Site managers and Site Supervisors Perception of Knowledge Transfer

A case study within a construction company

Master's thesis in International Project Management

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ABSTRACT

Knowledge management and more specifically knowledge transfer is part of most industries and companies. Within the construction industry, knowledge is often scattered between project and individuals. Knowledge transfer is a central issue for construction organisations' competitiveness which can be beneficial in terms of reduced cost, time savings and increased efficiency. There is an increasing demand from site supervisors and site managers to explore the possibility in the development of KT so not every project has to start from scratch. Therefore, the main research questions for this study are: *What perceptions do site supervisors and site managers have regarding knowledge transfer in construction projects? Which current initiatives regarding knowledge transfer exist within the studied organisation?* and *How can the studied company facilitate that different projects benefit from and take advantage of knowledge transfer?* In order to be able to answer these questions, a theoretical framework concerning knowledge transfer was used together with a case study of a Swedish construction company. An abductive research strategy was chosen with a qualitative method containing semi-structured interviews. The results from the case study show that the view of KT within the organisation is that it, when taking into account, helps to avoid the workers from making repeated mistakes or even prevents problems from happening within the project. Face-to-face discussion was the most preferred KT method and a wide personal network within the company as well as industry is seen as very beneficial when working with KT. Furthermore, the study concludes and suggests two different solutions in the development of KT within production. With the aim to study KT in and between projects, this master thesis provides a framework on how the studied organisation, and other companies in the construction industry, may improve their work with KT.

Key words: Knowledge management, Knowledge transfer, Construction industry, Site supervisor, Site manager

Platschefers och Arbetsledares Syn på Kunskapsöverföring
En fallstudie inom ett byggföretag

Examensarbete inom mastersprogrammet International Project Management

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SAMMANFATTNING

Kunskapshantering och mer specifikt kunskapsöverföring är en del av de flesta branscher och företag. Inom byggbranschen sprids kunskap ofta mellan projekt och individer. Kunskapsöverföring är en central fråga för byggföretags konkurrenskraft, vilket kan vara fördelaktigt när det gäller reducerad kostnad, tidsbesparingar och ökad effektivitet. Det finns en ökad efterfråga från arbetsledare och platschefer för att utforska möjligheten i utvecklingen av KT då inte alla projekt måste starta om från början. Därför är de huvudsakliga forskningsfrågorna för denna studie: *Vad för perspektiv har arbetsledare och platschefer avseende kunskapsöverföring i byggprojekt? Vilka aktuella initiativ finns angående kunskapsöverföring i den studerande organisationen?* och *Hur kan det studerade företaget möjliggöra att olika projekt kommer att gynna och dra nytta av kunskapsöverföring?* För att kunna besvara dessa frågor används en teoretisk ram för kunskapsöverföring tillsammans med en fallstudie av ett svenskt byggföretag. En abduktiv forskningsstrategi valdes med en kvalitativ metod som innehöll halvstrukturerade intervjuer. Resultaten från fallstudien visar att synen på kunskapsöverföring inom organisationen är att den, när man tar hänsyn till det, undviker att arbetarna gör upprepade misstag eller till och med förhindrar att problem uppstår inom projektet. Face-to-face diskussioner var den mest föredragna kunskapsöverföringsmetoden och ett brett personligt nätverk inom företaget samt industrin anses mycket fördelaktigt när man arbetar med kunskapsöverföring. Dessutom avslutar studien med att föreslå två olika möjliga lösningar i utvecklingen av kunskapsöverföring inom produktion. Målet att studera kunskapsöverföring i och mellan projekt utgör ramen för denna master examensarbete och belyser hur den studerade organisationen och andra företag inom byggbranschen kan förbättra sitt arbete med kunskapsöverföring.

Nyckelord: Kunskapshantering, Kunskapsöverföring, Byggbranschen, Arbetsledare, Platschef

Contents

Preface

This work is a result of a master thesis that was conducted during the spring semester of 2018 at Chalmers University of Technology in Gothenburg. The thesis is included as a final element in our master programme *International Project Management*. The work was carried out at and for a Swedish construction company.

We would firstly like to thank the several individuals who have been involved during this process and contributed with their knowledge and viewpoint concerning knowledge transfer. We thank the various interviewees at the studied company who answered our questions and thereby provided us with important insight. Based on their responds we were able to develop this master thesis and provide some recommendations and solutions.

Further on, we would like to give a special thank you to our supervisor at the company for the support as well as in providing us with contacts.

Last but not least, our supervisor at Chalmers University of Technology, Professor Pernilla Gluch, would we like to acknowledge and thank for her guidance and encouragement throughout this process. It would not have been possible without you.

Göteborg June 2018

Alice Bengtsson and Melwin Lindell

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List of abbreviations

KT   Knowledge transfer
KM   Knowledge management
SM   Site manager
SS   Site supervisor
SW   Skilled worker

Dictionary and glossary

The following words translate certain construction sector terms and functions as an English-Swedish dictionary.

Post-construction market	Eftermarknad
Business manager	Affärschef
End meetings	Slutmöten
Engineering specialist group manager	Specialistchef
Execution plan	Arbetsberedning
Head of department	Avdelningschef
Knowledge transfer	Kunskapsöverföring
Occupational health	Arbetsmiljö
Operational developer	Verksamhetsutvecklare
Operational system	Verksamhetssystem
Site manager	Platschef
Site supervisor	Arbetsledare
Planning	Projektering
Production manager	Produktionschef
Project manager	Projektchef
Vocational school	Yrkeshögskola

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1   Introduction

This chapter will introduce the topic of knowledge transfer to the reader and describe the background and difficulties which constitute the motive for this master thesis. The purpose and limitations of the report are presented as well.

1.1   Background

How come some companies are more successful than others? One explanation is that they are better at utilising and transferring knowledge which makes them more effective and innovative (Newell et al., 2009). Managing, developing and sharing knowledge evidently provide competitive advantages for organisations (Ahmad and An, 2008). It exists a lot of literature within knowledge management (KM) on how knowledge can be shared through organisations. Organisations are nowadays using a variety of techniques, tools and conceptual frameworks in order to capture and use knowledge (Styhre, 2003, Newell et a., 2009).

KM and specifically knowledge transfer (KT) is a central issue for an organisation's competitiveness but is not a simple concept to process as one could think. A vital aspect within KT is to secure knowledge so that it does not vanish when employees leave the organisation. It is important to not only transfer information, but experiences and knowledge as well (Jonsson, 2012). Knowledge in the construction industry is largely in the form of tacit knowledge and origins from individuals' experiences and perceptions of the world. The knowledge is thereby bounded to the everyday practice (Johansson, 2012). Generally, as the construction industry comprises of projects, knowledge is often scattered between projects and individuals. The complex nature of construction projects, results in the issue of reinventing the wheel, as knowledge is seldom shared or reused if it is not acquired correctly and transferred effectively (Cheng, 2009). Moreover, lack of KT can cause inefficiency and time delays for the organisation (Ekambaram et al., 2014) as well as extra cost and lower quality of projects (Ahmad and An, 2008). Without effective KT, the likelihood of knowledge loss in certain projects is much greater. Since a lot of knowledge exist in people heads and because the construction sector relies considerably on the experiences gathered from employees specialised in the field, it is important to obtain and transfer the knowledge from these individuals (Cheng, 2009). Site managers and site supervisors play a central role in the construction industry and have a high impact on improving project outcomes (Ling and Tan, 2015).

Although, it is known that knowledge is a valuable resource, providing good conditions to effectively transfer knowledge is neither easy nor obvious. The difficulty for organisations to define knowledge is one such problem which lead to the trouble to locate and acquire knowledge. Another reason could be the hardship to know or understand which knowledge that is needed and how to spread it in   the organisation.

Moreover, some see the benefit of holding onto knowledge that is personal due others do not possess that knowledge. This applies both to the organisation towards clients and competitors as well as the individual towards colleagues (Jonsson, 2012).

Leistner (2010, p. xv) discusses the trouble with KT as "*Many organisations still struggle to make best use of the knowledge that exists within them. While individuals might use their knowledge on a daily basis and for their decisions, frequently that knowledge is not shared and leveraged across the organisation from one person to another*".

Researchers have found that transferring knowledge requires bridging boundaries between individuals and departments in an organisation. To do so, there needs to be an understanding of how knowledge is acquired and shared in different social settings as well as exist an attitude that promotes KT (Johansson, 2012). Thus, an effective transfer of knowledge is considered to be one of the key factors for a successful performance of construction projects (Cheng, 2009).

This thesis has been conducted in collaboration with one of the biggest construction companies in Sweden. There exists a lot of different initiatives and ongoing work regarding KT in the studied organisation. Nevertheless, there is a huge demand in exploring new initiatives within KT which may be beneficial to the organisation, especially in construction projects. Thus, there is an increasing demand from site supervisors and site managers to explore the possibility to store knowledge and experiences so not every project has to start from scratch. This in hope of reducing failures, enhance efficiency and increase profitability.

1.2   Purpose

The overall objective with this case study is to examine the concept of KT in and between construction projects. The study object is a construction company in the Gothenburg region. Since employees possess a lot of knowledge that is bound to individuals, there is a need to investigate opportunities for knowledge transfer in a project-based organisation. Moreover, this master thesis will provide a framework on how the studied organisation, and other companies in the construction industry, may improve their work with KT within production.

Below are the research questions which have been investigated:
- What perceptions do site supervisors and site managers have regarding knowledge transfer in construction projects?
- Which current initiatives regarding knowledge transfer exist within the studied organisation?
- How can the studied company facilitate that different projects benefit from and take advantage of knowledge transfer?

1.3   Limitations

This master thesis focus on KT in and between projects in a studied company situated in Gothenburg. Further on the case is limited to one department and three different projects within the region of Gothenburg. It was initially determined to limit the study to investigate KT in and between different projects instead of obtaining the overall perspective of the organisation.

Moreover, it was established together with the supervisor at the studied company to investigate the perception of the site supervisors and site managers working in the various projects. Since they have a deep experience of the construction process. They are aware of the problems and improvements that exist in and between projects regarding KT. No limitation was drawn when it comes to the interviewees' experience within the industry, instead it was favoured to investigate the viewpoint from both experienced as well as non-experienced site supervisors and site managers.

When searching for literature there was a limitation to research within the construction sector. Due to KM and KT are such broad subjects, a restriction was required to filter the search to the appropriate literature.

2 Theory

This chapter will introduce the reader to knowledge management and the concept knowledge transfer which can be consider as a branch within KM. There will be a discussion regarding how KT can be defined and how it is applicable in the construction industry. Explicit and tacit knowledge will be further presented and discussed, as well as linked to the SECI model. Moreover, communities of practice will be exemplified as a KT activity to exchange knowledge and experiences at a greater extent.

2.1 Knowledge management

Since the 1990´s there has been a great rise of interest in knowledge and knowledge management, especially in organisations (Styhre, 2003). It was in this area, companies started exploring how to manage knowledge in work settings in an active way (Newell et al., 2009). Many critics from this time mean that KM only was a fashion word and that it would soon be forgotten. However, KM is still an area of subject which is still growing. A reason for the critic was that KM became widely used by researchers as well as practitioners within close by subjects such as organisational management, strategic management and innovation. The problem with this was that KM suddenly described several different areas of subjects (Jonsson, 2012). Styhre (2003) is in line with the same explanation and claims that this is one of the reasons why defining KM often is hard. Since it is very broad, and many theorists provides different undefined explanations of the subject.

