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# Managing Knowledge Transfer in Complex Project Environments

An Analysis Based on a Consulting Engineering Firm

Master's Thesis in Design and Construction Project Management

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CHALMERS UNIVERSITY OF TECHNOLOGY  
Gothenburg, Sweden 2023  
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Report No. E2023:084



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## ABSTRACT

Knowledge transfer is rapidly gaining more attention as organizations have become aware that knowledge is a vital asset that enables competitiveness. Though, given the predominant project-based nature of consultancy firms in the construction industry, transferring knowledge becomes a demanding task impeded by structural constraints. These structural constraints imply temporariness of projects, time constraints, and a high level of project complexity. Accordingly, consultant engineer firms within the construction industry are in need of adequate processes that facilitate knowledge transfer between projects. Owing to the importance of knowledge transfer in the construction industry, this study aims to analyze a consultancy firm's current working procedures to facilitate knowledge transfer between projects, as well as how a consultancy firm can work to improve its knowledge transfer practices. This was enabled by conducting a literature review in conjunction with a qualitative interview study. The Master's thesis presents a deepened understanding of knowledge transfer in project-based organizations, encompassing both opportunities and challenges, as well as models and theories. The findings conclude that the company of the study possesses several knowledge transfer methods, both for explicit and tacit knowledge, but necessitates a rather systematic and ongoing process in order to achieve optimal efficiency. Lastly, the understanding of knowledge transfer processes must emphasize moving beyond the project-centric approach, and instead, embrace a rather holistic perspective. Knowledge transfer must be a continuous and natural part of an organization that wants to learn and improve.

Keywords: Knowledge Transfer, Project-Based Organizations, Knowledge Transfer in Project-Based Organizations, Knowledge Transfer Methods, Successful Knowledge Transfer, Challenges Knowledge Transfer.



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## Acknowledgements

We want to thank our supervisor at Chalmers University of Technology, Petra Bosch-Sijtsema, for your valuable and continuous support and feedback throughout the Master's thesis. Your expertise and experience have guided us and our work this spring. We would also like to thank our supervisor at PE Teknik & Arkitektur, as well as all interview respondents, for dedicating time to help us understand the company's current state of practices. This has allowed us to obtain a deepened understanding of the subject, as well as valuable results.

Gothenburg, June 2023



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# 1. Introduction

What good is knowledge if not used and shared? In recent years, knowledge has gained a significant amount of attention among organizations as it has been acknowledged as an advantageous asset (Ren et al., 2017). However, due to the fact that organizations within the construction industry are, to a large extent, project-based organizations (PBOs), these organizations face difficulties in implementing organizational processes (Bresnen et al., 2004). Additionally, the projects conducted are unique, temporary, independent as well as complex, and consequently in need of well-structured processes for knowledge transfer. These factors have an extensive effect on PBOs, as they impose pressure on organizations to implement effective knowledge transfer processes. However, such processes and routines are often absent or insufficient in these organizations.

Due to the temporary structure of PBOs, organizations within the construction industry must deal with distinctive difficulties regarding continuous organizational learning (Pemsel et al., 2018). Additionally, organizations encounter challenges in retaining acquired knowledge during each project and transferring knowledge between projects (Brady & Davies, 2004). According to the authors, challenges in capturing acquired knowledge during each project are common among PBOs since knowledge often fails to transfer when projects reach the end. Accordingly, the probability that similar mistakes will occur again increases due to the lack of transmission regarding lessons learned during projects.

According to Smith (2001), knowledge is a resource connected to humans. Consequently, there is a significant risk that knowledge diminishes when the structure within an organization changes, for instance, when a project is completed. Furthermore, Smith (2001) highlights that in order to obtain an understanding of how to work with knowledge transfer, it is imperative to delineate knowledge into tacit and explicit knowledge. According to the author, tacit knowledge is based on individual practices and is more demanding to communicate and transfer. On the contrary, explicit knowledge is academic and thereby easier to transfer and document. Though, for the purpose of understanding knowledge transfer in PBOs, tacit and explicit knowledge both need to be considered to develop and improve knowledge transfer routines.

Currently, there is a general deficiency in research concerning knowledge transfer in engineering consulting companies. However, engineering consulting companies vary compared to, for instance, contractor firms within the construction industry in several aspects. To exemplify, at a consulting firm, certain consultants are involved in numerous projects simultaneously whilst other consultants work on the same project for a prolonged amount of time (Lundin et al., 2015). Consequently, this might affect how knowledge is transferred within the company. Therefore, this study attempts to delineate how a consulting engineering firm can improve its knowledge transfer.

Due to the fact that PBOs frequently lack routines for knowledge transfer between projects, this study will be analyzing how the engineering consultant firm PE Teknik & Arkititektur is working with knowledge transfer between projects. Because of the complexity of PBOs, as well as the challenges in transferring individual experiences and lessons learned, it can be argued that there is a need for analyzing how knowledge achieved during projects might be captured and

transferred into new projects. Therefore, the study will be conducted closely to PE Teknik & Arkititektur to provide more effective routines for knowledge transfer.

## **1.1 Aim and Purpose**

The overall aim of the study is to analyze a consultancy firm's current working procedures to facilitate knowledge transfer between projects, as well as how a consultancy firm, in general terms, can work to improve its knowledge transfer practices. This is supported by providing a comprehensive theoretical framework examining essential theoretical concepts of knowledge transfer. Further, this is expected to result in suggestions for areas of improvement for the company's current processes. Since the study is conducted closely with a specific consultancy firm, the objective will be accomplished through an examination of the perceptions and experiences of employees in conjunction with a theoretical framework. The report intends to provide an improved understanding of effective knowledge transfer in PBOs. This does not solely concern the studied consultancy firm, but also other project-based organizations within the industry.

In order to achieve the previously stated aim, the literature aims to provide a theoretical framework for knowledge transfer, the potential benefits, and challenges. Further, the empirical study aims to provide an understanding of current knowledge transfer practices within the company.

## **1.2 Research Questions**

The following research questions are established in order to accomplish the aim and purpose of the Master's thesis:

***Q1: How does a consulting engineering firm work with knowledge transfer?***

***Q2: How can a consulting engineering firm improve its knowledge transfer?***

## **1.3 Delimitations**

The concept of sharing knowledge is extensive, thus, the study will focus on the concept of knowledge transfer. Additionally, the geographical setting is delimited to studying a company in Sweden, however, the literature is not bounded to any geographical constraints. Also, the literature will not study the receiver and sender perspective of knowledge transfer, as it would require a more comprehensive study.

The empirical study will focus on PE Teknik & Arkititektur, a consultant company within the construction industry. Furthermore, the empirical study will focus on understanding what knowledge transfer practices the company possesses, and which measures can be implemented to improve knowledge transfer in the company as well as in PBOs in general terms.

## **1.4 Structure of the Report**

In Chapter 2, the report is initiated with a theoretical framework, where an in-depth study of knowledge transfer theories is conducted. This includes basic concepts of knowledge, PBOs, prerequisites, methods, challenges, and benefits of knowledge transfer. Secondly, in Chapter 3,

the methodology of the Master's thesis is presented. Thereafter, the results from the empirical study are delineated in Chapter 4, comparing the main findings from the conducted interviews. Subsequently, Chapter 5 presents a discussion that compares the main findings from the results with the theoretical framework. Lastly, the discussion leads to a conclusion in Chapter 6, and recommendations for the company are presented in Chapter 7. The Appendix includes interview templates.

## 2. Theoretical Framework

In the following chapter, the research topic will be explored from a theoretical point of view by comparing and analyzing literature findings. The theoretical framework explores the basic concepts of knowledge, PBOs, prerequisites, methods, challenges, and benefits of knowledge transfer.

### 2.1 Defining Knowledge

According to Grant (1996) and the knowledge-based theory, knowledge is the most strategically important resource of a company. There are many theories that conceptualize and models business enterprises, explaining and predicting both structures and behaviors. These are generally referred to as theories of the firm and since several different theories exist, these either compete with or complement each other in explaining different phenomena. The knowledge-based view of the firm is explained by Grant (1996) as an outgrowth of the resource-based view in the sense that it focuses on knowledge as the single most important strategic recourse of the firm. However, it concerns itself beyond strategic choice and competitive advantage and addresses the nature of coordination within the firm, organizational structure, management, decision-making, firm boundaries, and theory of innovation.

Since an organization is composed of multiple individuals, specialized in different knowledge areas, great effort is required in coordinating the knowledge available in order to utilize the resources available. The market in itself is unable to undertake this coordinating role and it is explained by Grant (1996) that “firms exist as institutions for producing goods and services because they can create conditions under which multiple individuals can integrate their specialist knowledge” (p.112). This ultimately leads to the view of the firm as a knowledge-integrating institution. While the previous research has focused on organizational knowledge and the organization as a body of knowledge, Grant (1996) sees knowledge creation as an individual activity and that the primary role of organizations is the application of existing knowledge to the production of goods and services. It is emphasized by the authors that it is the individuals within the organization who creates and stores knowledge, the concept of organizational knowledge is thus dismissed. The importance of the organization lies within the processes and structures that access and utilize the individual knowledge of its members.

But to understand this emerging view of the firm as a knowledge-integrating institution, it is initially important to establish an understanding of what knowledge is and how it can be defined. Wang and Noe (2010) claim that “knowledge is a critical organizational resource that provides a sustainable competitive advantage in a competitive and dynamic economy” (p. 115). Thus, organizations must understand how to successfully implement a successful process for knowledge management. Nevertheless, knowledge is difficult to explain and define, and not the least is knowledge transfer. It is imperative to understand and decide upon a clear definition for the concept of sharing knowledge, thus, in this chapter, the concept of knowledge will be explained by comparing existing literature.

First of all, the concept of knowledge is difficult to define as it is an extensive concept to grasp (Liyanage et al., 2009). Researchers have attempted to provide an understanding of this concept by distinguishing knowledge from information and data. This theory is supported by Liew (2013) who explains that knowledge, information, and data have a hierarchical relationship. Among these three components, knowledge holds the highest position, while data has the lowest:

- **Knowledge:** experience and advanced insight, interpreted and applied by individuals (Liyanage et al., 2009). It is gained from experience and explores the “know-what”, “know-how”, and “know-why” (Liew, 2013; Wang & Noe, 2010).
- **Information:** “a message that contains relevant meaning, implication, or input for decision and/or action” (Liew, 2013, p.50).
- **Data:** raw numbers, diagrams, sounds, and symbols (Liew, 2013; Liyanage et al., 2019).

