the supply chain process through partnership relationships, exclusive agreements should be considered in *long-term*.

Bonds

To enhance the HIR additional bonds should be implemented and existing bonds should be maintained in the relationship and thereby increase the variety of bonds. Implementing knowledge-based bonds, and maintaining social bonds are of most significance in *short-term* since those aspects lacks resistance in the relationship. Technical and legal bonds claims a long-term approach caused by the amount of scepticism and obstructions in the supply chain process.

In *long-term* early involvement of the supplier should be implemented to promote technical bonds. Legal bonds should be attained through extended long-term agreements in accordance with conclusions of that aspect.

Range of supply

Expanding the range of the supply by adding services and procedures increases both the uniqueness of the supplier and the efficiency of the supply chain. In *short-term*, this can be done by raising the awareness of the provided services and also increase the frequency of using services.

From a *long-term* perspective additional services and procedures should be added to improve the supply chain process through moving production towards the origin of the supply chain. By adding services and procedures to the range of supply the supplier would be able to label themselves as a logistic partner in addition to supplier of building material.

7 Reflections

This chapter contains discussions considering aspects of findings not connected to the purpose of the thesis. Instead the parts presented in reflections comprise findings notable according to the authors of the thesis. The chapter is divided into three sections 'Barriers in the procurement phase', 'Corporate alignment' and 'Suggestions for further studies'.

7.1 Barriers in the procurement phase

The procurement phase of construction projects are arguably highly influential in several aspects of the supply chain process. This can, for example, be seen in the empirical findings in terms of tendering process as a barrier for early involvement, caused by the uncertainties of which actors that will be procured. The procurement phase not only concerns tendering of suppliers but also tendering of contractors from the perspective of clients. Several contractors generally produce offers to attain a project initiated by a client, illustrated in *Figure 7.1*. Multiple suppliers will be involved in composing the offer according the empirical findings. Hence, the number of involved actors in the procurement phase is many, especially since a single contractor along with a single supplier of building materials will be procured eventually. The work of the other actors in the procurement phase should be regarded as waste, according to Josephson & Saukkoriipi's (2007) definition, since those procedures do not create value to the project. The only apparent value adding actors, in *figure 7.1*, are the actors connected by the red line, indicating the acquirement of the project. Furthermore, the relationship in procurement phase is apparently comparable to arm's length relationships since actors are set against each other to fulfil the needs of the procuring actor. Thus, the commonly used procedures in the procurement phase not only obstruct early involvement of actors but also enhance the influence of arm's length relationships.

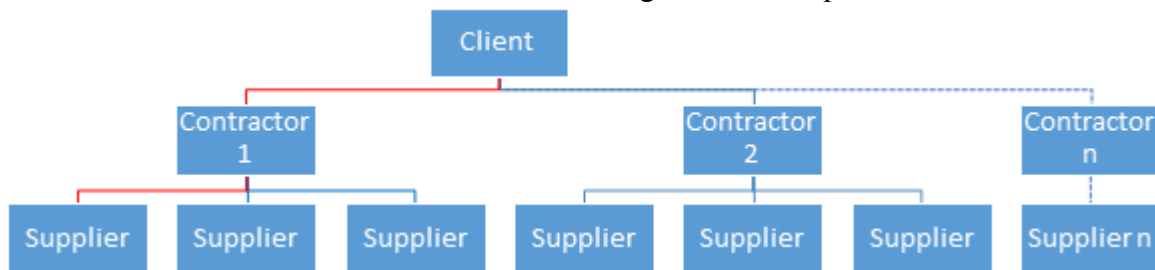


Figure 7.1: Illustrates the procurement phase in the construction industry where several actors are involved but solely one actor in each segment is procured. The red line visualises the procured actors.

7.2 Corporate alignment

The empirical findings indicate the difference of opinion in the organizations, both internally and externally. The strategic level at the supplier company has a vision of increasing sales of services and to be involved in the design phase to contribute with material and logistics solutions. As it is illustrated in *figure 7.2a*, the operational level at the supplier company is not aligned with the strategic level vision. It is considered by the operational level that the contemporary mode of operation is satisfying. Contingency is expressed towards being involved in the design phase, and they consider their expertise as something that is not lacking at the contractor company. Corporate misalignment such as this can have negative consequences for the supplier, since it affects the strategy for increasing sales of services.

At the company, the operational level is positive to services such as apartment specific packages, (un)loading and carriage of materials to the level of the structure where it is about to be used. However, the strategic level does not consider services as a priority. Instead, the

price on each material is more important, and is therefore highly prioritized. The approach of the strategic level at the contractor company corresponds to Koskela's (1992) argument on the segmented control in the construction supply chain. Decisions are made based on optimization of a specific segment, rather than considering the construction process as a whole. A misalignment is thus created between the strategic level and the operational level at the contractor company as well.