Within the theory of how to secure and steer knowledge in organisations, knowledge management (KM) is the concept most used. KM is widely accepted as the process of acquiring, selecting, organising, sharing, and leveraging information and expertise that is essential for the company when it comes to productivity and decision quality (Zhang and Zhao, 2006). Instead of reinventing the wheel in each project by creating solutions that already exist, the focus within KM is to reuse and share previous experiences and knowledge amongst the different departments and employees in the organisations, or in the construction industry; between projects (Ahmad and An, 2008). As stated by Cheng (2009) "Without effective knowledge management, knowledge created in certain project is liable to be misplaced or lost subsequently" (Cheng, 2009, p. 2035).

2.1.1 KM processes

Tan et al. (2007) identify four KM processes which are applicable in the context of construction. These are *knowledge capture*, *knowledge sharing*, *knowledge reuse*, and *maintain knowledge*. Included in (1) knowledge capture are three sub-processes: identifying and locating knowledge, representing and storing knowledge, as well as validating knowledge. Resulting in the importance to firstly recognise the knowledge and the location of learning situations where new knowledge is created. Thereafter it is needed to organise and structure the knowledge into different categories. By validating

the captured knowledge, its credibility can be ensured. (2) Knowledge sharing is about providing "the right knowledge to the right person at the right time" (Tan et al., 2007, p. 19). In order to achieve effective knowledge sharing, the factors affecting are information and communication technology (ICT), supportive organisational culture, and trust between the employees. (3) The reuse of knowledge involves adapting and applying the knowledge through reapplication of best practice or reconceptualising the problem and searching for reusable ideas, thereby reusable knowledge. Due to new information, rules and theories and so on, knowledge may become obsolete after some time. (4) Maintaining knowledge is thus important to keep the knowledge up to date by reviewing, correcting and refining it.

2.2   Categorising KM from literature

It exists a lot of literature within KM on how knowledge can be shared through organisations. Organisations nowadays are using a variety of techniques, tools and conceptual frameworks in order to capture and use knowledge (Styhre, 2003, Newell et al., 2009). Theorists within the subject call this kind of knowledge by for example: Knowledge exchange, Knowledge transfer, Knowledge sharing and Knowledge dissemination. Therefore, it is quite common that theorists within KM use different terms interchangeably which often leads to confusion (Jonsson, 2012). This report will further on refer to the subject as KT. Jonsson (2012, p. 30) refers to KT as: *the process of transferring knowledge and learning between two or more individuals within an organisation as well as what motivates the individual to want to share.*
The following chapters will focus on explicit and tacit knowledge, as well as individual and organisational knowledge.

2.2.1   Explicit and tacit knowledge

One of the most well-known distinction of knowledge in the discussion of KT is between explicit and tacit knowledge (Hislop, 2013). Explicit knowledge can be described as a kind of knowledge which can be written down on a piece of paper and often is impersonal. Meanwhile, tacit knowledge often is personal and harder to describe and is instead connected to learning by doing (Jonsson, 2012). Thus, tacit knowledge represents knowledge which people possess and cannot fully became explicit (Hislop, 2013). Styhre (2003) defines tacit knowledge as: *what cannot be codified, formulated and expressed to the extent that another person can follow those instructions and then undertake the same activity* (Styhre, 2003, p. 62). Hislop (2013) states that two of the most commonly referred examples in explaining tacit knowledge, are the ability to ride a bike or swim, and this in reference to Nonaka et al. (2000). Jonsson (2012) uses the commonly referred examples by claiming that tacit knowledge can be compared to the learning of riding a bicycle or baking a new kind of bread. Even if there is an existing manual of how to ride the bike or baking the bread, it will take practice and experience to master this correctly since you will fall off the bicycle the first couple of times nor will the making of the bread be as good during the first

makings. Further on Jonsson (2012) explains this distinction in the table below by referring to Hislop (2009):

Table 1. Difference between explicit and tacit knowledge. Modified from Jonsson (2012, p. 103)

Explicit knowledge	Tacit knowledge
Possible to codify	Hard to codify
Objective	Subjective
Impersonal	Personal
Self-reliant on context- time and place	Content reliant- here and now
Easy to transfer	Hard to transfer
"Know-what"	"Know-how"
Data/information	**Knowledge/skilful knowledge**

2.2.2 Individual and organisational knowledge

Another common categorisation in terms of KT in organisations is the one between individual and organisational/collective knowledge. Just as in KT in general and the categorisations such as explicit and tacit knowledge, there exist different views of individual and organisational knowledge depending on the theorist within the subject (Hislop, 2013). Jonsson (2012) claims with reference to Alvesson (2004) that for simplified reasons may be feasible to express explicit knowledge as organisational and individual knowledge as tacit.

However, Hislop (2013) states that there are arguments for that knowledge can only exist at the level of the individual. Jonsson (2012) highlights this fact and states that there is a debate where some theorists claim that organisational knowledge is a part of values and standards while others see the organisational knowledge as the total individual knowledge within the company. Newell et al. (2009, p. 6) state that *Organisational knowledge is about beliefs, behaviours and routines that help shape the organisation´s capabilities.* Moreover, some common explanations of individual knowledge are facts and expertise that people possess, while databases, codified knowledge and information regarding who knows what are examples on collective knowledge (Lowendahl et al., 2001).

2.3 Knowledge transfer in the construction industry

Commonly within the construction sector, and in organisations overall, the workers have access to more knowledge than they can explicitly express or share to others. This tacit knowledge originates from different intellectual backgrounds and is based on individuals' experiences, reflection and perceptions of different things (Ahmad and An, 2008). Tacit knowledge, which cannot be communicated orally or in writing, has a prominent role in the construction industry context and is bound to the everyday practice. Due to the industry's highly projectified environment, the need of capturing,

sharing and managing knowledge is essential (Johansson, 2012). In line with this Ahmad and An (2008, p. 133) state that "Construction projects are in knowledge-intensive environments where many interrelated components work together in a complex matter", pushing on the importance of KT.

2.3.1 Rationales for KT in construction

As organisations have recognised the significance of KT, they work with different practices aimed at exploiting the knowledge existing within the projects. Often through project documentation and conducting project learning reviews. These reviews are commonly performed when the project has reached a milestone or at the end of the project (Newell et al., 2009). According to Ekambaram et al. (2014, p. 288) the lack or misuse of KT can result in issues such as:

- Reinventing the wheel
- Inadequate decision making
- Lack of work process planning

Ekambaram et al. (2014) base their reflections on a case study and continue with stating that these issues can have a big impact on the outcome of the project. Inefficiency, unnecessary time and delays in projects are problems that may occur due to lack of KT. Ahmad and An (2008) agree with this view and notify its importance regarding to reduce cost and time while improving the quality of construction companies' projects. Cheng (2009) presses the importance of KT in the construction industry, not only to increase the effectivity but also when it comes to choosing appropriate projects and winning bids. Because of the nature of the construction industry with projects that are unique, temporary and with different construction phases, knowledge is separated and scattered from one project to the next, resulting in knowledge loss among different projects as well as across different phases (see Figure 1). Which will result in that a lot of construction companies suffer from making repetitive costly mistakes and having to reinvent the wheel in each new project.
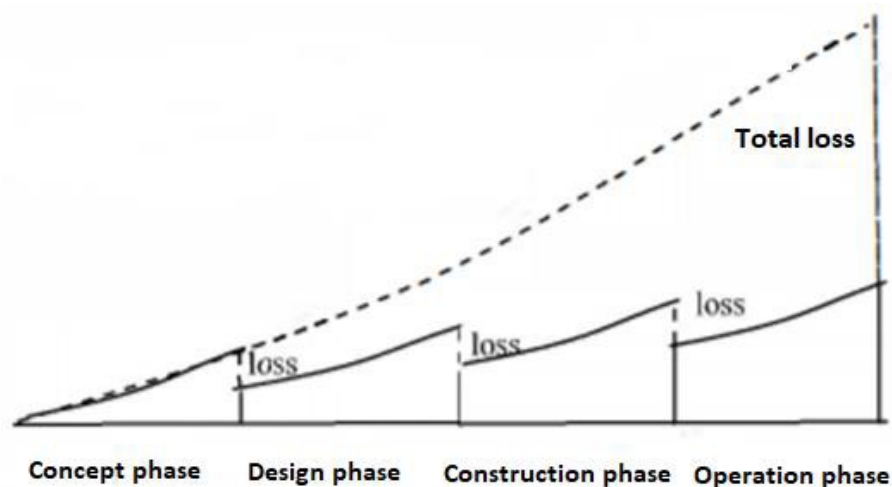

Figure 1. Knowledge accumulation and loss during the lifecycle of a project (Cheng, 2009)

2.3.2 Managing knowledge in projects

As stated in chapter 2.2, there are two kinds of knowledge: tacit and explicit. Tacit knowledge is much more difficult to document and transfer due to it is highly personal, while explicit knowledge is easier to articulate and share. For construction projects, tacit knowledge could be shared through face-to-face contact or lessons learned. With tacit knowledge as a process, knowledge could also be transferred and sustained through informal learning approaches like communities of practice (Khuzaimah and Hassan, 2012). Meanwhile, standard operating procedures, construction rules, specification, bid documents etc. are good examples of explicit knowledge. Cheng (2009) claims that construction organisations should aim to collect and transfer tacit knowledge to make it standardised and reusable for all concerned. However, standardisation is mentioned by Newell et al. (2009) as a reason when KT becomes problematic. When a project is different in some way and do not fit the normal template, a standard procedure will not work. They further on state that "where new knowledge has been created in the context of these projects that do not fit the standard routines there is a reluctance to try and share this learning…" (Newell et al., 2009, p.111) because of its then considered irrelevance to the standard projects. In construction projects, the main obstacles of implementing KT are insufficient time of members (due to the characteristics of projects; tight time plan, the team breaks up when the project is completed), organisational culture changes (the difficulties of communicating across disciplines or cultural contexts), and lack of agreed standard processes (there is a reluctance to invest in KT) (Cheng, 2009). Jonsson (2012) continues by referring to Leistner (2010) who is listing some of the most common hindrances: lack of insight about KT, "knowledge is power" attitude, no transparency, insufficient IT infrastructure, and lack of reward system. By taking these into account, it is also important to have a culture that promotes KT with motivated employees who are willing to share and transfer their knowledge to others. Furthermore, the managers must act as good examples and show the way by allowing transparent knowledge flows and processes (Jonsson, 2012).

Cheng (2009) further on gives suggestions when implementing KT in construction projects. Due to delay in capturing knowledge, turnover of staff and employees' reluctance to share knowledge, Cheng (2009) argues that the knowledge and experiences need to be stored in a knowledge bank during the execution of a project. He also presses the importance to capture these experiences live and document them. This sort of base acts as a reservoir which other projects and employees can resort to when in need of information about previous projects or experiences. Furthermore, the importance of live capturing knowledge is pointed out as vital by 76% of construction organisations according to Tan et al. (2007). They refer to Whetherill et al. (2002) who assert that "a construction organisation's only sustainable advantage lies in its capability to learn faster than its competitors and the rate of change imposed by the external environment, and that there is a need to integrate learning within day-to-day work processes" (Tan et al., 2007, p. 20). According to Tan et al. (2007) new knowledge

in learning situations primarily evolve from interactions from a group of people or individuals. Hence, a combination of KT technologies such as a web-based knowledge base, and KT techniques i.e. capturing knowledge through projects meetings and reviews, would be the best option for KT. Consequently, the organisation may achieve innovation, overall improvement and sustain competitive advantages. Building a knowledge-sharing organisational culture is discussed as important according to Cheng (2009). Due to the difficulty of documenting tacit knowledge, it is vital to create an organisational culture of accepting KT activities. As stated by Cheng (2009) "knowledge transfer greatly depends on the attitude of team members to share it when be required" (Cheng, 2009, p. 2038). He further proposes to adopt incentives to prompt employees to transfer knowledge.