Nevertheless, seen to the concept of knowledge transfer, it appears to lack in terms of a common definition among researchers (Ajmal et al., 2009). According to Wang and Noe (2010), knowledge transfer is not equivalent to knowledge sharing or knowledge exchange. The authors suggest that the foremost dissimilarity between knowledge transfer and other forms of knowledge is that it encompasses both the activity of sharing knowledge from the source, but also the attainment and application by the respondent. Additionally, knowledge transfer is frequently delineating the knowledge distribution between units or organizations instead of between individuals. On the contrary, the definition of knowledge exchange encompasses both seeking knowledge as well as knowledge sharing. However, the following definition of knowledge transfer and successful knowledge transfer by Liyanage et al. (2009) is used for this report:

*“Knowledge transfer is the conveyance of knowledge from one place, person, or ownership to another. Successful knowledge transfer means that transfer results in successful creation and application of knowledge in organizations.” (p.122).*

### 2.1.1 Tacit and Explicit Knowledge

It is imperative to understand that knowledge can be divided into two different dimensions, specifically tacit and explicit knowledge. The former, tacit knowledge, is characterized by personal knowledge forming the basis of explicit knowledge, which Jasimuddin et al. (2005) describe through the personalization theory. This strategy entails that knowledge is closely linked to whom possesses it, requiring face-to-face dialogues as a prerequisite for knowledge transfer. Moreover, Smith (2001) describes tacit knowledge as knowledge achieved by individual practices and that it can be defined as “knowledge for which we do not have words” (p.314). Tacit knowledge is subjective, very much connected to the individual, and usually varies depending on locational context. Consequently, tacit knowledge is hard to formulize in a written context, such as in terms of books, databases, files, or manuals. Rather, tacit knowledge is expressed in the context of beliefs, values, perceptions, assumptions, mental models, and insights. Also, it is described by Smith (2001) that tacit knowledge might be transferred through personal interactions, sharing of experiences, networking, and informal conversations. Further, the author argues that it is important to facilitate for employees to engage in knowledge transfer activities. This enables the sharing of experiences and, thus, increases the transfer of tacit knowledge.

Jasimuddin et al. (2005) argue that tacit knowledge has a strategic advantage for organizations since tacit knowledge is challenging to replicate. Thus, tacit knowledge is considered a protected resource for organizations compared to its competitors. Though, Jasimuddin et al. (2005) posit that while tacit knowledge is a competitive advantage for an organization, it is fraught with challenges. Primarily, this refers to the fact that tacit knowledge is demanding to accumulate and thus it may occur reluctance to share this knowledge due to fright of losing power (Javernick-Will, 2012). Building on that reasoning, the most difficult challenge for

organizations is the loss of employees, which consequently entails a loss of valuable knowledge.

On the contrary, explicit knowledge is easier to document, describe, and transfer between individuals compared to tacit knowledge. Contrasted to the personalization strategy, Jasimuddin et al. (2005) designate explicit knowledge with the codification strategy. This category of knowledge can be defined, stored, and shared with the use of information technology (Ajmal & Koskinen, 2008). This can be exemplified by the use of manuals or other databases that are sufficiently accessible and reliable (Smith, 2001). Consequently, knowledge from previous experiences can be utilized and is easier to transfer. In construction projects, Mossman and Ramalingam (2021) argue that explicit knowledge refers to for instance different construction and design standards, laws, and other regulations. Organizations do not face the same difficulties with losing knowledge in terms of explicit knowledge compared to tacit (Jasimuddin et al., 2005). However, while this is an advantage, it must also be noted that storing explicit knowledge requires financial investments. Additionally, competitors have an increased chance to replicate this sort of knowledge and are argued to be prone to external threats.

To concretize, Jasimuddin et al. (2005) illustrate explicit and tacit knowledge with the iceberg effect. This implies that explicit knowledge is uncovered and easily accessible but has its foundation and is supported by tacit knowledge. Conversely, one or the other is not to prefer as both are required to sustain competitive advantages and an extensive knowledge base. The previously mentioned personalization and codification strategies both need to be included since both possess valuable knowledge for an organization. Lastly, both explicit and tacit knowledge is summarized in Table 1.

Table 1: Explanation of tacit and explicit knowledge.

<b>Type of knowledge</b>	<b>Characteristics</b>
<i>Explicit</i>	Accessible knowledge that is easier to express in a written context, such as documentation, databases, etc. (Ajmal & Koskinen, 2008).
<i>Tacit</i>	Knowledge that is bounded to individuals and difficult to express (Smith, 2001). Thus, it is difficult to transfer or replicate.

### 2.1.2 Knowledge Transfer: the SECI-model

With the intention of understanding knowledge transfer in organizations, it is imperative to understand knowledge transfer as a process. Nonaka and Takeuchi (1995) have developed the SECI model (Socialization, Externalization, Combination, Internalization) that distinguishes four different knowledge creation processes which are based on tacit and explicit knowledge.



The authors suggest that the SECI model illustrates a pattern between tacit and explicit knowledge which works as the foundation for creating knowledge in an organization. According to Fernie et al. (2003), it is important to consider both explicit and tacit knowledge when defining knowledge creation. The authors argue that explicit knowledge simply corresponds to a modest part of knowledge and that only concentrating on explicit knowledge in organizations results in a considerable part of the knowledge being disregarded. However, by considering both explicit and tacit knowledge by emphasizing the theory by Nonaka and Takeuchi (1995), a greater understanding of knowledge can be perceived.

The SECI model includes four parts: socialization, externalization, combination, and internalization (Nonaka & Takeuchi, 1995). The model assumes that knowledge-creating organizations emphasize the flow of knowledge among individuals and groups to facilitate and progress explicit and tacit “knowledge stocks” (Rice & Rice, 2005). It is argued that the model has received positive attention from management practitioners, as it illustrates knowledge transfer as a dynamic and spiral process.

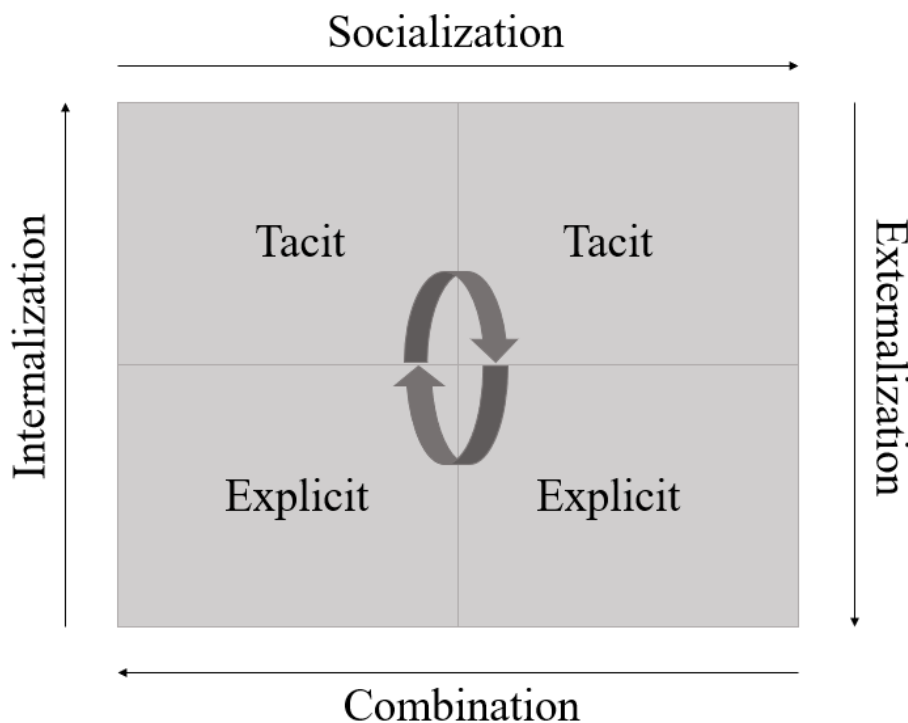


Figure 1: The SECI-model. Adjusted from Nonaka and Takeuchi (1995).

The spiral process is initiated through socialization, which highlights the process of sharing tacit knowledge (Rice & Rice, 2005). Socialization underlines the importance of face-to-face communication and facilitates sharing of experiences through mental models. However, this process can be hampered by e.g., language or cultural barriers. Prencipe and Tell (2001) highlight the need for lessons-learned meetings that facilitate face-to-face communication. According to the authors, this provides an opportunity to evaluate previous projects and a recognition of what knowledge is useful in upcoming projects. These meetings create an occasion to evaluate what went wrong and what can be improved for future projects.

Secondly, the process proceeds to externalization which illustrates the transformation of tacit knowledge to explicit knowledge (Rice & Rice, 2005). This tends to be one of the most challenging endeavors for organizations, as it implies transferring knowledge that is bounded

to individuals into written documents and texts. Potential techniques that can be used for this process refer to theories, analogies, and metaphors.

*“The conversion of tacit knowledge into explicit knowledge means finding a way of expressing the inexpressible” (Koskinen, 2000, p.43).*

Thirdly, the model proceeds to combination which entails the process of transferring explicit to explicit knowledge (Rice & Rice, 2005). To concretize, organizations must convert complex explicit knowledge into a valuable and useful compilation accessible to the whole organization. This is argued to require information technology. Information technology can be applied with different methods, for instance through databases or document management systems that facilitate storing and retrieving knowledge within the organization (Ren et al., 2017). Databases can facilitate knowledge transfer by sharing knowledge in platforms that is accessible to everyone involved in projects. By utilizing different sorts of databases, platforms, or other shared spaces, anyone who is connected can access needed knowledge and information regardless of time or place. Additionally, employees, both senior and junior, can upload and share their experiences from former projects which can be applied to future projects. Thus, an understanding can be created of what went well, what went wrong, and how making the same mistakes can be avoided. All knowledge is based on experience, thus having a common platform would facilitate the management of complex projects as it can support project teams when encountering difficult issues (Anbari et al., 2008).

Lastly, the SECI model captures internalization which designates the conversion from explicit to tacit knowledge (Rice & Rice, 2005). An accumulation of this process provides a valuable asset as its own but also has an incentive and prerequisite for innovation, and can be facilitated through e.g., mentoring. It is also argued that by implementing this process through organizational boundaries, it has the possibility to enable socialization in upcoming projects. Thus, the SECI model is perceived as an ongoing spiral process.

The different knowledge transfer processes and their corresponding SECI-elements are summarized and explained in Table 2.

*Table 2: Summary and explanation of the SECI steps.*

<b>Knowledge transfer process</b>	<b>SECI-Element</b>	<b>Explanation</b>
<i>Tacit to tacit</i>	Socialization	Sharing of experiences through direct communication and mental models (Rice & Rice, 2005).
<i>Tacit to explicit</i>	Externalization	Transferring knowledge that is bounded to individuals into written documents and texts (Rice & Rice, 2005).