Figure 7.2a further illustrates the misalignment between the operational level in both organizations and the strategic level. The vision of the strategic level at the supplier company is more aligned with the need and attitude at the contractor company, and the approach of the strategic level at the contractor company is aligned with the approach of the operational level at the supplier company. The ideal relation would be if (1) an alignment existed internally, and (2) that the organizations were aligned with each other, according to figure 7.2b.

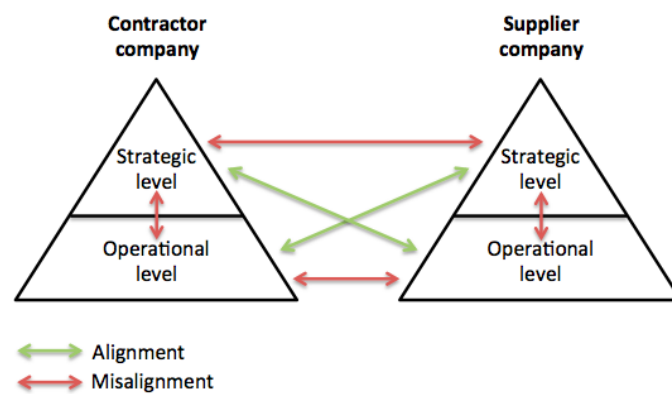


Figure 7.2A: An illustration of the misalignment in each organization as well as between the two organizations.

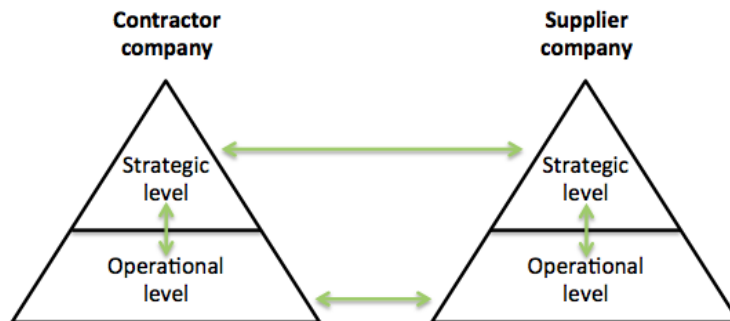


Figure 7.2b: An illustration of the ideal relation between the two organizations.

7.3 Suggestions for further studies

Some aspects of the findings could preferably be further analyzed in additional studies. A profound research of the impacts of the procurement phase in the construction industry along with how those aspects influence HIR are suggested. The lack of corporate alignment is mentioned in the thesis but not analyzed. The misalignment in companies in partnership relationships is therefore recommended to study in order to comprehend the magnitude of those effects. Furthermore, the thesis concludes improving procedures in the relationship in terms of long-term agreements and standardized knowledge transfer for example. The design of frameworks of how those procedures should be implemented would promote the implementations and reinforce the existing thesis. Moreover, identical projects as the examined reference project will be carried out with the same actors involved. By studying those projects developments of the found conclusions could be examined from a straightforward perspective.

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Appendix A – List of interviews

Contractor		Supplier	
C1	2016-04-15	S1	2016-04-19
C2	2016-04-14	S2	2016-04-21
C3	2016-04-19	S3	2016-03-24
C4	2016-03-19	S4	2016-03-10
C5	2016-03-16	S5	2016-03-17
C6	2016-03-22		

Appendix B – Interview questions

What is your background?

What is your current position/responsibilities?

Describe your role in the process of the collaboration between the contractor and the supplier.

When does the supplier get involved in the project?

To what extent is the supplier involved in the design?

To what extent does the supplier/contractor use each others competences and/or services?

Are there any potential improvements in the process to consider?

What do you consider to be the major difficulties concerning the material flow to the construction site?

How often are wrong materials delivered to the construction site?

How do you and the involved actors handle such a problem?

What are the major problems on the construction site?

How does the collaboration work today?

What are the positive aspects of the relationship?

What are the negative aspects of the relationship?

How could the collaboration be improved?

How would you describe the relationship in terms of trust?

How would you describe the relationship in terms of dependency?

How would it affect your business if your organization would not have any business exchange with the other party?

How would you describe the relationship in terms of communication?

What are the essential communication channels for exchanging information?

How would you describe the relationship in terms of conflict resolution?

Do you have experience from such circumstances?

Do you consider it to be difficult to transfer improvements from one project to another?

What do you believe to be a proper solution for such difficulty?

What are the reasons for why the contemporary relationship is formalized as it is?

Is there an expressed strategy? If so, what is the strategy?

How does the procurement of suppliers work?

What characteristics are evaluated and what qualities are considered important?

How do you want your organization to develop, and how will that affect your relationship?

What are your thoughts on entering long-term agreements with the other party?

What is expected in order for a long-term agreement to function?

What are your concerns regarding long-term agreements?

What kind of agreements are beneficial for your organization?

What is your opinion about partnering?

Do you have experience from partnering?

What is the most important characteristics of a supplier?

What is the most important characteristics of a contractor?

How is a project affected by an enhanced collaboration between a contractor and a supplier?

How do you want the collaboration/relationship to operate in the future?