2.4   Communities of practice as mean for KT

Studies have shown that productivity in the construction industry has deteriorated in the last decade, implying that one way to achieve best practice is through KT (Addis, 2016, Ekambaram et al., 2014). Addis (2016) states that KT will through innovation give the organisation a competitive advantage. Due to its open and collaborative approach in sharing tacit knowledge, communities of practice (CoPs) has increased in popularity in recent years. The technique origins from the field of social theory of learning and moreover focuses on joint collaboration and mutual sharing of knowledge between individuals. It is argued that CoPs can provide a lot of support in uncovering tacit knowledge in projects (Khuzaimah and Hassan, 2012).

Within the construction industry, Wenger's (1998) theoretical construct of community of practice has been first introduced as a way to measure management performance when it comes to how knowledge is created and shared in the construction sector (Johansson, 2012). The theory indicates that learning can only be understood in a social perspective; communities of practice. Khuzaimah and Hassan (2012) refer to Wenger and Snyder (2000) when explaining the framework, describing it as when motivated individuals have a common interest and purpose and thereof meet regularly to share knowledge and foster learning activities. As learning is a process of social participation, the participation enables a sort of action as well as a sense of belonging. Johansson (2012) continues with referring to Brown and Duguid (1991) who mention three communication-based processes. These are defined as "narration (storytelling to facilitate understanding of technology/events/work practice, and creating a vocabulary to solve problems), collaboration (an interactive process discussing group problems that leads to a reduction of conflicting meanings and the development of knowledge), and social construction (which is demonstrated through narration and collaboration and displays how an individual identifies with a community)" (Johansson, 2012, p. 6). As demonstrated, communication is a core competency which connects the members of a project group to a common set of strategies, goals and actions. The Project Management Institute (2013) emphasises the importance of communication in projects and demonstrates this in a figure which is shown below. The observations drawn from the

figure (Figure 2) indicate that organisations that communicate more effectively have more successful projects, thereby supports the theory of implementing CoPs in the company.
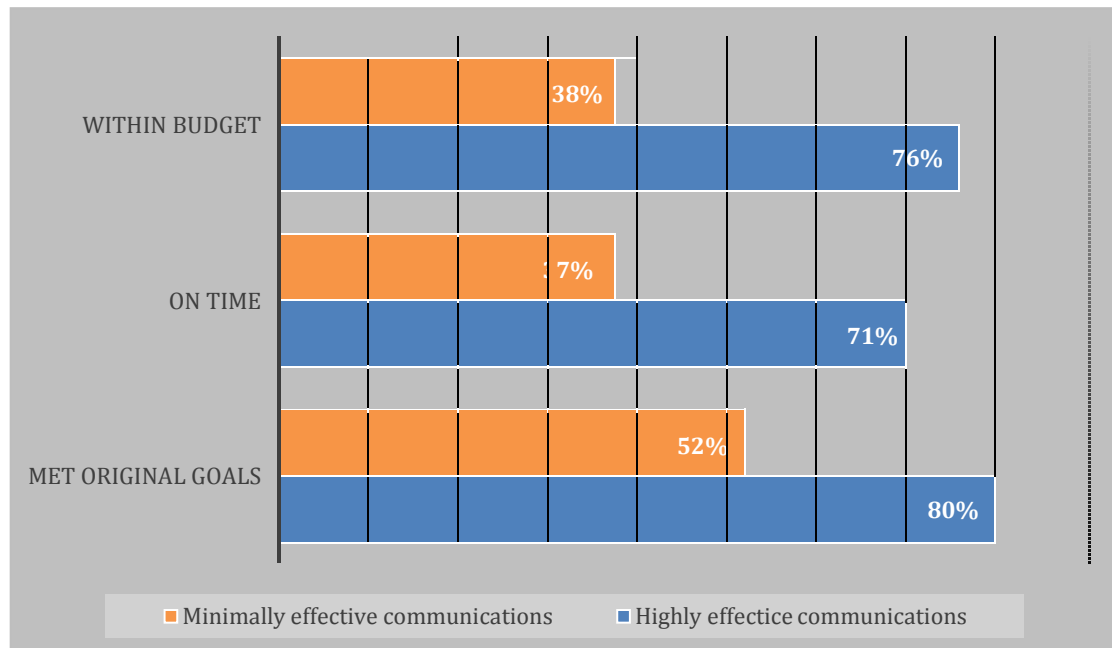

Figure 2. The important role of communications (PMI, 2013)

Communities of practice has also grown to be a KM tool to connect project members when it comes to creating and sharing knowledge (Khuzaimah and Hassan, 2012). They continue with highlighting the importance of social interaction between individuals, and state that it is the only way to uncover tacit knowledge. With its main focus on people, CoPs help to connect and bring people in a friendly environment to gather their expertise collectively and further "deepen their knowledge through knowledge sharing activities" (Khuzaimah and Hassan, 2012, p. 347). Comparing to a project team, a CoP has its strength on its voluntary commitment rather than to be compulsory. It also helps to build relationships and establish trust and mutual respect among the members, which will provide a foundation for sharing of knowledge and continual learning. There are some elements of CoPs that may facilitate the difficulties that comes with tacit knowledge. It is a way for uniting individuals from different backgrounds with different experiences to share and transfer their knowledge through informal discussions and open dialogues. The process is made easier if the members have similar or shared values and beliefs. When it comes to best practices, lesson learned and success stories, these can best be shared during CoPS meetings, where the members can be updated with the latest knowledge. CoPs are also a vehicle to support and drive innovation by catalysing new ideas and utilising the intellectual capital that exist within the members of the entity. Furthermore, CoPs may serve as a good starting point for beginners who are new to the work or topic to get insight and expertise from those experienced in the subject (Khuzaimah and Hassan, 2012). As discussed by Lytras et al. (2008) it is important to understand that to CoPs to be effective, there needs to be a dedicated team with common

interests that possesses social as well as intellectual capital and which ensures that learning opportunities are made available to the members.

As stated by Jonsson (2012) there has been a shift from IT to a more individual related focus when it comes to knowledge management and how knowledge is transferred in social settings. The importance of individuals' ability to explain or put something in context is also central when managing KT and whether or not a project may succeed. Jonsson (2012) discusses that KT "is more about talking and interacting, than packing and storing knowledge" (Jonsson, 2012, p. 200). This is important before, during and after an event, to not only transfer the knowledge but to develop it as well. In the process of transferring knowledge there exist three terms for individuals: knowledge brokers, knowledge stewards and knowledge researchers (Jonsson, 2012). Knowledge brokers have the main task to connect individuals; knowledge stewards help others to codify information and knowledge; meanwhile knowledge researchers assist others by searching for information that may be valuable to create new knowledge. In each case the importance of trust and having a shared interest between individuals, communities or organisations is crucial when managing KT (Johansson, 2012). Jonsson (2012) furthermore discusses solutions such as creating physical venues for exchange of experiences or creating a stronger learning or KT culture within the organisation, instead of using tools such as intranet, databases or other search engines.

2.5   Knowledge conversion: SECI model

How organisational knowledge is created and transferred can be demonstrated in the SECI model developed by Nonaka (1994) which has been used extensively by practitioners within KT. With the right tools and techniques, the view is that individuals will be able to share their tacit knowledge to others (Khuzaimah and Hassan, 2012).

This widely accepted model shows the dynamic process of interaction that exists between tacit and explicit knowledge, and which through conversion forms four processes (Figure 3). *Socialisation* (tacit to tacit) refers to transferring tacit knowledge between individuals, through the process of sharing experiences and thereby creating tacit knowledge. Practice, guidance and observation are examples of that. It is very difficult for one person to get into another person's thinking process without some shared experience. *Externalisation* (tacit to explicit) is the process of articulating tacit knowledge into explicit concepts. Since tacit knowledge can be virtually hard to codify, the use of metaphors and analogy is an important mechanism. Tacit knowledge is codified into documents, manuals etc. making it easier to spread through the organisation. *Combination* (explicit to explicit) refers to combining different concepts of explicit knowledge, by systemising them into a knowledge system. Existing knowledge are combined to create new knowledge. Databases and various IT tools play an important role in this process. *Internalisation* (explicit to tacit) is the process of learning by doing. It is important to make the knowledge a part of the culture or way of

work, by incorporate tacit knowledge in a person's or an organisation's tasks. Explicit knowledge is embodied into tacit knowledge through practical action (Jonsson, 2012).
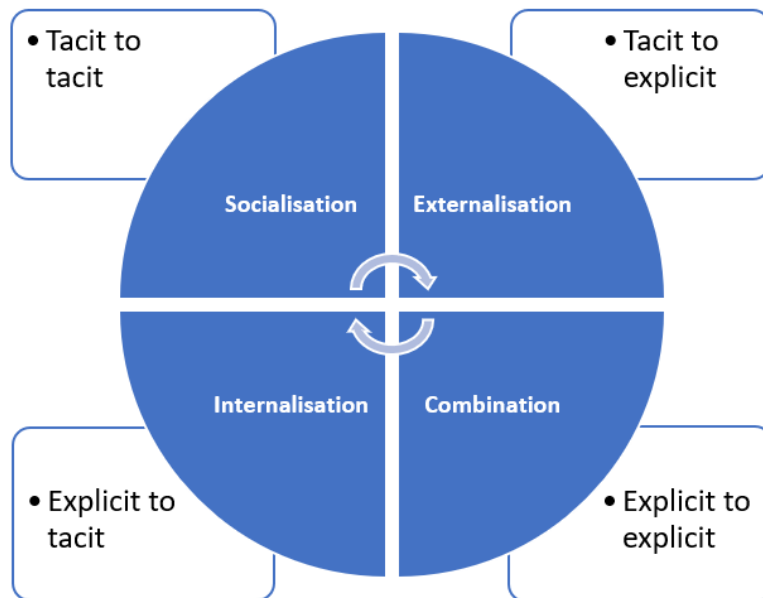
Figure 3. The SECI model (Nonaka, 1994)

2.6   Critical reflection on KT

Defining knowledge and the categorisations within KM is almost impossible aside from finding a lexical definition which does not capture the different nuances and practices inherent in the concept (Styhre, 2003, Jonsson, 2012). Styhre (2003) claims that the widely used term KM can best be characterised as a trans-disciplinary area of research, this since the different theories within the subject appeals to theorists which origins from psychology, sociology, philosophy, literature theory etc.

Recent studies have shown that research on KT in the construction sector is not absolute on the account of actual practice of sharing and transferring knowledge has not been investigated (Johansson, 2012 referring to Styhre, 2009). There is a lot of research on the topic, however, it mainly focuses on the general KT among internal organisations (Cheng, 2009, Jonsson, 2012). Nevertheless, it appears that transferring knowledge is based on informal, personal contacts and trust (Johansson, 2012, Cheng, 2009). Newell et al. (2009) state that in order to facilitate the type of communication and dialogue that is needed to share tacit knowledge and moreover generate learning, trust is a vital factor. They continue by claiming that while trust is indeed important for knowledge creation, it is also difficult to establish. Furthermore, when it comes to KT, each organisation views knowledge differently and has its own procedures which is affected by "the conditions under which a construction project had to be finalised: on time, budget and with profit" (Johansson, 2012, p. 10). How knowledge is created, managed and

transferred by the different actors in the construction industry is often determined by these conditions.