<i>Explicit to explicit</i>	Combination	Conversion of complex explicit knowledge into a valuable and useful compilation accessible to the whole organization (Rice & Rice, 2005).
<i>Explicit to tacit</i>	Internalization	Formulation of shared experiences through e.g., mentoring (Rice & Rice, 2005).

### 2.1.3 Prerequisites for Implementing Knowledge Transfer Processes

As previously discussed throughout this study, organizations are dedicating more attention to knowledge transfer as it has been shown to gain competitive advantages. However, it is vital for an organization to have the correct prerequisites prior to implementing a successful knowledge transfer. The most prominent factors found are presented below:

- **Systems:** Systems for handling knowledge implies that project-based organizations must implement effective systems which facilitate knowledge transfer (Ajmal et al. 2009). The authors emphasize that knowledge is not solely an asset, it must also be understood as a process.
- **Familiarity:** an organization striving for effective knowledge management must ensure that employees are aware of knowledge processes and practices (Ajmal et al. 2009).
- **Authority:** Authority to perform knowledge activities is described as the importance of employees not only wanting to engage in knowledge transfer but also being authorized to do it in some way (Ajmal et al. 2009).
- **Incentives:** Further, incentives are argued to be crucial for implementing successful knowledge management (Ajmal et al. 2009). This can be both materialistic, moral, or coercive rewards. Conversely, Goh (2002) proposes that financial rewards can rather encourage competitiveness and non-sharing of knowledge. Comparatively, Wang and Noe (2010) argue that employees must understand the value of transferring knowledge to be motivated to put time and effort into sharing experiences.
- **Culture:** Organizational culture is a recurring prerequisite for knowledge transfer, and Goh (2002) argues that a company must have a culture that emphasizes openness, collaboration, trust, and continuous improvement. The importance of organizational culture is also discussed by Rahman et al. (2018) who argue that it has a positive effect on knowledge transfer. Comparably, Karlsen and Gottschalk (2004) possess that organizational culture enables people to understand what knowledge is worth transferring, who possesses it, and how to transfer it based on social interactions.

- **Structure:** Goh (2002) argues that companies must find a balance when inspiring employees to share knowledge through structured processes and less structured processes. To elaborate, companies should understand where structured processes are needed and, conversely, where less structured processes are more effective. This entails an understanding of what knowledge, tacit or explicit, is to be transferred.

#### **2.1.4 Positive Outcomes of Effective Knowledge Transfer**

In Chapter 2.1, the knowledge-based view was clarified which emphasizes that knowledge is the most valuable and strategically meaningful resource of a firm (Grant, 1996). Consequently, it is evident that successful knowledge transfer processes have the ability to provide positive outcomes for organizations. The main reason for allocating time and resources to improve knowledge transfer processes is owing to the fact that with increased knowledge comes improved decision-making (Liyanage et al., 2009). Thus, employees do not have to reinvent the wheel when confronted with issues and difficulties in projects (Patriotta et.al., 2013).

As a consequence of improved decision-making, the positive outcomes from successful knowledge transfer are several, for instance, Argote and Ingram (2000) highlight increased performance and efficiency. Yet, even if knowledge transfer processes within organizations might result in several advantages, the actual success of these processes might differ significantly between organizations. Moreover, it is important for organizations to possess methods to locate which knowledge the organization holds as well as how this knowledge can be exploited for effective knowledge sharing (Nonaka et al., 2000). Moreover, Argote and Ingram (2000) highlight that research underline how organizations allocating assignments to the employee possessing the most appropriate knowledge consequently gain positive outcomes in terms of productivity. However, it is also emphasized how these procedures are something organizations often learn by practice. Moreover, according to the authors, research also underlines that organizations, where the employees work in groups, gain an understanding of which individual possesses which knowledge. Subsequently, this results in positive benefits in terms of increased group performance.

However, studies also show that various knowledge transfer procedures result in different positive outcomes for an organization (Haas & Hansen, 2007). In research made on management consulting companies, it is discovered that explicit knowledge organized in terms of digital files resulted in positive outcomes in terms of time efficiency, though, this did not result in increased value to their customers or increased quality. On the contrary, sharing tacit knowledge in terms of, for instance, guidance based on personal experiences, resulted in increased value towards customers as well as quality, yet this did not result in increased time efficiency. In addition, the study highlights the importance of sharing both tacit and explicit knowledge for a successful knowledge transfer.

Furthermore, it is highlighted by Goh (2002) that knowledge can be viewed as a foundation for an organization's competitiveness. Further, Goh (2002) states that "in today's highly competitive environment, knowledge management will be the key to organizational success in this millennium" (p.23). Moreover, it is described by the author that the competitiveness of an organization relies on which knowledge the organization possesses, how the organization utilizes this knowledge, as well as how rapidly the organization can accumulate new knowledge. Therefore, establishing processes for transferring knowledge within an organization is highlighted as crucial since effective knowledge transfer might lead to

innovation, which can be seen as the secret to persistence for an organization in a competitive market.

Based on the literature findings outlined in Chapter 2.1.3, the main positive outcomes from successful knowledge transfer are summarized and presented below:

- *Increased performance and efficiency*
- *Increased productivity*
- *Enhanced innovation*
- *Time efficiency*
- *Increased quality*
- *Competitiveness*

## **2.2 Knowledge Transfer in Project-Based Organizations**

Since the Master's thesis aims to understand knowledge transfer in the context of PBOs, it is imperative to define and explain the key concepts and challenges that pertain to this type of organizational structure. PBOs are constituted by projects, and Ajmal et al. (2009) define a project as "a group of people working together with shared responsibilities and resources to achieve a collective mission" (p.157). The members of a project can be divided into visible and invisible members. The former implies employees who are consistently involved in the projects, whereas the latter entails other stakeholders such as suppliers. Consequently, teams can lack in terms of having a common goal, commitment, and social consciousness which can impede effective knowledge transfer.

The nature of a PBO differs from other organizational structures and, according to Ren et al. (2017), knowledge transfer has a vital role in PBOs. Projects outline the core structure of PBOs, and once a new project is initiated, the process is often reinvented instead of capitalizing on previous projects and experiences. Moreover, Ajmal et al. (2009) posit that the vast majority of PBOs are involved in numerous projects parallelly. Moreover, these projects are characterized to be complex, large-scale, and expensive, and are also demanded to comply with a set budget and stay within schedule.

As expressed by Prencipe and Tell (2001), organizations within the construction and consultancy industries are both representatives of PBOs. These sorts of firms are lacking in terms of organizational models or methods which can be utilized to transfer attained knowledge into other or future projects. Additionally, the authors argue that this organizational structure is characterized mainly by the uniqueness and transient nature of their respective projects, with the former possessing a variety of crucial elements. With respect to the latter point, the transient characteristics of projects necessitate the new formation of project teams. Consequently, it results in a continuous succession of new relationships, interactions, and knowledge acquisition. This is unique to PBOs, as opposed to other organizational structures.

## **2.3 Challenges with Transferring Knowledge in Project-Based Organizations**

The process of knowledge transfer implies both advantages and complexity. Consequently, this chapter explores the main challenges and adversities that may arise when striving for effective knowledge transfer within organizations. Prencipe and Tell (2001) highlight that the temporariness of projects can impede the transfer of knowledge and experiences between

projects. This is supported by Ajmal and Koskinen (2008), emphasizing that one of the greatest challenges with knowledge transfer is the limited time frame for conducting systematic reviews of completed projects as well as documenting gained knowledge and experience. On the other hand, Schindler and Eppler (2003) possess the concept of project amnesia, entailing that experiences and knowledge from former projects are not observed or noticed. Consequently, project amnesia is related to time, discipline, motivation, and skills which are all key elements for successful knowledge transfer. It is argued that project amnesia is a result of time constraints, lack of awareness of methods, lack of personal interest, unwillingness, and lack of communication. Conversely, if project amnesia is eluded there are still challenges. Most importantly, when knowledge can be documented it must be executed in a clear and specific manner. Otherwise, there is a considerable risk that knowledge will be considered unfeasible, difficult to comprehend, and unused.

Similarly, as to what Schindler and Eppler (2003) suggest, Ajmal and Koskinen (2008) explicate further social obstacles to transferring knowledge, which implies that people are reluctant to evaluate and admit to failures and mistakes. Being able to promote a constructive environment, which is vital for evaluating mistakes, is argued to be rare in PBOs. Thus, this is an ignored opportunity for organizations as failed projects tend to posit valuable information and lessons which can be learned from and applied in further projects. Correspondingly, Javernick-Will (2012) argues that one barrier is that employees tend to not have the time to share knowledge and that knowledge is the power that individuals possess and resist to share. Building on the previous reasoning, Ren et al. (2017) believe that the characteristics of projects cannot be ignored, since similar projects make teams more willing to communicate and share their experiences, and lack of time hinders people to share information. Thus, it can be argued that challenges with knowledge transfer are rooted in the organizational culture within a company (Ajmal & Koskinen, 2008).

According to a study accomplished by Javernick-Will (2012), a challenge to transfer knowledge within organizations is connected to lack of time. Although, the study revealed that it is rare that organizations possess prescribed time allocated for knowledge transfer for their employees. In the article, Javernick-Will (2012) highlights that, infrequently, organizations have a designated knowledge manager whose responsibility is to be in charge of knowledge transfer. Yet, it is also highlighted in the article that it is prevalent that knowledge transfer is seen as a supplementary task to the employees' work, and that time is not set aside for knowledge transfer. However, it is described by Javernick-Will (2012) that although time is not set aside for knowledge transfer within an organization, societal expectations might result in employees being motivated to transfer knowledge. Consequently, the authors argue that although allocating time aimed at knowledge transfer within an organization is central, it is also important for organizations to understand how knowledge transfer might be included in the employee's daily tasks. Likewise, the importance of setting aside time for the employees to transfer knowledge for effective knowledge transfer is also highlighted by Goh (2002) who argues that procedures and sufficient structures regarding knowledge transfer are important but that it is crucial that employees are given time to practice these.

### 3. Methodology

In the following chapter, the choice of methodology for the Master’s thesis is motivated and explained in detail. This entails the research approach, study design, data collection, data analysis, ethical aspects, trustworthiness, and the authors’ reflection on the methodology.

#### 3.1 Research Approach

The idea of the study originated from the deficiency of adequate knowledge transfer processes in the construction industry. Thus, a collaboration with the studied company was established which early on in the process expressed the need for effective knowledge transfer for successful projects. Firstly, a discussion with the company as well as a preliminary literature search resulted in primary research questions. Secondly, the literature search enabled delimitation of the subject and research questions. Consequently, a literature framework was conducted simultaneously as the qualitative study. Lastly, the interpretation of data and results was summarized into a discussion and conclusion. The research process is illustrated in Figure 2.

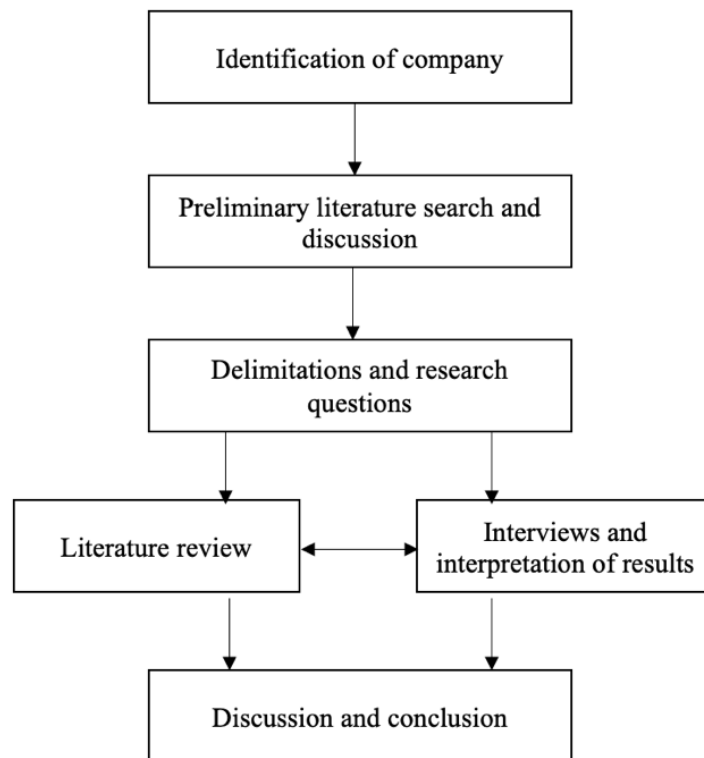


Figure 2: The research process.

Bell et al. (2019) explicate that there exist three approaches to the relationship between theory and empiricism: deductive, inductive, and abductive research approach (Bell et al., 2019). Using a deductive approach, the researcher develops a hypothesis based on current literature. On the contrary, the inductive approach aims to develop a theory by collecting a substantial quantity of data. However, if using the inductive approach, a sufficient amount of data must be collected in order for it to be theory-building. Lastly, the abductive approach aims to adapt theory based on results from data back and forth. According to Bell et al. (2019), this is a continuous understanding between data and theory iteratively. Consequently, the Master’s thesis was formed by the abductive approach. The reason for this is that the literature and

qualitative research were executed simultaneously. Thus, eventual missing theories or concepts could be modified. Additionally, the field of knowledge management has a soft value and is difficult to emphasize in numbers. Hence, a qualitative research methodology was more suitable for this report which instead emphasizes words rather than numbers (Bell et al., 2019). The goal of the interviews was to obtain a deepened understanding of the subject and the context of the organization.

### **3.2 Study Design**

Bell et al. (2019) explain that there exist mainly five research designs that provide a framework for collecting data. The Master's thesis was constituted by a case study design, which entails that the thesis solely focuses on analyzing one case. Bell et al. (2019) describe a case study as follows "What distinguishes a case study from other research designs is the focus on a bounded situation or system, an entity with a purpose of and functioning parts" (p. 63). Furthermore, the authors argue that case studies can be distinguished into four categories: a single organization, location, person, or event. Consequently, the Master's thesis concentrated on a single organization, a consultant engineer company within the construction industry. The company was founded in 2006 and holds 21 offices in Sweden (PE, n.d.), and this study focuses mainly on the office located in Gothenburg. The company is constituted of architects, constructors, project managers, and engineers who work on projects to mainly develop buildings.

### **3.3 Data Collection**

The interviews were performed in a semi-structured manner, implying that there was room for follow-up questions while still following a certain pre-constructed structure (Bell et al. 2019). This enabled for freer conversations, allowing interviewees to provide fuller and more extensive answers. However, the interviews also contained questions that respondents answered with a scale from 1 to 5, where 1 represented "very low/bad" and 5 "very high/good". Thus, it can be argued that the empirical study was not only qualitative, as it contained questions that had the characteristics of a quantitative study. The reason for adding questions with a quantitative characteristic was due to the fact that it provides a clear understanding of the company's current processes for knowledge transfer as well as future improvements. Further, the interviewees were able to elaborate on their answers in order for the authors to get a deepened understanding of their opinion.

Two different interview guidelines were used for the interviews. The first guideline, presented in Appendix I, aimed to receive an understanding of how the company works with knowledge transfer. This guideline was used for all interviewees except SM. The reason for this was that SM possesses a highly ranked position within the company and adds a different managerial perspective to the study. Thus, the questions had to be modified and customized. This template is illustrated in Appendix II.

The vast majority of the interviews were conducted on-site, however, two interviews were held on Microsoft Teams due to geographical hindrances. Regardless of location, all interviews were recorded with Microsoft Teams and later transcribed. The respondents were informed about this and gave their consent. The interviews lasted for approximately 30 minutes each, which the interviewees were informed about before the interviews.



The interviewees participating in the study are anonymous and thus presented in the following manner:

- PM1 –Project Manager
- PM2 –Project Manager
- DC1 – Division of Construction
- DC2 – Division of Construction
- DA – Division of Acoustics
- DETS – Division of Electricity, Tele, and Security
- SM – Senior Management
- DE – Division of Environment

### **3.4 Data Analysis**

Concerning data analysis of the qualitative research, a thematic analysis was adopted. According to Bell et al. (2019), a thematic analysis implies searching for themes in the empirical findings. To exemplify, this can be executed by seeking e.g., repetitions, indigenous categories or typologies, and similarities and differences. When analyzing the conducted interviews for the Master's thesis, considerable emphasis was placed on repetition to find common, or infrequent, themes. Examples of identified themes in the interviews were organizational culture, requirements, structure, and continuity. In order to identify these themes, the authors took notes during the interviews. Afterward, the recordings of the interviews were listened to again, and consequently, any missing information was added. Thus, the interviews were coded into common themes, which would facilitate the writing of the result and, consequently, the discussion.

### **3.5 Ethical Aspects**

In business research, Bell et al. (2019) highlight the importance of considering ethical aspects. To concretize, there are four main aspects to take into consideration namely: avoiding harmfulness against participants, uninformed consent, intrusion of privacy, and deception. For the purpose of avoiding harm to participants, respect, non-judgment, and active listening were demonstrated during interviews. Further, private information, recordings, and any other form of communication with participants have been removed for the purpose of ensuring that sensitive information will not be disclosed without authorization. Secondly, avoiding uninformed consent implies that researchers are obliged to provide as much information as possible about the current study in order for the participant to decide whether he or she wants to participate or not (Bell et al., 2019). This was ensured by providing information and explaining the Master's thesis in depth before conducting the interview. Additionally, the participants were asked for consent regarding recording and were not obliged to respond to a question they are not comfortable answering. This also avoided any intrusion of privacy. Lastly, deception was avoided by providing clear information about the Master's thesis purpose and the use of respondents' information.

### **3.6 Trustworthiness of the Study**

According to Bell et al. (2019), trustworthiness can be distinguished into four criteria that must be fulfilled: credibility, transferability, dependability, and confirmability. Credibility aims to ensure that the results are true, believable, and credible. To increase the level of credibility, the

chosen interviewees had long experience as consultants and have worked for several years. However, since the organization is relatively young, this might hamper its credibility as several consultants have not been employed within the company for a long time. Furthermore, as the Master's thesis aimed to understand how consultant engineer firms can work with knowledge transfer by analyzing a specific company, it is difficult to measure the transferability of the study. The settings of other companies can vary in terms of e.g., organizational culture, organizational structure, or other conditions that might hamper the transferability. However, the empirical findings aimed to find a common structure for knowledge transfer, which is not bounded to the construction industry as knowledge transfer is essential in all industries. Consequently, this increases the level of transferability. Thirdly, dependability ensures the consistency of research findings and that records are saved of all phases of the report (Bell et al. 2019). Throughout the study, there has been consistency regarding problem formulation, data analysis, interview transcripts, and selection of interviewees. Thus, it was always possible to return to the source if confusion arose. Confirmability aims to ensure that personal values or interests are kept aside from the study and that objectivity and neutrality are prioritized (Bell et al., 2019). This has been possible by promoting openness when analyzing interviews, as well as keeping in mind that the authors of the Master's thesis must understand that all opinions and perspectives are essential to provide a deepened understanding of the subject in question. Consequently, a high level of objectivity has been attained. However, it should be noted that avoiding complete objectiveness is impossible (Bell et al., 2019). Although, when considering all four criteria for trustworthiness, it is concluded that the Master's thesis has a high level of trustworthiness.

### **3.7 The Authors' Reflection on the Methodology**

According to the authors of this Master's thesis, the chosen methodology for the Master's thesis was considered suitable in order to comply with the stated aim and to perceive an in-depth understanding of the subject in question. Though, in hindsight, there is still room for improvement regarding the chosen methodology. For instance, more interviews could have been conducted to increase the trustworthiness as well as the understanding of current knowledge transfer practices within the company. Further, it can be discussed that a pre-study would allow the authors to test the interview questions prior to conducting the interview study, as well as enabling a general understanding of the topic. However, the authors are satisfied with the chosen methodology as it has provided useful and valuable results that can be applied to several consultant engineering firms within the construction industry.

## 4. Results

In the subsequent chapter, the empirical findings are presented. The interviews presented numerous crucial elements for knowledge transfer and provided a basis for further suggestions for improvement. The results are systematically presented in topics based on the aim of the questions, and the interviewees' responses are compared for each topic.

### 4.1 Current Practices of Knowledge Transfer within the Company

Regarding current knowledge transfer practices at the company, the respondents were asked to answer three qualitative questions on a scale between 1-5 where 1 represented very bad and 5 represented very good. The answers are presented in Figures 3, 4, and 5. As showcased in Figure 3, the respondents answered that the current practices at the company work fairly well, as the mean is calculated to be 3.5. Additionally, it can be analyzed from Figure 4 that much effort is put on knowledge transfer today at the company, as a mean of 3.9 was calculated. Lastly, it can be interpreted, based on Figure 5, that the respondents are familiar with the current practices that the company uses for knowledge transfer today. Here, a mean of 3.7 was calculated.