3   Method

This thesis is based on a case study within the construction sector. It investigated the chosen company's knowledge transfer in and between projects. According to Swanborn (2010) a case study is compatible with numerous data sources and may be defined in a lot of different ways. He refers to studying a social phenomenon which is carried out within the boundaries of one social system or a few, providing examples such as organisations, groups, and individuals. The focus should lay on describing and explaining "social processes that unfold between persons participating in the process, people with their values, expectations, opinions, perceptions, resources, controversies, decisions, mutual relations and behaviours" (Swanborn, 2010, p. 13). Moreover, Bryman (2016) mentions two types of research strategies: qualitative and quantitative. With case studies, both qualitative as well as quantitative elements may be included. However, the suggestion by Bryman (2016) is to use a qualitative research method since this approach involves an analysis of low structured data and aims to reproduce a comprehensive description of how, what and why things happen. A common comparison between the two research strategies is that the quantitative method goes in width whereas the qualitative focuses in depth (Axelsson and Agndal, 2012). There are some weaknesses linked to conducting a qualitative research such as its inability to replicate, meaning that the data and results cannot be corroborated. Another issue is that it is not possible to do any classification due to the study focuses on a small unit, resulting in a generalisation of results is limited (Bryman, 2016).

The choice of research strategy is based on the relationship between theory and research. A deductive approach tests theory while answering the question why. Meanwhile, an inductive approach is when theory is an outcome of research and answers the question what. Inductive approaches are usually associated with qualitative research (Bryman, 2016). However, the abductive approach is favoured in this case study. In a qualitative data analysis, it is proposed by Timmermans and Tavory (2012) that an abductive strategy is preferable to use. As stated by the authors "abduction reflects the process of creatively inferencing and double-checking these inferences with more data" (Timmermans and Tavory, 2012, p. 168), resulting in a flexible approach to move back and forth between theory and data iteratively.

The design of this study constitutes of a pre-study, followed by a literature and an interview study, as can be seen in Figure 4. Then followed an analysis of the data collection leading to suggestions and conclusions. The pre-study was conducted to get an insight of the company's organisation as well as to get a deeper understanding about the subject. Moreover, it was a way to, together with the company, formulate the research questions based on their need regarding KT. This phase consisted of an introduction with the company's Operational developer, meetings with a representative from the Post-construction market and a Lean specialist as well as two study visits. The pre-study resulted in the selection of a qualitative research strategy with interviews composed with a semi-structured framework. The reason of this was to have structure

but also flexibility as to offer the interviewees the chance to answer more freely. As stated by Fylan (2005, p. 65) "semi-structured interviews are simply conversations in which you know what you want to find out…but the conversation is free to vary". The data collection constitutes of interviews, with the aim to gather detailed data and focus in depth. Since an abductive approach was chosen, the possibility to go back and forth between data and theory has been much more convenient in this thesis. In that sense the view is that theory and data are complementing each other instead of determining each other. Parallel to the data collection, a literature study was conducted as can be seen in the figure below. Literature and other research within the area resulted in several findings, as well as theoretical and methodological contributions to the topic when analysed and discussed in relation to the data collection. At the end, possible solutions and conclusions are presented when it comes to KT in the construction industry.
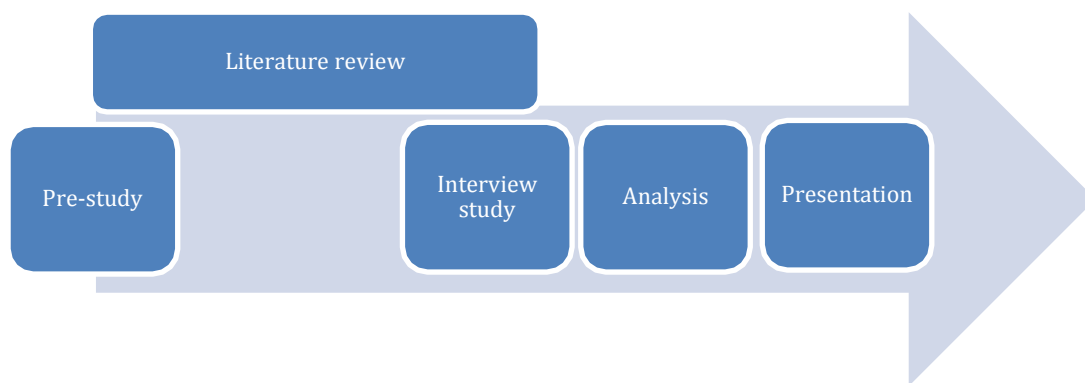
Figure 4. Case study process

3.1   Pre-Study

The pre-study began with a meeting with the Operational developer to introduce and discuss the company as well as the topic. The second meeting was with a project manager of Post-construction market. This unit works with errors and defects appearing after project completion and therefore has some insight of recurrent problems that are commonly overseen within production. Recurrent issues and improvements concerning KT were discussed. A Lean specialist working in the organisation was the object for a third meeting. In this meeting different tools and methods within projects were brought up. All of the meetings were conducted in Swedish and summarised in writing. Parallel to this stage, two study visits were made to learn more about the studied organisation as well as to see how the projects work with KT in practice. Both of the study visits belong to the business area of Building where one of the projects was a commercial building while the other a residential building, which is further described in chapter 4.1.

Based on the pre-study, it was decided to focus on KT in and between projects. It was moreover determined to investigate the topic from the perception of the organisation's site supervisors and site mangers. With support from the supervisor at Chalmers University of Technology, the focus of the literature was determined. By conducting a pre-study, the different focus areas could be identified which further on provided a

foundation for the interviews. "Knowledge transfer and its importance for construction projects", "knowledge transfer in practice", "learning from mistakes", "organisational conditions" as well as "the prospective outlook of KT methods" are the recognised areas of focus.

3.2 Literature review

The thesis is to some extent based on secondary data through literature. The literature study has progressed throughout the project but most extensively at the beginning, as knowledge needed to be gathered within the designated areas. The aim with the literature review was to produce a theoretical framework. The literature study was firstly conducted by going through uploaded documents from a previous undertaken course *Knowledge and learning in project organisations* at Chalmers University of Technology. This course provided a lot of information about KM and KT which compose a majority of the theoretical framework. It further on gave insight on appropriate references whom served as a guide when determining possible topics in the thesis. The second approach to extend the search was to search in databases provided by Google scholar and Chalmers library. In order to find appropriate literature for knowledge transfer, the main key words that were searched on were "knowledge management", "knowledge transfer", "knowledge sharing", "projects" and "construction". Moreover, the scientific articles and books concerning the subject were based on the following research areas:
- Construction management
- Project management
- Knowledge management

3.3 Interview study

A number of semi-structured interviews have taken place to collect information for this master thesis. The aim with the interview study was to get detailed data regarding KT from the perception of site supervisors as well as site managers and thereof gain a deep understanding of the subject. The data was collected through eleven interviews at three different construction projects in Gothenburg and was gathered in the middle of the case study. Eight of the interviews were conducted with site supervisors, whereas three were with site managers. All within the business area Building of the studied company.

3.3.1 Description of the interviewees

The different interview objects were selected and provided by the operational manager at the studied organisation. They currently held a position as either a site supervisor or site manager on different construction projects. The interviewees were chosen based on their position and experience.

The group of interviewees constituted a mixture of gender, age, experience and background. Those who were more experienced have been working as a foreman in more than two years and had commonly a background as a carpenter or as another worker within production. The majority of the interviewed site managers had started their career as a skilled worker and thereafter advanced to site supervisor and then site manager. The less experienced ones had been working around a year and some were newly graduates and had been studying at vocational schools or had a bachelor or master in construction engineering. Based on the interviews, it emerged that most interviewees have either done an internship, trainee program or written a bachelor or master thesis on behalf of the company before becoming a site supervisor and thereafter site manager.

Among the interviewees, a few were working on their first project whereas the majority have been involved in two or more projects. The different respondents, despite experience, are familiar with the concept KT.

3.3.2   Data collection and analysis

Prior to asking the interview questions, the interviewee was given a short introduction to the master thesis and its purpose. A semi-structured interview method was used. The same questions were prepared for both the site supervisors and site managers, but they were to some extent free to elaborate their answers. The choice of using semi-structured interviews was also based on the possibility to ask follow-up questions. Hence, the opportunity to adapt the questions to the interviewees' answers was greater. The last question was designed as a survey with multiple choice questions where the interviewees had the opportunity to rank different KT methods identified in literature. The interviews were conducted face-to-face and happened individually with each interviewee. Further on, the interviews were around thirty to forty minutes long. With permission from the interviewees, all interviews were recorded and later on transcribed. Therefore, it was easy to go back and get a better understanding of the interview. The interview guide can be found in Appendix 1 (Swedish) and Appendix 2 (English).

The interviews consisted mainly of questions regarding KT and what kind of advantages it could entail. How the studied company works with KT and if it is prioritised were then asked. Further on, the respondents got to answer if they see any connections between lack of KT and problems such as time delays, extra costs and decreased productivity, as well as if they are knowledgeable about the different initiatives within the organisation. Moreover, trust and to what extent they share knowledge were discussed, followed by ranking different KT methods.

3.4   Ethical concerns

Ethical aspects of the research have been taken into consideration throughout the writing of this master thesis even though most of the focus regarding this aspect has

been in the part of the case study and more specifically with the interviews. Kvale and Brinkmann (2009) claim with reference to Birch et al. (2002) that ethical problems occur in research of interview studies mostly since the privacy of the interviewee interferes when the declarations of the research become public. Further on Kvale and Brinkman (2009) state that ethical problems arise throughout the entire process of interview studies and that potential ethical aspects have to be taken into consideration throughout the interview study process. Four different areas regarding different ethical aspects are being highlighted: Informed consent, Confidentiality, Consequences and The researcher´s role (Kvale and Brinkman, 2009). It can be found below how these affected the interviews within the case study, and how they were taken into consideration throughout this thesis:

- Informed consent - All of the interviewees were informed about the general purpose of the research, how it is designed and how the advantages of participating in the case study may be beneficial to the master thesis. The process of the research was highlighted as well as information regarding the publication of the master thesis.
- Confidentiality - None of the interviewees nor the company can be identified throughout the report since anonymity was of priority. This since the participants in the report should not be able to be identified and harm them in anyway.
- Consequences - The consequences of this master thesis have been taking into consideration, both in the aspects of the participants within the report as well as what the possible outcome may lead to in terms of consequences for the organisation. The confidentiality is a big part of this aspect.
- The researcher´s role - Both the role and integrity of the writers of this master thesis have been of importance in order to achieve a high qualitative research by keeping the ethical aspects in mind. Attempting to be neutral throughout the thesis is an example of this since the outcome of the thesis should not be biased.

4 Case description

The case study constituted an investigation of the studied construction company's work within KT. Furthermore, the case is based on three different projects within the business area Building, in the region of Gothenburg. The context within this chapter is based on both public and internal document information provided by the organisation. Some parts of the context are based on information which has been given through conversations by employees within the company during the writing of this master thesis.