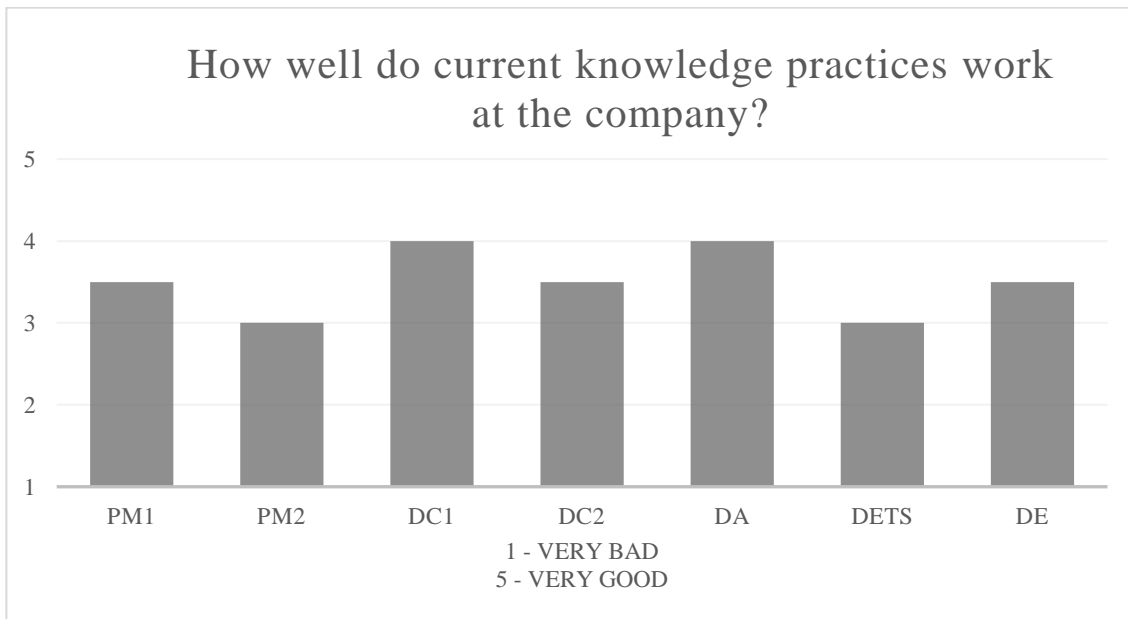


Figure 3: How well do current knowledge transfer practices work at the company?

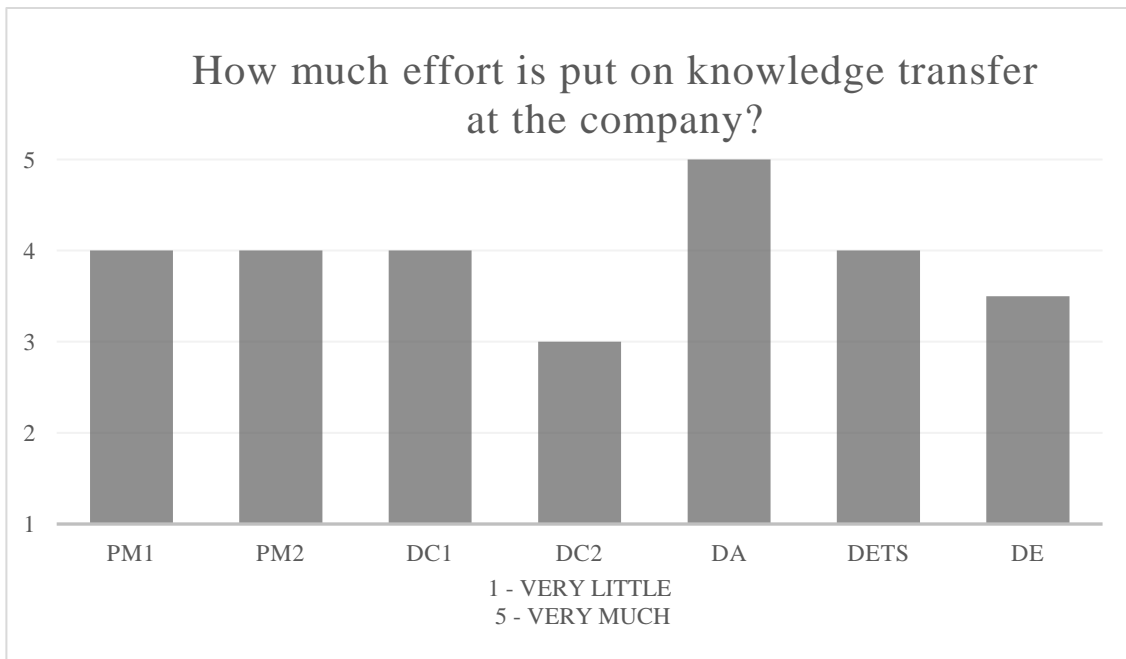


Figure 4: How much effort is put on knowledge transfer at the company?

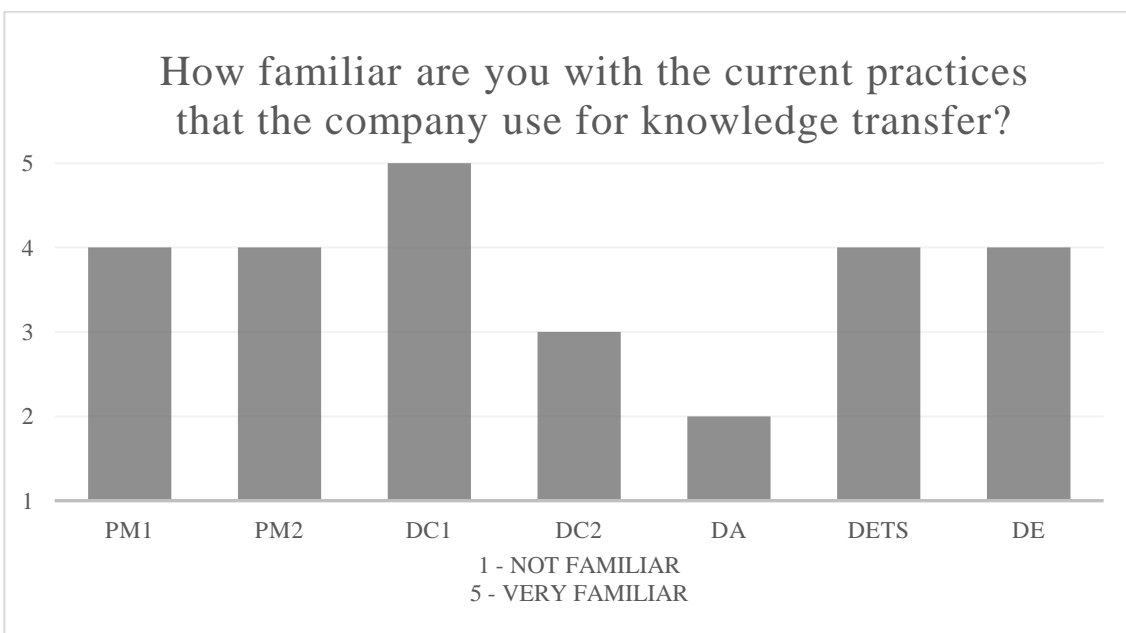


Figure 5: How familiar are you with the current practices that the company uses for knowledge transfer?

#### 4.1.1 Face-to-face Communication and Knowledge Transfer Meetings

Regarding the elaborative questions, face-to-face communication with colleagues is a method that was pointed out by several respondents. To exemplify, PM1 underlined asking colleagues for relevant knowledge as a knowledge transfer method and argued that it is a dynamic process. Further, PM1 argued that tacit knowledge is transferred through employees contacting each other to benefit from each other's experiences. Moreover, face-to-face communication was also emphasized by PM2, who argued that asking colleagues when encountering problems in a project is an important method for knowledge transfer.

In addition, knowledge transfer meetings were highlighted recurrently by the respondents as a current knowledge transfer method. Yet, no common structure for the whole organization regarding these meetings was emphasized but the respective department described having their routines. For instance, PM1 argued that they have weekly knowledge transfer meetings within the management department aimed at the exchange of experiences and to discuss as well as take advantage of the knowledge that the group possesses. Additionally, the importance of meetings as a practice for knowledge transfer was described by DA, who claimed that they, approximately once a month, have meetings where employees present a project and what they learned from it. Through these presentations, the respondent argued that the employees learn to reflect on which knowledge and lessons learned they want to transfer to their colleagues. Conversely, it was argued by SM that meetings regarding knowledge transfer at the start and end of a project often get rushed through since the employees are eager to get started with the new project.

Furthermore, using knowledge transfer meetings as a method for transferring knowledge was highlighted by the respondents from the department of construction. DC1 claimed that they have knowledge transfer meetings within the group where they discuss lessons learned. Yet, the respondent described that these meetings are not executed for all projects but rather for projects where they believe there are significant insights to acquire. However, how these projects were selected was not further explained. Furthermore, knowledge transfer meetings were highlighted by DC2 as a current practice as the respondent described that they have project review meetings where they highlight certain questions, problems and decide which projects might be used as reference projects. Further DC2 argued that they have knowledge transfer meetings within the group where they review what has been good, bad, and what they can bring into the next project.

Further, it was discussed by the respondents that the company executes knowledge transfer meetings aimed at the whole organization or for certain offices. To exemplify, PM1 explained that they have monthly knowledge transfer meetings for all offices in Sweden. Additionally, DE also argued that they execute weekly knowledge transfer meetings with all departments which aims to brief each other on current projects. Further, DA discussed that knowledge transfer meetings might be held between departments working within the same field. The respondent also discussed that similar meetings also can be executed for the whole organization. However, the outcomes would mainly be to strengthen the team spirit of the organization since the information would be needed to be adapted towards the listeners. To clarify, DA reasoned that:

*“Presenting for the whole organization is more about creating solidarity within the organization and a network among the employees. Presenting for a group that works with the same things transfers explicit knowledge.”*

*-DA*

#### **4.1.2 Digital Tools**

Despite face-to-face communication and knowledge transfer meetings, digital tools were one further current practice that was highlighted recurrently by the interviewees. For instance, a CV base where employees can search for colleagues and which knowledge they possess was described repeatedly as a digital tool used for knowledge transfer by the respondents. However, it was also argued by some interviewees that they are not especially familiar with this tool. To exemplify, DC2 argued that they have a good overview of which knowledge the employees

possess in their department and, consequently, they do not need to use the CV base as a tool for knowledge transfer. Additionally, DA argued that there is a need for structure in the CV base regarding, for instance, what it should include.

Further, using channels on Microsoft Teams aimed at asking questions when encountering problems was highlighted as a digital tool for knowledge transfer by DETS, DE, and DA. Further, DA claimed that through these communication channels, they get the possibility to ask questions and thereby save time by taking advantage of the knowledge the department possesses. Also, it was argued by DA that such Microsoft Teams channels open up the possibility to collaborate with other departments within the same business area and, thus, get to know each other and share knowledge. Consequently, they get the possibility to distribute projects between the different groups depending on which knowledge they possess. Further, DA emphasized that it is important to build a relation of knowledge transfer as the respondent reasoned:

*“If I share knowledge, there are others that want to share knowledge with me –  
you build a relation of knowledge transfer”*  
– DA

Further, DA described that they are developing a portal for acoustics where the employees within their department are going to be able to search for lessons learned and explicit knowledge. According to the respondent, the goal of developing the portal is to elaborate the knowledge transfer practice within the department. Furthermore, the respondent described that the aim of the portal is that the employees will be able to extract lessons learned that might be useful in other projects, that it becomes a piece of a puzzle for knowledge. Regarding digital platforms used within other departments to transfer knowledge, PM1 described that protocols from construction meetings are used to write down lessons learned, however, no common platform is described to exist according to the respondents.

## **4.2 Incentives and Motivation for Knowledge Transfer**

Regarding incentives for knowledge transfer at the company today, the respondents were asked three 1-5 questions which are presented in Figures 6 and 7. Based on Figure 6, it can be argued the company put a prominent effort into encouraging the employees to transfer knowledge as the mean was calculated to be 4.57. Further, it can be analyzed based on Figure 7 that the employees feel motivated to transfer knowledge gained during a project as the mean was calculated to be 4.5.

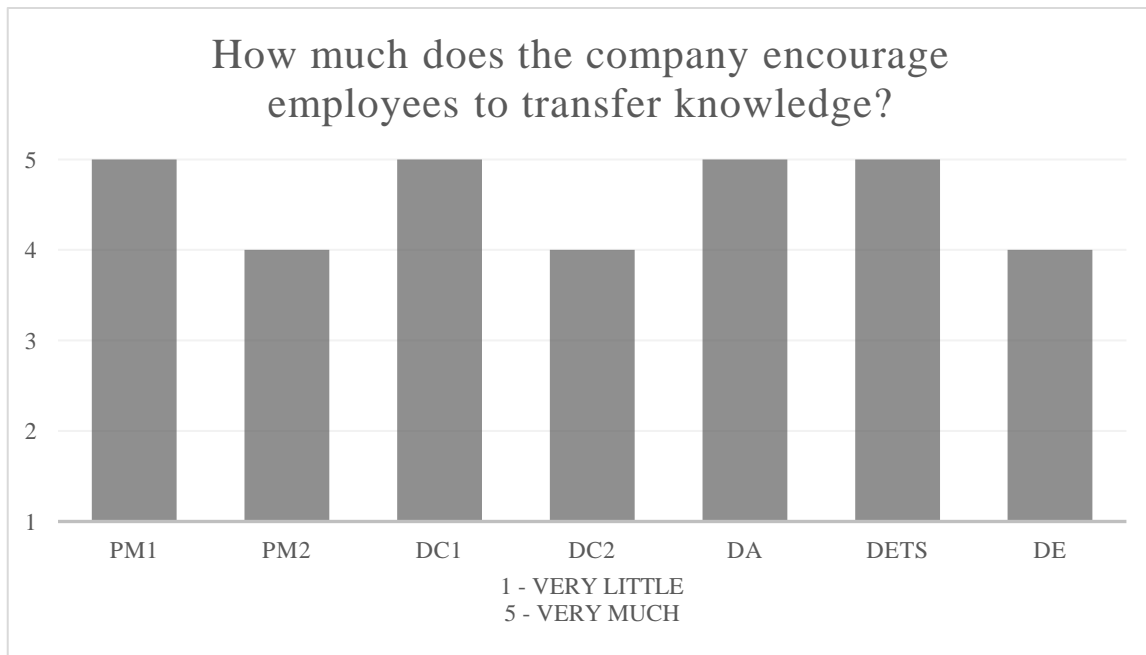


Figure 6: How much does the company encourage employees to transfer knowledge?

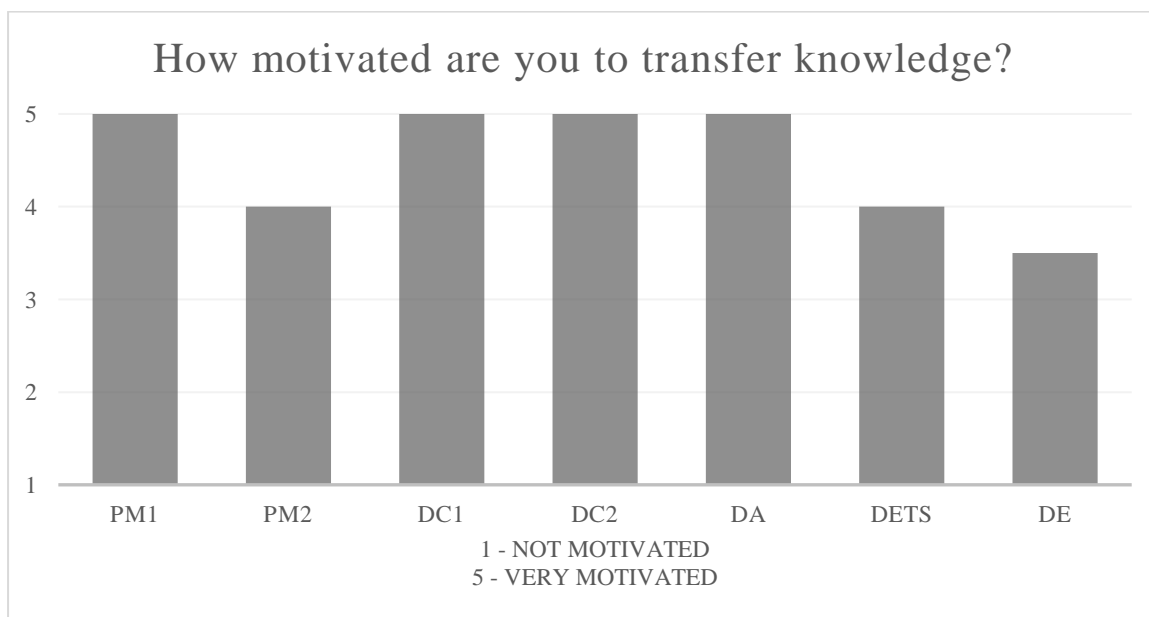


Figure 7: How motivated are you to transfer knowledge?

Implementing knowledge transfer processes also requires sufficient incentives and driving forces. The results indicate that there are no financial or materialistic incentives for knowledge transfer. Rather, what motivates the employees seem to lie within the organizational culture. This is rather a driving force than an incentive that was brought up by the interviewees. To exemplify, DM 2 reasoned the following:

*It is a common driving force in our company. The company's motivation is to do everything more simple, safer, and better. Consequently, the job gets more effective and as a result of this, the company becomes more successful. It is in the organizational culture."*

- PM2

Further, DC1 explained that having a culture where employees are encouraged to ask any sort of question is a prerequisite for effective knowledge transfer, which was supported by both DC2 and DE. Similarly, DA highlighted the need for encouraging each other to share knowledge. As a result of this, DA argued that it will encourage others to share knowledge since you build a relation of knowledge transfer. Knowledge transfer within the company is not an obligation or requirement from management, instead, DEETS believed it lies within the nature of being a consultancy firm, as knowledge is their most valuable resource.

Regarding personal motivation, the vast majority of the interviewees argued that motivation is dominantly rooted in developing and improving as consultants. To concretize, PM2 discussed that as consultants, people must collaborate and utilize knowledge to develop and improve. Elaborating on this reasoning, DC1 argued that when consultants improve, the company can ensure quality proof work, as well as adhere to time and budget for the client. PM2 believed that transferring knowledge makes everyone better, and as a result of this, DC2 argued that the company can build its valuable knowledge bank. On the other hand, DA argued that the main motivation is rooted in learning from mistakes and thus sharing experiences, or as the respondent more precisely articulated:

*“Mistakes make you wise. I have become very wise over the years.”*

- DA

### **4.3 Challenges with Knowledge Transfer**

Regarding challenges in transferring knowledge, it became evident that lack of time is the dominating obstacle. This was explicated by DC1 who stated:

*“The biggest challenge is lack of time. When projects are finished, there is a lot of information to document, especially if the project has been taking place for several years. It is a lot of administrative work.”*

- DC1

As DC1 and DE argued, lack of time is a hindrance for consultants when working with knowledge transfer, and as expressed by PM1, time is money for consultants. Relatedly, DC2 expressed that the administrative work is not done if it is not a must due to time constraints. Though, lack of time was not the only challenge expressed by the employees. Lack of structure was argued to be an obstacle, which is exemplified by DA who argued that structure is crucial for knowledge transfer since it should be easy to do the correct thing. Consequently, the respondent believed that there must be an automaticity in the processes which can be a challenging task for the company. On the other hand, DE expressed difficulty with understanding where knowledge is needed and who possesses it.

Moreover, SM expressed that due to the fact that the company is relatively young, there is a challenge with developing a homogeneous organizational culture in all offices. This was due to the fact that the company bought small companies in order to recruit competent people. It was also argued, by several respondents, that lack of time is considered a big challenge for knowledge transferring. Though, according to SM, the company has developed a team book with the purpose of creating a common culture. Furthermore, the respondent also expressed the need for courage among employees to ask for feedback from employees. This was argued to be a valuable knowledge source, important for improving knowledge transfer within the company.



#### **4.4 Positive Outcomes of Effective Knowledge Transfer**

It is vital to understand the positive outcomes of knowledge transfer. The vast majority of the respondents expressed that there is not one single positive outcome, rather, DC2 expressed that there is a need to have a holistic perspective on the positive outcomes. Most prominently, the main benefits expressed by the interviewees referred to improved quality, costs, and time-effective work. Both DE and DC1 claimed that knowledge transfer ensures that the wheel does not have to be reinvented, which allows for improved quality. The respondent focused on allowing for effective production, where money can be saved, and the time plan is held. Similarly, DETS believed that quality, time, and money matter, however, the respondent argued that quality is the main positive outcome. Additionally, avoiding re-work saves a big amount of money as it is argued to be time-consuming, similar to what DC1 argued. This was also supported by PM1 and PM2, who both reasoned that time, quality, and costs are the main benefits of successful knowledge transfer.