4.1 Information about the company

The studied company is one of the largest construction and property developer in the Nordic region with approximately 17 800 employees and a turnover of roughly 55 billion SEK (2017). The organisation offers services which develop and build residential and commercial buildings, industrial facilities, roads and infrastructure projects and other types of civil engineering structures. The organisation has four business areas which are divided into three businesses with different business logics.

The construction and civil engineering business, which is the one being studied, is conducted into two different business areas: Infrastructure and Building. Further on, the business area studied within the company is Building which primarily constructs housings and offices, but also commercial buildings such as hospitals, schools, retail stores and storage facilities. Building is the largest business area within the organisation with a 45 percent share of the total turnover. Figure 5 gives an overview of the organisational structure with focus on projects in production.
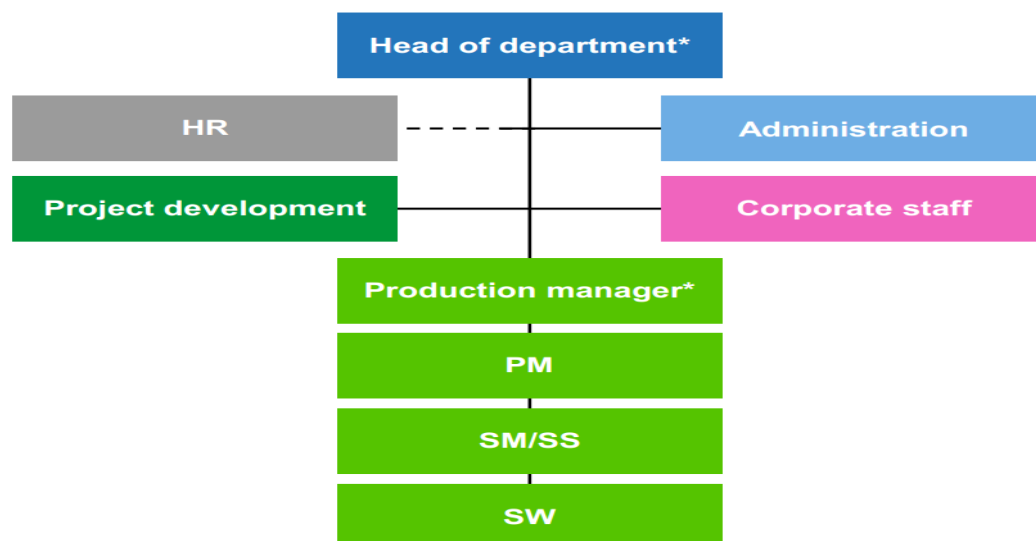

Figure 5. Organisational structure within the department

4.1.1   Description of studied construction projects

The three different projects which were part of the case study belong to the business area Building. Thus, all of the projects were constructing houses and more specifically residential livings. Each of the projects therefore had similarities in their working process since they all belonged to the same business area and the scope of the projects were similar. The Operational developer within the organisation claimed that all of the projects are medium-sized and have classic characteristic features and scopes for projects within their region in the business area of Building, and more specifically in the construction process of residential livings. The turnover in the different projects are between 100-200 million SEK and have a time frame between 2-5 years.

4.2   Current initiatives within KT

The organisation has been working with several different initiatives regarding KT, this with the aim and goal in attempting to capture and share knowledge in and between the different construction projects. The different initiatives vary depending on regions, nevertheless the current initiatives which are accessible and could be found throughout the company are described below:

Operational system – This web-based source gives employees within the organisation an overview of how the company works and defines how the different building processes should be dealt with. The main purpose with this is to provide a source which entails that everyone within the organisation works in the same way.

Project portal – This is a tool which each project should work continuously with and it is connected with the Operational system. It provides the projects and its members with a system which describes different working tasks and statuses within each project. This web-source also provides knowledge documents such as execution plans and different templates and documents which can be beneficial for the projects, nevertheless they are not specified for the different projects.

Knowledge forum – A form of survey which enabled employees within the different production projects to provide and share knowledge which they think could be beneficial to other employees. After the knowledge has been shared from an individual in a project, the employees in the office of the company sort out this knowledge and thereafter provides feedback on it and communicates it forward to those who it may concern.

Exchange program – This initiative should work as a tool for bringing different departments within the organisation closer together, especially the office and production. The exchange program makes it possible for employees to visit production and vice versa. This in an attempt in trying to get further insights and understanding of each other's work.

Another initiative which focus on the KT within production is the *site manager forum.* This is an arrangement where site managers in the business area of Building come together approximately every sixth week to share knowledge amongst each other. The agenda differs between the different meetings, although the focus constantly is on developing KT within the different production projects. The Post-construction market is always participating during these arrangements.

Furthermore, the business area of Building combines the initiatives mentioned above with KT initiatives which is based on end meetings. The knowledge which is being highlighted during these meetings and may be essential for the organisation to capture and share, will be communicated to the project managers and thereafter expected to influence the different projects they are managing.

This list of initiatives serves as a guide for the further investigation of how KT can become an established practice within a construction company.

5 Empirical findings

In this chapter the results from the data collection is presented and analysed. Based on the literature review together with the interview study and the answers that emerged, the different focus areas regard *Knowledge transfer and its importance for construction projects*, *Knowledge transfer in practice*, *Learning from mistakes*, *Organisational conditions*, and *The prospective outlook of KT methods*. The interviewees consisted of experienced as well as non-experienced site managers and site supervisors who gave their perception of KT within the studied organisation.

5.1 Knowledge transfer and its importance for construction projects

KT is a concept well known within the studied organisation. Although the explanation differs between individuals and projects, the definition of the concept was more or less the same. The more experienced interviewees refer to previous experiences and projects while the other group think about the project they work with at the moment. A sentence which occurred in all of the diverse formulations was that KT could prevent for *not being forced to reinvent the wheel all over again.* The majority of the interviewed developed this by explaining that this will also affect the projects in terms of saved time and money, efficiency, preventing repeating mistakes, communication and a smoother work way. One interviewee refers to KT as "when opinions exchange at the completion of a construction phase"[1]. Other definitions were "communication, telling everything you know to another person"[2], "teaching"[3], "knowledge sharing from older generations to younger ones" [4] as well as "work methods and work thinking" [5] . In general, a consistent explanation was that knowledge transfer is about sharing knowledge and experiences between individuals, however, the perception is that these experiences are derived specifically from working in previous projects. It also appeared that these experiences are mostly communicated out at the construction sites when it comes to asking questions and sharing experiences, while it at the same time exists end meetings to discuss the completed project which is also a way of KT.

The view of KT within the company is that it, when taking into account, helps to avoid the workers from making repeated mistakes or even prevents problems from happening within the project. One respondent gives the example of the importance of knowing which subcontractor provides good services. When it comes to new employees on the workplace, KT is to a large extent vital due to their inexperience. The perception is, however, that it is not that easy in practice, as mistakes are continuously happening when KT is not being considered. Another claim from some of the respondents is that

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[1] Interviewee 3
[2] Interviewee 4
[3] Interviewee 6
[4] Interviewee 9
[5] Interviewee 8

KT enables people to talk to each other in a greater extent. But it appears that communication mostly exists within the project group and not between projects which will be further discussed in a later section.

According to all of the respondents, trust is seen as an essential factor for succeeding with KT. Lack of trust from the receiver may lead to a consequence where the knowledge which is being transferred will not be taken into consideration or partly not as efficient as if the trust between the individuals would be greater. As stated by several interviewees *if you do not have confidence in someone, you will not listen* which is further linked to that employees cannot expect getting bad information from others within the company. Especially because it is a workplace where the personnel commonly work the same way and strive after a mutual goal. As another one stated "you need to know that the information and knowledge you are receiving is relevant"[6] which the perception is that you believe, if you know and trust that person. Furthermore, when the purpose with KT is to exchange knowledge and experiences, it is vital that the employees have the courage to ask a lot of questions. The interviews showed that the site supervisors, especially newly employed, must ask a lot of questions during their daily job. This to not make repeated mistakes that are costly for the company, as referred by one respondent "if you do not trust the people on the workplace there is a risk of chaos on the construction site"[7]. Although, KT is a way to widening the contact network, it appears that it is easier to discuss and ask questions if you know the person from before which would consequently increase the possibility of trustworthiness.

Main findings related to the knowledge transfer and its importance for construction projects are:
- Taking into account KT could prevent for not reinventing the wheel
- Trust is a vital factor for a successful KT

5.2   Knowledge transfer in practice

When the interviewees were asked how the company is working with KT and if it is prioritised, the answers were rather consistent. The majority believe that the organisation works with KT, but they cannot pin point any current established initiatives set from the company regarding knowledge transfer. They believe that it is up to every individual and particularly that it varies from project to project if it is taken into consideration or not. This since none of the existing initiatives are considered to be successful or are seen as useful in production. Nevertheless, they all mentioned they have awareness that different initiatives have been tested. A given explanation for this according to the respondents working in the company for several years, was that there has been too many different initiatives and databases within the company. Further on, the perception is that it is up to the individual to asks questions or search for the needed

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[6] Interviewee 8
[7] Interviewee 4

information when it comes to KT within the project. There are a lot of different methods and ways of working within the company which results that the employees' knowledge and experiences are not collected in one place. This is considered to be a problem since the majority of the interviewees see benefits with having a shared place where one can easily access each other's experiences and knowledge. Furthermore, some of the interviewees mentioned the start-up and end meetings that are conducted within the project. Then everyone that has been involved in the work gathers, and what has been good, bad and possible improvements are being discussed. According to some, these meetings occur each month while others answered they occur after each project or completed element.

One respondent mentioned an initiative which was created by a site manager in the company. This initiative consisted of a database where information, mistakes and smart tips could be shared among employees in the organisation. However, information about this site did not reach out to a large enough amount, resulting it to be only used by a few. The interviewee mentioned in this connection that there is very much competence and information concerning the subject and within the company, but it is difficult to obtain. In line with this, some of the respondents do not consider that the organisation is actively working with KT. Instead it is common to ask questions to the experienced, often older, site supervisors and site managers. These possess a large amount of experience and knowledge which can be forwarded to the less experienced ones. As one interviewee stated "it is so much easier when you are surrounded by pedagogical co-workers"[8] when referring to KT. Another example of this is a retired site manager who helps and supports the current site manager who is new in the position.

In addition to the much appreciated end meetings, the exchange program that exists was highly recommended. It is being mentioned as a great tool for getting a better understanding and insight of the various actors within the company. It is composed so that those who are in office visit the production and get to see how things work in reality, while the site supervisors visit their office. One of the site managers underlined the importance of making different parts of the organisation aware of how the different segments are working. This to get a greater perspective on how the various working processes are being dealt with in practice, especially on site. It leads to that the designers get to experience common problems that occur in production whereas they also get to share their opinions with the site supervisors, as well as the other way around. As a result, knowledge and experiences are shared between the different departments. Post-construction market is a division that is frequently referred to when it comes to KT. Some of the interviewees mention their project group's recurrent contact with this unit. Post-construction market gives feedback, specifically when problems have occurred, but it can also step in to prevent issues from happening. It is also mentioned that Post-construction market has invited projects to meetings to inform about common cost

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[8] Interviewee 6

items that it encounters. The interviewees referring to this department consider it to be a very effective way to facilitate KT.