Further, DA emphasized the importance of how successful knowledge transfer can result in more engaged coworkers. This in turn will allow for improved results to a lower price for the customer, and consequently, more satisfied customers. With increased knowledge, there is a possibility for fewer errors, and subsequently, coworkers can feel more secure in their work roles. Elaborating on this reasoning, SM argued that it all starts with humans:

*“Good results are because of employees that feel important, as well as satisfied clients who want to proceed business in the future.”*

*- SM*

#### **4.5 Potential Improvements for Knowledge Transfer within the Company**

Firstly, regarding what level current practices can be improved (see Figure 8), a mean of 3.75 was calculated, implying that there is a moderate need for improvement. However, it can also imply a high degree of motivation as several interviewees stated that a company can always improve in terms of knowledge transfer. It is also noted that the respondents included in the same department are in consensus with regard to what extent knowledge transfer can be improved within the company.

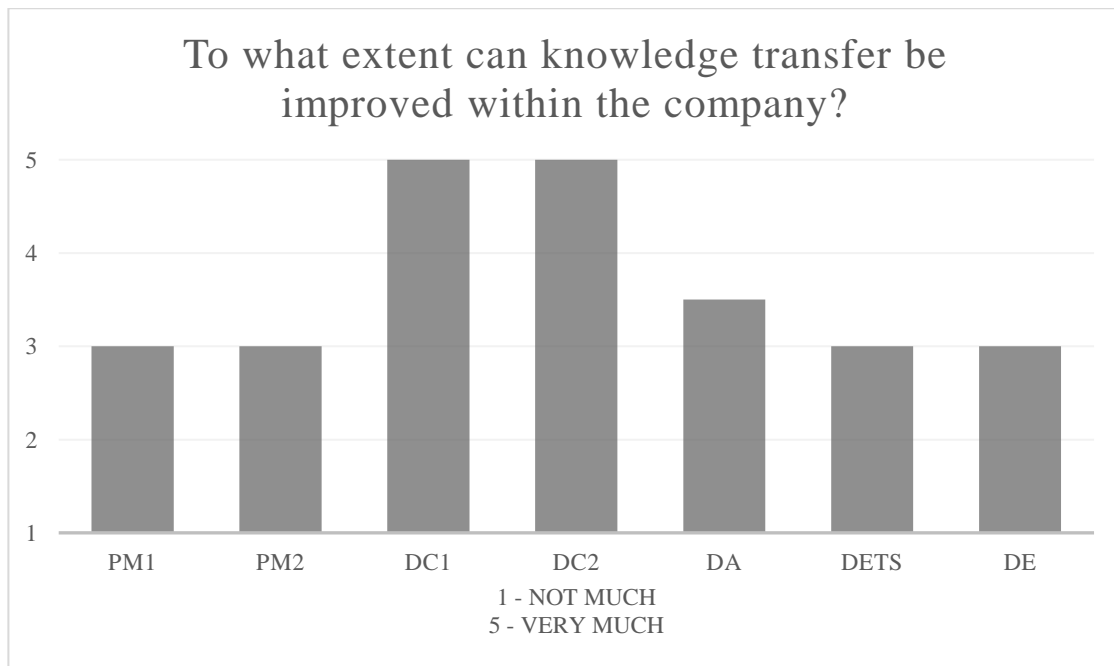


Figure 8: To what extent can knowledge transfer be improved within the company?

Regarding improvements of their current knowledge transfer practices, there were differences among the interviewees' answers. However, one common denominator was the need for social meetings and routines. PM1 argued that best practices would be informal communication with colleagues and small spontaneous meetings, such as coffee breaks. The respondent also believed that shadowing, meaning junior employees following seniors in their work, is a way of transferring knowledge. Though, this is argued not to be very cost sufficient. Building upon the reasoning of social interactions, ETS emphasized a wish for regular meetings containing workshops where experiences can be shared.

An additional area of improvement refers to having a continuous and natural knowledge transfer process. As PM2 argued, several projects take place over a long period of time, consequently, there is a need for an ongoing exchange of knowledge. DC2 believed that there must be requirements from the top management, emphasizing that consultants must review each project as a minimum. The respondent argued that this could be constituted by a template that clearly describes how knowledge must be documented, for instance stating what went well or wrong, how did communication work (internally and with the client), and did the project comply with the expected time and budget. Similarly, DC1 also had a request for implementing a standardized process, meaning that it would be desirable to have a shared platform where lessons learned from projects were to be stored.

Conversely, DA has already developed this sort of system for the department of acoustics, explained in Chapter 4.1.2, and expressed a desire to implement it within other business departments as well. The respondent also wished for delegating a person at each department who is responsible for knowledge transfer, a knowledge coordinator. This is supported by ETS, who believed that it would be beneficial to have one employee for each knowledge area who is responsible for coordinating knowledge transfer. Additionally, SM stated that the company must set aside time for knowledge transfer and value this time.

## **5. Discussion**

As stated in the introduction, organizations within the construction industry are often project-based, subsequently resulting in difficulties in implementing organizational processes (Brensen et al., 2004). In addition, the projects are unique, temporary, independent, and complex, and consequently demanding well-structured procedures for knowledge transfer. In fact, Argote et al. (2000) claim that it is crucial for an organization to have adequate knowledge transfer procedures to gain competitive advantages within the industry. In this chapter, the literature in conjunction with the empirical study is discussed to analyze whether they corroborate each other, or if there exist any disparities. The core of the discussion is constituted by the two research questions that are analyzed in the report.

### **5.1 How Does a Consulting Engineering Firm Work with Knowledge Transfer?**

When analyzing the current practices for knowledge transfer within the company, the most prominent finding is that there is no consensus regarding methods and practices for knowledge transfer. To concretize, all business departments have the possibility to use and develop different knowledge transfer processes. Consequently, this can be discussed to be a weakness within the company, causing the knowledge transfer to become disorganized and fragmented. Thus, it can also be argued that the different procedures for knowledge transfer vary in terms of effectiveness, as there exist both well-working processes as well as areas of improvement. Since the different departments possess diverse procedures for knowledge transfer, it can also be claimed that the effectiveness of the knowledge transfer varies depending on the department, since some departments have managed to implement more effective methods for knowledge transfer than others.

Further, as argued by Fernie et al. (2003), when analyzing knowledge transfer processes within a company, it is imperative to understand that both tacit and explicit knowledge must be interpreted as two distinct and valuable sorts of knowledge. Hence, as an organization it is not sufficient enough to solely perform well within one of these knowledge categories, there must be a well-balanced approach. As Jasimuddin et al. (2005) ascertain, knowledge can be interpreted with the iceberg effect, implying that tacit knowledge constitutes the basis for explicit knowledge, and, hence, neither can not be overseen. Thus, when interpreting and analyzing the interviews, it can be understood that knowledge transfer processes are adapted to explicit and tacit knowledge, but there still exist areas of improvement. Consequently, with the SECI-model presented by Nonaka and Takeuchi (1995) as a starting point, it is possible to identify the different knowledge transfer methods that are implemented and used at the company and to conclude whether they are suitable or not in order to transfer tacit or explicit knowledge. Hence, the following chapter aims to examine the current practices for transferring explicit and tacit knowledge at the company.

#### **5.1.1 Current Practices for Transferring Explicit Knowledge**

By observing the current practices for transferring explicit knowledge, it is evident that there exists a moderate inconsistency between the prevailing departments. To clarify, there do indeed exist tools that emphasize explicit knowledge, such as databases and Microsoft Teams channels. However, there is no consistency regarding these tools between different business units. Additionally, the interviews revealed that regarding familiarity with knowledge transfer processes within the organization, a mean of 3.71 was calculated. This can imply that there is a moderate understanding and familiarity with current processes, however, this only applies to

the respondents' own business departments rather than the organization as a whole. Connecting the interview findings to the SECI-model by Nonaka and Takeuchi (1995), it can be reasoned that the process of converting explicit knowledge to explicit, the combination step, can be argued to work relatively well seen to the whole organization. However, when analyzing the organization in a more detailed matter, it is apparent that the combination step has different levels of success in the different business departments as each one decides upon its own procedures. Hence, this can be perceived as a weakness within the organization.

As a result, some methods are working well but could be implemented in the organization as a whole to create consistency and improved knowledge transfer. According to the interview findings, it can be observed that there exist methods that have been developed considering the circumstances of the organizations, that could be spread to a larger extent within the organization through a bottom-up approach. Such methods are, for instance, a digital platform where employees are encouraged to upload relevant explicit information from projects that might be valuable in other projects. Accordingly, the benefits of using databases for knowledge transfer were also found in the literature framework as Ren et al. (2017) argue that shared spaces such as digital platforms allow for increased accessibility for everyone involved in projects, and that shared experiences can be applied in future projects. This is also supported by Ajmal and Koskinen (2008) who argue that information technology is effective for sharing explicit knowledge. Therefore, it can be argued to be vital for the organization to work towards implementing knowledge transfer methods that facilitates the accessibility to knowledge and experiences.

### **5.1.2 Current Practices for Transferring Tacit Knowledge**

How do you really express the inexpressible? It has become evident in the literature and interview findings that tacit knowledge presents a unique challenge regarding knowledge transfer. This problem is well explained by Smith (2001) who states that tacit knowledge is "knowledge for which we do not have words" (p.314). The company faces the same challenges for implicit knowledge regarding finding a common work procedure. However, as previously stated, the difficulties of transferring tacit knowledge might endeavor to find a common structure even more difficult. To clarify, these methods refer to, for instance, meetings for knowledge transfer and lessons-learned discussions. However, similarly to the company's processes for transferring explicit knowledge, it is up to each business area to decide upon a structure and shape of these methods. Moreover, this identified deficiency is in accordance with what is discussed in the literature framework as Jasimuddin et al. (2005) argue tacit knowledge is bounded to individuals and is difficult to accumulate. Thus, by connecting to the SECI-model by Nonaka and Takeuchi (1995), it can be discussed that the company possesses difficulties with the socialization step as well as the externalization step, entailing transferring tacit to tacit knowledge, or tacit to explicit knowledge.