It was a very divided response if the respondents know about the knowledge forum that the company has. A common reference was that there are already so many different databases within the organisation that you are not aware about a specific one nor know its content. None of the interviewees, either if they knew it or not, use the forum. Some of the reasons were lack of preparation, time, or information. However, it became clear that the site supervisors would benefit from having a type of template or model so you have, especially as a newly employed, a structure to follow instead of starting over with each new project or phase. One interviewee states that it is easy to ask questions through the company's web-based sources but most of the time the questions occur and are asked at the construction site with the other site supervisors and site managers. The perception by the interviewees is that they share knowledge in their everyday work and that it is huge part of their daily job. All site managers had a positive attitude towards sharing their knowledge to colleagues and among other projects within the organisation. They stressed the importance of this and underlined that the knowledge sharing is crucial for succeeding within their own project. It commonly occurs in form of conversations and meetings out on the production site, but often in limitation to the workers within their own project. The more experienced respondents underlined that a wide personal network within the company as well as within the industry is something that is very beneficial when working with KT. This due to the fact that it becomes much easier to get in contact with other colleagues which you have been working with or met earlier, especially when questions are arising or if you need some kind of support. A lot of the site supervisors work with apprentices and trainees which result that they have to explain and clarify things, so they learn enough to later on manage themselves. Others have a constant contact with subcontractors about specific detail issues. Furthermore, by exchanging knowledge with other colleagues you get a sounding board when it comes to ideas and opinions. In addition, you get confirmation if you are doing your job correctly, which for some is very reassuring.

According to the interviewees it is easier to transfer knowledge face-to-face than through forums, and the culture within the organisation seems to be *when someone asks – you do your best to answer*. The opportunity to exchange knowledge is primary within the project group. The perception is that it is only in rare cases information and knowledge are transferred to other projects, due to the size of the company, lack of external communication and that it is time consuming. One respondent mentions a close friend within the company and gives this as an example when it is easy to transfer knowledge and get in touch with others in the company. In line with this, another respondent draws the conclusion that it is easier to share knowledge when you have worked within the organisation for a while because then you probably have a larger personal network. An exception when it comes to the possibility to transfer knowledge between projects, one interviewee mentions annual meetings and conferences where they usually talks about work. The same interviewee involves the project manager   in

the discussion. Accordingly, it is up to the project manager to inform other projects about any faults and actions that may reduce costs. In comparison, some of the interviewees refer to the site manager whom they communicate a lot with. The various site managers gather on regular forums to discuss important information that has been brought up within the different project groups. Further on, the exchange program is a good way to broaden as well as strengthen the employees' network within the company. As one states "it is mostly at study visits, when you are out and meet people, when positive changes can happen"[9].

The different interviewees got to state whom they receive knowledge from and who they transfer their knowledge to. The answers were pretty consistent when it comes to the both ways. The respondents obtain knowledge from site supervisors, site managers, suppliers, project manager, subcontractors, skilled workers, project buyers, clients, users, designers, Internet, as well as the office of the company. They share their knowledge to site supervisors, subcontractors, suppliers, project manager, site managers, friends, interns, skilled workers, clients, users, and the office.

Main findings related to knowledge transfer in practice are:
- There does not exists any current KT initiative which facilitates the site managers and site supervisors in their daily job
- KT occur mostly through conversations and meetings at the production site
- Easier to transfer knowledge face-to-face
- The sharing of knowledge and experiences is often limited to the project group

5.3   Learning from mistakes

The majority of the interviewees see links between KT and time delays in projects when KT has not been taken into account, and this is usually shown in beginner mistakes when new elements go wrong. In line with this, all of the respondents highlight the importance of asking questions. However, the responsibility lies with both the individual who possesses the knowledge as well as the individual who receive it. The site managers spoke frequently during the interviews that the site supervisors must dare to ask questions, this to avoid simple mistakes which could have been prevented. The majority of the site managers did repeatedly refer to the statement of *not being forced to reinvent the wheel all over again.* The respondents emphasise the importance for site supervisors to ask "stupid" questions and they prefer to see someone ask one question to much than one too little. Some interviewees draw connections with time delays, additional costs and reduced productivity with lack of KT within production, embedded in double work.

Giving examples when KT has not been utilised in production was not difficult for the interviewees. One respondent has been on three projects that are similar to each other

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[9] Interviewee 10

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in terms of size and scope and has noticed that the same mistakes have been repeated. The attitude is, however, that those in the project team try to make use of what they have learned from previous projects and bring those lessons to the next project, but it is often easier said than done. Another one exemplifies not taken KT into account, by just mentioning how long time it takes to do something for the first time, before you have obtained experiences. Another interviewee refers to a project where several site supervisors have moved between different projects which has resulted that a lot of information has been lost. Huge problems in production that appeared through several interviews are the ones concerning water and moisture. These have either been solved or improved with the help of Post-construction market, due to their recurrence. Heavy windows and doors is another issue that created problems and that has been prevented through new replacements, again together with Post-construction market.

The view from the respondents is that you want to avoid mistakes at all costs, as it takes time to do something twice, hence KT can be a factor worth spending resources on.

Main findings related to learning from mistakes are:
- Asking questions are highly prioritised, especially for site supervisors
- Problems which have occurred in different projects could have been prevented by a more successful KT

5.4 Organisational conditions

There is a split view connected to KT within the organisation. The general perception is that the employees are responsive and ambitious, and people are open to share their knowledge and experiences. Further on, one of the interview object claims that the organisation has gone through a change in this aspect of willingness to share knowledge, especially between projects. This with reference to the fact that site managers in the past for example held knowledge for themselves when they had found a special way to earn money within their project. An attitude that, according to the site manager, is completely disappearing within the organisation. Once again, all site managers state that it is not unusual that they contact people they know since earlier within other projects to get support or feedback. However, some respondents still consider that the attitude towards KT need to change. A lot of the interviewees experience that there is a gap between the workers in the production and the people in the office. A feeling of "us" versus "them" exists according to some respondents. The majority of the interviewees see a benefit of involving the workers more since they possess a lot of knowledge and experiences. The whole organisation should work more together and see more of each other's realities and the belief is that a stronger cooperation between production and the office will benefit both parties. Moreover, some respondents mention the wide range of different forums and databases that exist within the company but then refer to the industry as conservative. Some of the older employees that have worked in the organisation for a long time, think you should do as you have done before instead of trying out new methods or ways of working. But the perception among the interviewees is that if they see a positive shift they will adapt.

The general approach to KT is that you share your knowledge when asked. Neither the site managers nor the site supervisors are good at documenting their experiences on forums or databases. There is a huge reservation towards (increased) administrative work. There is even an attitude "now are we done, let's move on"[10] which according to the interviewees is something that may have to disappear in order to achieve better KT. Another respondent considers that there is not much talk about KT within the organisation which is further recognised by a few other interviewees. They believe that some people do not know about it or how to proceed with it, and thereof press the importance to introduce the subject to the whole organisation. In this case, the employees will be aware of the importance of KT and hence understand the beneficial aspect of implementing KT throughout the organisation.

Moreover, to implement incentives or rewards to increase the use of KT is supported by only a few of the interviewed. Those who see it as beneficial when it comes to KT refer to that a reward of some sort may lead to a larger openness by people that are more introverted. Incentives such as longer leave and extra payment are examples that are mentioned. Others see it more valuable to share their knowledge if they know that other employees do it as well. Some refer to KT as an advantage to both spread and share. The gain is that the organisation ultimately saves time and therefore also money. However, most interviewees do not think that rewards and incentives are the solution that would facilitate KT within the organisation. Instead they claim that this is part of their job and that there should instead exist tools within the company which are easy to manoeuvre and support the work of KT.

Main findings related to organisational conditions are:
- People are open to share knowledge and experiences
- There exists a huge hesitation towards administrative work
- Rewards to increase KT is not seen as favourable

5.5 The prospective outlook of KT methods

The interviewees were confronted with a set of methods to rank the ones best suited for sharing knowledge and experiences. The different methods are demonstrated in the table below. The scale goes from 1 to 8 where 1 stands for the most important method whereas 8 is the least preferred. Noticeable is that the majority of the site managers and site supervisors see face-to-face meetings as the best way to exchange experiences, closely followed by regular meetings with other employees in the same position within the organisation. The method least preferred is the knowledge forum that the organisation has used in the recent years.

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[10] Interviewee 6

Table 2. Ranked methods from the perception of site managers and site supervisors

Methods	Interviewee 1	Interviewee 2	Interviewee 3	Interviewee 4	Interviewee 5	Interviewee 6	Interviewee 7	Interviewee 8	Interviewee 9	Interviewee 10	Interviewee 11
Knowledge forum	7	6	8	8	8	2	7	5	5	4	6
Face-to-face meetings	1	1	1	4	1	5	2	1	3	1	2
Workshops	6	7	5	7	2	4	5	2	2	7	7
Conferences	5	3	6	6	5	7	8	7	4	8	8
New information system (knowledge bank)	4	8	3	5	6	8	6	3	6	3	3
"Lesson learned" (learning from mistakes)	8	4	7	3	4	6	3	8	8	5	5
Mentoring	3	5	4	1	7	3	1	6	1	2	1
Regular meetings with other employees in the same position	2	2	2	2	3	1	4	4	7	6	4

The attitude towards a forum for the site supervisors was in majority positive. The interviewees thought that it could either work as a place to discuss experiences from previous as well as current projects, or to establish contact with other site supervisors in the same situation. However, the purpose and arrangement of the meetings must be different in comparison to the site manager forum. The site managers which are positive to the idea stress that the objective with the meetings must be predetermined. It is central to have a clear idea of what the result of meetings may lead to. Further, one site manager was critical to the idea due to the fact that KT is not only about getting together and hear about what has worked out or what could have been improved. Instead the interview object highlights it as a huge advantage to broaden the contact net through this forum. Moreover, the majority of the site supervisors believe that a site supervisor forum would be a beneficial initiative. Especially the newly employed sees it as a useful tool to get a better insight in the organisation. To get the chance to review problems and solutions, as well as mistakes that should not be repeated in production is something that the interviewees consider as very valuable. Furthermore, the respondents emphasise the advantages of such meetings as you get to know other site supervisors, and that it makes you more willing to later on contact these people and thereby widening your contact network. Those who see a site supervisor forum as a good idea, highlight the need of having a clear purpose with it so people do not go there "to sit off the time"[11]. Those interviewees who do not think that a site supervisor forum would be beneficial, consider the meetings to be unnecessary since they often lack a clear objective. Instead they as well highlight its importance in the perspective of broaden the contact network. The possibility is greater to know who to get in touch with when future problems or questions arise, after attending such a meeting.

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[11] Interviewee 6

Main findings related to the prospective outlook of KT methods are:
- Face-to-face situations are the best way to exchange knowledge
- A site supervisor forum was seen as a positive initiative
- A wide contact network is very beneficial

6   Analysis and discussion

In this chapter, the results from the case study will be presented. The analysis will be discussed based on the three following research questions:
- What perceptions do site supervisors and site managers have regarding knowledge transfer in construction projects?
- Which current initiatives regarding knowledge transfer exist within the studied organisation?
- How can the studied company facilitate that different projects benefit from and take advantage of knowledge transfer?

6.1   What perceptions do site supervisors and site managers have regarding knowledge transfer in construction projects?

Styhre (2003) and Jonsson (2012) claims that one of the reasons why defining KT often is difficult is due to the fact that it is a very broad subject, and many theorists provide different explanations of it. Styhre (2003) states that it is nearly impossible to define and categorise the whole subject aside from finding a lexical definition which however does not capture different nuances and practises inherent in the concept. In comparison to this, it was found that employees within the organisation were familiar with the concept of KT while the definition and categorisation of it was widely spread between the individuals and projects. This shows that there exist similarities between the literature and case study regarding the complexity and various extent of defining KT. However, a common definition of the concept is not vital for a larger spread of knowledge and experiences within an organisation. The importance is instead to have a mutual understanding of KT to further increase the use of it and realise the benefits it entails.

One of the more recognised categorisation within KT is explicit and tacit knowledge (Hislop, 2013). Although the definitions of the different kind of knowledge may be many, explicit knowledge can be described as a kind of knowledge which can be written down on a piece of paper and is impersonal. This while tacit knowledge often is personal and harder to describe and is instead connected to learning by doing. It emerges from the case study that there exist a huge amount of competence and information concerning KT within the company, however, it is difficult to obtain since a lot of it could be seen as tacit knowledge that is bound to individuals within the organisation. Explicit knowledge exists in databases and manuals in the organisation. However, various kind of tools were not forwarded by the site supervisors and site managers since they are afraid it would increase the administrative work, which is not preferred.

It is common within construction that organisations and workers in this industry have access to more knowledge then they can explicitly express or share to others (Ahmad

and An, 2008). Since projects are a common work form, the need of capturing, sharing and managing knowledge is essential (Johansson, 2012). The view of KT within the organisation is that it, when taking into account, helps to avoid the workers from making repeated mistakes or even prevents problems from happening within the project. It is clear that KT is seen as a huge advantage if it could be dealt with in a more satisfied way. This is seen as something very positive due to the fact that further advantages of KT are savings of money and time, as well as the workload of correcting unnecessary errors. Another view within the organisation is that the project group achieve a smoother way of working when KT has been considered. These findings are in line with Ekambaram et al (2014) as well as Ahmad and An (2008), who claims that inefficiency, unnecessary time and delays in projects are problems that may occur due to lack of knowledge transfer. Further on, Ekambaram et al (2014) state that the lack or misuse of KT within the construction industry can result in issues such as *reinventing the wheel*. Ahmad and An (2008) refer to the same sentence and highlight the advantages of KT in terms of reusing and sharing previous experiences and knowledge in the given organisation. A claim that occurred in all of the interviews when trying to define what KT may lead to and the advantages of it. These facts highlight the importance of KT and what the outcome of working with it in a more systematically way may lead to.

Most of the interviewees state that it is up to each individual to consider KT in their everyday work. In line with this, all respondents had a positive attitude towards sharing their knowledge to colleagues and among other projects within the organisation. They stressed the importance of this and underlined that knowledge sharing is crucial for succeeding within their own project. This commonly occurs in form of conversations and meetings out on the production site, but often in limitation to colleagues within their own project. Further on, motivational incentives to increase KT within the organisation is not promoted by the interviewees in contrast to the discussion by Jonsson (2012). Even though there is not a prevailing attitude to hold information instead of sharing it, the perception is that the employees will do it if others do it as well. Neither money nor extra vacation days are incentives that control if an employee share more knowledge. This can be seen as something positive since the interviewees consider that receiving and giving knowledge is a part of their daily job and moreover something that is only beneficial for the individual itself.

6.2 Which current initiatives regarding knowledge transfer exist within the studied organisation?

In terms of how the company works with KT today and if it is prioritised, the findings within the case shows that the majority considers that the organisation works with KT but do not recognise any current established initiatives set from the company regarding KT. They believe that it is up to every individual and particularly that it varies from project to project if it is taken into consideration or not. Furthermore, the more experienced interviewees referred to KT and drew comparisons to previous experiences

and projects while the more unexperienced interviewees only referred to KT within their own current project.

To exchange knowledge, the end meetings were mentioned as a good way to share experiences between project members. The suggestion was though to increase their occasions to more frequently. Having these project meetings may add real value to the project. How well the meetings are managed is however critical for the success of KT and moreover the project. The aim is to communicate critical project information with quick feedback, brainstorming solutions as a team, besides reviewing the status collected. As face-to-face discussion was the most preferred KT method, discussion of problems and work-related hindrances may result in overcoming obstacles at a faster rate, and issues concerning KT may be debated and solved. Moreover, having regular meetings will enable the discussion to concern minor experiences as well, and not only the huge critical ones, taking into account the whole project process. The site manager forum exists, as it states, for the site managers. They gather on meetings to discuss project information and share experiences amongst them. It emerged from the interviews that a similar concept but for the site supervisors is recommended. It should either work as a forum to discuss experiences or as a social seminar to broaden the contact network for the members. Either way, there must exist a clear and coherent objective. It is moreover important that the participants do not see these meetings as an interruption to their real work and a waste of valuable time, but instead understand the organisational advantages of it.

It emerged both from literature and the case study that there is a huge hesitation towards administrative work and the possible increase towards to document experiences and knowledge. Although there exists time for this task according to the interviewees and in contrast to the theory referred to by Cheng (2009), much of the site managers and site supervisors do not invest in or prioritise it. The approach to KT is instead that you share your knowledge when asked. Nevertheless, literature support practice since all of the respondents consider that KT is based on informal, personal contacts and trust (Johansson, 2012, Cheng, 2009). All site managers highlight the typical way to contact different people they know, within other projects or other companies, to share ideas or to get feedback. Whereas, the site supervisors limit the communication and connection to the project group but propose that it would be easier to get in touch with others if they knew them from before. Indicating that a broader contact network, which the site managers have, is a key to increase KT. The more experienced respondents evidently noted that a wide personal network within the company as well as industry is something that is very beneficial. The exchange program is therefore an appreciated and well-functioning method to share and exchange experiences from the perspective of the site mangers and site supervisors. Observing and experiencing situations up-front is a great way to learn how things are working as well as how others work within the organisation. The exchange program moreover broadens the employees' contact network due they have the opportunity to meet personnel from other departments within the organisation. As several interviewees consider there is a gap between the workers in production and

the personnel in the office, this sort of tool reduces splits and further ties the different employees together.

As Cheng (2009) gives advice to store knowledge and experiences in a knowledge bank during the project process, the interviews show that the company has already tried and failed to implement digital initiatives and databases. An example was the knowledge forum. None of the interviewees, either if you know it or not, see it as a useful tool for KT. Since there is a reservation to document knowledge overall and due to the negative response regarding a data system storing KT, a knowledge bank is not considered to be a suitable approach to manage KT within the studied company. Instead, in line with the discussion made by Jonsson (2012), creating physical venues for sharing knowledge is more relevant. Hence, as stated before, all of the respondents has the willingness to share their knowledge and experiences to others. In line with this, there was a coherent view that face-to-face meetings were the best way to exchange knowledge. The interviewees prefer verbal communication and sharing experiences by working practically together in projects. In line with this, the perception by the interviewees is that they share knowledge in their everyday work and that it is a matter of course to do just that. As Khuzaimah and Hassan (2012) discuss, knowledge could be transferred and sustained through a learning approach like communities of practice. CoPs is a tool for uniting people from different backgrounds and with different experiences to exchange knowledge through informal discussions and open dialogues. It is moreover argued that CoPs can provide support in uncovering tacit knowledge in projects. The respondents advocate social participation and by bringing people together in a friendly environment through knowledge sharing activities, it is more likely they will exchange experiences to a greater extent. Further on, a site supervisor forum could act as such activity where the involved either discuss experiences or get to know each other to increase the likelihood of contacting each other later on. As stated by Khuzaimah and Hassan (2012), lesson learned and success stories can be best shared on CoPs meetings. CoPs is also a good starting point for newly employed to get insight and expertise from those more experienced, much in line with what emerged during the interviews where they see the site supervisor forum as a useful tool to develop and deepen their knowledge.

6.3 How can the studied organisation facilitate that different projects benefit from and take advantage of knowledge transfer?

Jonsson (2012) discusses the importance of social settings when knowledge is being transferred and underlines that there has been a shift from IT to a more individual related focus when it comes to KT. The importance of individuals' ability to explain and put something in context is central if the project will be successful or not, hence KT is more about talking and interacting than packing and storing knowledge. The concept of *socialisation* (SECI model) discussed by Jonsson (2012) is thereby a proved process, resulting that tacit knowledge is conversed into tacit knowledge through   the

interviewees sharing of experiences between them. It is moreover highlighted by Johansson (2012) and Newell et al. (2009) that trust is an essential and crucial factor in this process. When given the question if the interviewees believe that trust is an essential foundation in KT, the unanimous answer were yes. The explanation of this was that trust is crucial for succeeding with KT in-between the individuals it concerns. Furthermore, several of the interviewees stated *if you do not have confidence in someone, you will not listen* when developing their answer.

As identified, tacit knowledge is a big part of the construction industry as stated by Johansson (2012), which can be further observed in the organisation. Accordingly, the importance of talking and of social interaction between people is the only way to uncover tacit knowledge (Jonsson, 2012; Khuzaimah and Hassan, 2012). As mentioned by Jonsson (2012) it is important to do this before, during and after an event or phase, not only to transfer knowledge but to develop it as well. In the interviews it emerged that there is a great necessity to ask questions throughout the construction process, to prevent making repetitive mistakes which is in line with the theory discussed by Cheng (2009). Cheng (2009) also states that construction companies suffer from having to reinvent the wheel in every project which was heavily debated in most of the interviews. The losses associated with lack of KT according to the interviews, were much in line with Ekambaram et al. (2014) and Ahmad and An (2008) such as time delays and extra costs. Due to the nature of projects in the construction industry, there is evident examples of knowledge loss throughout the production department. Unexpected swaps of site supervisors between projects is one such case where a lot of information has been lost or resulted in delays, which is connected to the consequences of knowledge loss referred to by Cheng (2009). Consequently, there is a problem with not only lack of KT but lack of communication. According to Johansson (2012) a shared repertoire is developed and maintained through three communication-based processes. Narration, collaboration, and social construction can all be used within the organisation to facilitate KT. Moreover, communication is a vital factor and has a positive impact on project outcomes and overall success. Organisations do not put enough importance on effective communication and the benefits it entails, which can be observed within the company. Especially when it comes to critical project information regarding the execution process of the different phases as well as the contact in and between the different projects and various departments within the organisation. It stresses the fact that there needs to be initiatives within the organisation which makes it possible to share knowledge in-between individuals in an even greater extent. As accordance to PMI (2013), research finds that effective communications between individuals result in completing an average of 80 percent of projects within budget, on time and meeting the set goals, achieving more successful projects.

As projects may differ in complexity in terms of size, time, and budget, it is rarely possible for a project group to undertake a systematic review of a completed project and document the knowledge and experiences derived from it. Moreover, there are individual and social barriers that prevent the transfer and documentation of knowledge

and experiences. These types of barriers may include open and honest transparency of failures and mistakes which are not always present in project-based organisations. This is unfortunate because it is common that failures and mistakes provide the organisation with valuable knowledge and inputs (Cheng, 2009). These barriers were mentioned by the interviewees as something that occur from time to time. It is common to cover up small mistakes while being honest about the critical ones. However, in order to improve the KT, several respondents consider it to be necessary to enhance the openness. By not presenting and/or communicating every small mistake, the possibility that someone else repeat the same mistake is much greater, which consequently result that the organisation lose both time and money. Even so, a transparent knowledge transfer will increase the decision quality as well as productivity within the organisation as stated by Zhang and Zhao (2006). Another problem is to get the employees willing to take part in the knowledge exchange. As it emerged during the interviews, some respondents do not see the potential benefits for the whole organisation but instead look at the internal project or even ask *what's in it for me?* According to Cheng (2009), KT depends on what kind of attitude the individuals have towards the subject. Additionally, Jonsson (2012) refers to Leistner (2010) who mentions lack of reward systems as common hindrance of implementing KT. He continues with stating the importance of having motivated employees who are willing to share knowledge and experiences. Thereby, there need to be a drive from the employees to undertake a proper project review which can help in transfer of tangible knowledge of time, cost, know-how, and know-why. Or in some way secure the knowledge and experiences gathered from previous projects. Moreover, the lack of clear standard processes, such as templates and models, on how to capture and share knowledge and experiences results in employees do not assign sufficient time and resources to this aspect. This is referred by Cheng (2009) as one of the main obstacles when implementing KT in construction. However, based on the disparity within production where each project is different, standardisation is not possible. Resulting that standardised templates and models are not practicable in the studied organisation. Instead, KT needs to be included in the overall project plan to get the employees prioritise it as well. Thereby, it is necessary for the company to develop an organisational culture that encourages and facilitates KT.

Based on the interviews, the perception is that most of the knowledge exchange happen at the construction site though daily discussions and sharing of experiences. Thus, a wide contact network is seen as highly beneficial since reaching out to others, whether if it is inside the organisation or outside, is seen as highly beneficial. When it comes to getting answers regarding an issue or specific element, the respondents do not see any problems of getting in touch with other workers knowledgeable in the requested area. Instead they underline the trouble of knowing who to turn to. Resulting that there needs to be a way to facilitate the transfer of knowledge between the employees in the organisation.

7   Suggested solutions

The overall impression from the interviews is that KT is promoted and seen as something positive for the organisation's success. However, the view is that there is a gap within the organisation between the individuals in the office and the workers in production. To increase the use and understanding of KT, it is considered that this gap needs to be reduced and that KT must permeate throughout the organisation. It is therefore vital when implementing new initiatives, that the individuals working in the office focus on the implementation of the new initiatives so that these are successfully spread to those concerned, and that the information is not restricted to only a part of the organisation. By implementing KT activities in the workplace, the likelihood of people sharing and exchanging knowledge and experiences in and between projects and moreover departments would be much greater.

A suggestion is to implement a site supervisor forum for the individuals in need of broaden their contact network to further deepen their knowledge within different areas in production. The goal is that the site supervisors, after attending such meetings, feel like they could get in touch with someone outside their immediate project when it comes to asking questions and getting feedback, see Figure 6. As it is more likely they will contact another site supervisor when they have met them before. It is moreover important that these forums have a clear purpose and that the participants see the overall benefits, and do not feel like they waste their time participating. Since the forums also occur face-to-face, which was the most favourable method of KT, the view is that it will be an appreciated initiative that will succeed when implemented.

Linked to the proposal above, the idea is to develop a tool that will facilitate the attempt to contact other employees in the organisation. Through a web-based site, employees which are experienced in different areas, for example production of a frame, excavate, amounting of roof beams etc., will be shown with their contact information. A picture and a telephone number will be presented, together with the specific area of expertise the employee is knowledgeable in, see Figure 7. This employee will either be a site manager or site supervisor that is experienced in the requested element and who is willing to have someone contacting him or her. Moreover, it is important that this tool is easy to access as well as easy to find, based on what emerged from the various interviews. The intention is to provide a solution to some parts of the problem regarding KT within the studied organisation. The figure below is an example on how this tool may look.
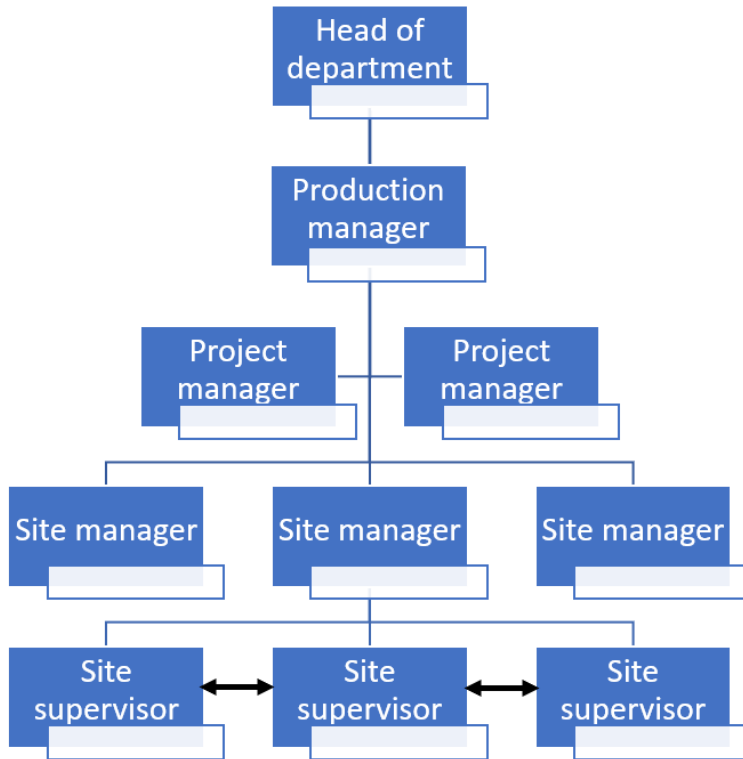
Figure 6. The purpose of site supervisor forum

Figure 7. Web-based tool

8   Conclusion

KT is a concept well known by the site managers and site supervisors, although their definition of it varies. Most of the respondents refer to it as sharing experiences between each other and that when utilised effectively will result in not reinventing the wheel again. Taking into account, KT entails savings of money, time and productivity, beyond the fact that it keeps workers from making repeated mistakes. However, how it is worked with, differs between each person and project. Nevertheless, the attitude of working and developing KT in and between the projects, is seen positive by both the site managers and site supervisors. Asking questions is highly prioritised, and the perception is that most of the knowledge exchange happen at the construction site through daily discussions and sharing of experiences. Thus, a wide contact network is seen as highly beneficial since reaching out to others whether if it is inside the organisation or outside, is seen as very valuable.

Several initiatives regarding KT exist within the organisation. The different initiatives have the aim to share knowledge and experiences between individuals in the company through documentation and surveys. However, as the majority of the interviewees state, additional administrative work in their daily job is not favoured. Moreover, the perception among the respondents is that there already exist too many initiatives and databases, and that these have not worked out.

A site manager forum exists, where the site managers have meetings to discuss project information and share experiences amongst them. It emerged from the interviews that a similar concept but for the site supervisors is recommended. It should either work as a forum to discuss experiences or as a social seminar to broaden the contact network for the members. Either way, there must exist a clear and coherent objective so the people involved know the purpose of the forum. It is moreover important that the participants do not see these meetings as an interruption to their real work and a waste of valuable time, but instead understand the organisational and individual advantages of it.

To conclude, the perception is that initiatives that are based on face-to-face situations are the ones that most likely will result in a collective, feasible and profitable KT. Therefore, our suggestion is that the implementation of a site supervisor forum combined with a web-based tool will lead to an improvement in the work of KT in and between projects. Thus, an effective management of KT is vital and could be a reason to why some companies are more successful than others.

9 Further research

The amount of interviewees can be seen as a merely small number in the rather large organisation, therefore the results and conclusions which can be drawn may be limited. Thus, more interviews would be preferred to get an even deeper and more precise understanding of KT within the studied organisation as well as to increase the generalisability. Moreover, conducting a quantitative study would have increased the understanding of KT, but due to limited time and resources, this was not possible.

It would also be interesting to study the whole organisation and get an overall perspective of KT. By studying different departments and managers to get their perception of the concept. Furthermore, investigating other regions in Sweden would be interesting, to compare results as well as to analyse if and how they work with KT.

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Appendix 1

Kan du berätta lite kort om dig själv? Hur länge har du arbetat inom organisationen?
Vad är din arbetstitel? Utbildning? Tidigare erfarenheter?

Vad är kunskapsåterföring för dig?
Vilka fördelar ser du med kunskapsåterföring? Skulle du kunna lista.

Hur arbetar organisationen idag med kunskapsåterföring? Tycker du de prioriterar
kunskapsåterföring?
Känner du till erfarenhetsforumet som organisationen har på sin webbsida? Vad
tycker du om det?

Ser du några kopplingar mellan kunskapsåterföring och tidsfördröjningar i projekt när
kunskapsåterföring inte har tagits hänsyn till? Extra kostnader? Minskad
produktivitet?
Kan du ge exempel på problem inom produktionen där du anser att
kunskapsåterföring hade kunnat förhindra detta?

Anser du att förtroende är en viktig grundsten i kunskapsåterföring? Varför anser du
att det är viktigt?
Hur benägen är du på att dela med dig av din kunskap? Brukar du göra det? När? Hur
ofta? Till vilka? Skulle du kunna rita vilka du får kunskap av, samt vilka du skulle
vilja få kunskap av? (RITA, sätt dig själv i mitten)
Känner du att det finns möjlighet att dela med dig av ny kunskap du anser kan vara
vital i andra projekt inom organisationen? Samt ta del av?
Skulle du tänka dig att delge kunskap i större grad om det fanns incitament för det?
Kan du ge exempel på dessa incitament?

Anser du att den organisatoriska kulturen/attityden behöver förändras när det kommer
till kunskapsåterföring och aktiviteter kopplade till det?
Om du fick betygsätta från 1 till 8, vilka/vilken metod/-er anser du är bästa sättet att
dela kunskap/erfarenheter?
- Erfarenhetsforumet organisationen redan har
- Face-to-face möten
- Workshops
- Konferenser
- Nytt informationssystem (som en kunskapsbank)
- "Lesson learned"
- Mentoring

- Kontinuerliga möten/träffar med andra individer med samma befattningar inom organisationen likt dig själv
- …..etc.

Appendix 2

<u>Interview questions</u>

Can you tell me a little about yourself? How long have you worked within the organisation? What is your job title? Education? Past experience?

What is knowledge transfer to you?
What advantages do you see with knowledge transfer? Can you list some.

How does the organisation work with knowledge transfer? Do you believe that they prioritised knowledge transfer?
Do you know about the experience forum which the organisation has on their web-page? In that case, what is your opinion about it?

Do you see any links between knowledge transfer and time delays in projects when the knowledge transfer has not been taken into account? Extra costs? Reduced productivity?
Can you give examples in the production were problems that occurred could have been prevented if knowledge transfer would be taken into consideration?

Do you believe that trust is an important element when working with knowledge transfer? Why do you consider it to be important?
How motivated are you of sharing your knowledge? Do you usually do it? When? How often? To who? Would you be ale to write down who you receive knowledge from and further on who you receive knowledge from?
Do you believe that it is possible to share new knowledge which you consider to be vital to other project within organisation? And further on also take part of new knowledge?
Would you like to share knowledge more if there were incentives for it? Can you give examples of these incentives?

Do you think that the organisational culture / attitude needs to change when it comes to knowledge transfer and the activities related to it?
If you were to rated from 1 to 8, which/what methods you think is the best way to share knowledge/experiences?

- The already existing experience forum
- Face-to-face meetings
- Workshops
- Conferences
- Nytt informationssystem (som en kunskapsbank)
- "Lesson learned"
- Mentoring
- Continuous meetings / meetings with other individuals with the same positions within the organization as yourself
- …..etc.