As previously stated, meetings were highlighted in the empirical findings as a frequently used knowledge transfer method, both meetings within the group and for the whole organization. This is also a commonly discussed method in literature, as Prencipe and Tell (2001) argue that lessons-learned meetings are a favorable method to evaluate previous projects and highlight what could be brought into subsequent projects. However, according to the interviews, it seems that these meetings are rushed through and not executed consistently and adequately since consultants want to proceed with working on projects for the client. Consequently, it can be discussed that this partly depends on lack of motivational incentives, which is a reasoning supported by Ajmal et al. (2009) and Goh (2002). Correspondingly, Noe (2010) argues that

employees must understand the value of transferring knowledge to be motivated to put time and effort into sharing experiences. Although, when comparing the interview findings, it is apparent that there is a high degree of motivation among employees, as a mean of 4.5 was calculated. However, this motivation is not an incentive related to direct financial rewards, rather, it was argued to be based on the fact that consultants always want to develop as knowledge is their most important resource. This is similar to what Grant (1996) argues regarding the knowledge-based view, suggesting that knowledge is the most strategically important resource of an organization. Though, it can be discussed how the results regarding motivation would have differed if a more comprehensive interview study was conducted.

However, meetings are not the only method the company utilizes for tacit knowledge transfer. According to the interviews, a significant amount of knowledge appears to be shared through informal face-to-face communication. Although this is a quite spontaneous and unstructured method for transferring knowledge, it can be discussed that employees build a relation of knowledge transfer when sharing experiences and helping each other to solve problems. This reasoning is also supported by the literature framework as Prencipe and Tell (2001) argue that knowledge creation as a result of people-to-people communication is an essential knowledge transfer method within an organization. Moreover, it is highlighted by the authors that employee communication can enable for sharing lessons learned, possibly resulting in increased use of accumulated knowledge within the organization. Subsequently, it can be discussed that there is a significant value in creating opportunities for employees to be able to transfer knowledge through social interactions and build a relationship of knowledge transfer.

## **5.2 How Can a Consulting Engineering Firm Improve its Knowledge Transfer?**

As the master's thesis has investigated how a consultant engineering company works with knowledge transfer, there is consequently possibility to discuss how a consulting engineering firm in more general terms can improve its knowledge transfer processes. When analyzing the empirical results, it is evident that the studied company lacks adequate methods for knowledge transfer. More specifically, it can be reasoned that the company lacks structure and continuity in its knowledge transfer procedures which consequently results in deficiencies in how knowledge is being transferred between projects within the organization. It can be discussed the implementation of knowledge transfer methods cannot be done in isolation, as it requires having the correct tools and prerequisites to succeed. Thus, it is vital to have a comprehensive understanding of the concept, emphasizing the need to move beyond project-centric approaches and, instead, embrace a rather holistic perspective. Knowledge transfer must be a continuous and natural part of an organization that wants to learn and improve.

### **5.2.1 Organizational Culture**

The first vital factor in embracing a holistic perspective for knowledge transfer is organizational culture, that emphasizes knowledge transfer within an organization. It was found in the interviews that the company experiences problems with implementing a homogenous organizational culture. This is due to the fact that the company is relatively young, implying that employees come from different organizations with different cultures. Thus, it can be discussed both based on empirical data and literature findings that organizational culture has a vital role in knowledge transfer. To explicate, the importance of organizational culture is highlighted by Ajmal et al. (2009) as the authors argue that projects consist of employees with distinctive cultural backgrounds and that culture has a prominent impact on the effectiveness of knowledge transfer. Also, Karlsen and Gottschalk (2004) argue that culture enables

employees to percept how to transfer knowledge, and which knowledge that should be transferred within the organization. Further, Rahman et al. (2018) argue that culture has a positive effect on knowledge transfer. Accordingly, it can be discussed that culture is a fundamental driving force for knowledge transfer. Further, based on empirical findings, it can be reasoned that the company's emphasis on knowledge transfer as a part of its organizational culture has resulted in, for instance, increased efficiency. Consequently, it can be reasoned that this is crucial for the company to strive towards developing a more homogenous culture to improve the company's knowledge transfer further.

Founded on the challenges of transferring tacit knowledge presented in the literature framework, it can be argued that organizations may not be able to control the transfer of tacit knowledge to the same extent as the transfer of explicit knowledge. This is because tacit knowledge is deeply rooted in individual experiences and is often shared in a less structured manner (Jasimuddin et al., 2005), for instance during informal and unplanned conversations. As mentioned previously, requirements and standardized processes are important to ensure that knowledge is transferred. However, it can be discussed that it is important to establish freedom among employees and a balance regarding how controlled the structure for transferring tacit knowledge should be. To explicate, it is argued by Smith (2001) in the literature framework that tacit knowledge is more rooted in naturally occurring processes based on individual interactions. Therefore, it becomes important to strive for a homogenous organizational culture that emphasizes the transfer of tacit knowledge instead of solely striving for making it more structured.

As the company uses regular presentations of interesting projects as a knowledge transfer method, it can be discussed to contribute to a feasible organizational culture. To clarify, it is highlighted in the empirical findings that presentations for the whole business area result in positive outcomes in terms of increased team spirit, whereas presentations within each department result in positive outcomes in terms of knowledge transfer. According to Goh (2002), it is of great importance with an organizational culture that emphasizes openness, collaboration, trust, and continuous improvement. Also, Rahman et al. (2018) argue that organizational culture affects the effectiveness of knowledge transfer. Subsequently, it can be argued that it is important that the company continues with presentations for the whole business area, even if it does not directly lead to knowledge being transferred. Instead, it results in an organizational culture that emphasizes continuous improvement, collaboration, and openness, which subsequently can be discussed to have a positive effect on the effectiveness of knowledge transfer. Therefore, it can be discussed that a mixture of both presentations for the whole business area and within the group is important for successful accumulation of knowledge.

### **5.2.2 Structured Knowledge Transfer Processes**

As earlier discussed, one deficiency of the company's knowledge transfer work is the lack of consensus between business departments regarding routines and procedures. Thus, each department varies in its knowledge transfer work, implying a scattered work. Based on this reasoning, it can be discussed that structure is a vital parameter for consultant engineering firms when aiming for a successful knowledge transfer process. To improve knowledge transfer procedures, it can be argued that it is essential that all departments have a common structure to ensure consistency and standardized nature of the process. Consequently, in the long term, knowledge transfer has the ability to become a natural and integrated part of an organization, and not perceived as solely a requirement.

As mentioned in Chapter 5.2.1, it can be reasoned, based on empirical findings, that the prevailing organizational culture to a large extent emphasizes freedom among departments to develop their own methods for knowledge transfer. Yet, it can be considered that is not sufficient to allow each department to create its own knowledge transfer procedures. In complex projects, it can be challenging to understand which factors contributed to success or failure. Consequently, it can be argued that by implementing a standardized process for knowledge transfer, the company can enable to facilitate old experiences in new projects. This reasoning is also highlighted by Prencipe and Tell (2001). Thus, it can be discussed that uniqueness and complexity will always differ in projects, however, by implementing a standardized framework, the work can be streamlined, to avoid reinventing the wheel.

Furthermore, based on empirical findings, it can be argued that a bottom-up approach to new knowledge transfer methods might be favorable since it can stimulate innovation and is focused on solving problems identified in existing organizational procedures. Yet, regardless of the benefits of a bottom-up approach to new knowledge transfer methods, the importance of a clear strategy from the top management also needs to be emphasized. For instance, through the implementation of requirements and standardized processes to ensure that accumulated knowledge is being utilized within the organization to gain competitive advantages. This is also emphasized by Goh (2002) who argues that it is vital for organizations to find a balance between less structured processes and structured processes since both are equally essential for successful knowledge transfer. According to the author, companies must comprehend what knowledge is to be transferred to understand if structured processes or less structured processes are more effective.

Moreover, the empirical findings implied that lack of time is one hindrance to transferring knowledge for consultants. This is also considered by Javernick-Will (2012) and Ren et al. (2017), who argue that lack of time is a barrier to transferring knowledge. Furthermore, the interviews proved that the administrative work of knowledge transfer is not done if it is not a must. Accordingly, it can be argued that there is a need for increased structure regarding requirements from the top management, emphasizing that consultants must review each project as a bare minimum. However, information regarding how such requirements actually would affect the effectiveness of knowledge transfer appears to be lacking in the literature. Though, it can be reasoned that increased requirements entail that time aimed at knowledge transfer is set aside for the employees. According to Goh (2002), structure and procedures are important factors for effective knowledge transfer, however, employees must be given sufficient time to use these. Therefore, it can be discussed that it is vital to implement requirements and standardized processes to increase the effectiveness of the knowledge transfer. Yet, it is equally important to allocate adequate time for employees to transfer accumulated knowledge.

Additionally, the interviews also indicated that delegating responsibility to someone who has allocated time for working with assembling knowledge transfer could result in favorable results in terms of increased regularity. Moreover, it can be discussed based on empirical findings that this responsibility requires skilled knowledge as well as interest within the respective business area in order to understand, assemble and decide what knowledge should be transferred. Consequently, allocating an already employed person within each department to have responsibility for knowledge transfer would be a promising way to improve the regularity of knowledge transfer. This would also facilitate an increased level of structure and can be applied in other consultant engineering firms. Moreover, is also highlighted in the literature framework as Ajmal et al. (2009) argue that it might be of importance not only with employees wanting to engage in knowledge transfer but also being authorized to do it. However, it is argued by

Javernick-Will (2012) that giving employees responsibility for knowledge transfer requires that time is set aside and that it becomes a part of their daily tasks.



## 6. Conclusions

The Master's thesis has aimed to analyze a consultancy firm's current working procedures to facilitate knowledge transfer between projects, as well as how a consultancy firm, in general terms, can work to improve its knowledge transfer practices. This was executed by conducting a single case study and connecting these findings with the literature. In this chapter, a conclusion is presented to answer the research questions.

### ***Q1: How does a consulting engineering firm work with knowledge transfer?***

The Master's thesis has analyzed the current state of knowledge transfer processes within the studied company. It can be concluded that there exist several already implemented methods for transferring both tacit and explicit knowledge such as knowledge transfer meetings and databases. Also, it can be concluded that there exists a strong strive and willingness to work with knowledge transfer, yet the company lacks sufficient structure and consistency for carrying out the processes. To exemplify, the different departments are provided extensive freedom to structure their own knowledge transfer processes, resulting in a wide variety of processes for knowledge transfer within the organization.

Moreover, it can be concluded that the knowledge transfer processes for transferring explicit knowledge work more effectively compared to the processes for transferring tacit knowledge. The transfer of tacit knowledge is more complex since this knowledge is strongly bounded to individuals, yet successful processes for such transfer have great advantages for the organization. To exemplify, these advantages can imply improve decision-making, increased quality, and improved efficiency regarding time and costs towards the client. Based on this reasoning, it can be concluded that adequate processes for knowledge transfer exist to some extent, however, these can be elaborated to fully benefit from the positive outcomes of successful knowledge transfer.

### ***Q2: How can a consulting engineering firm improve its knowledge transfer?***

Prior to implementing adequate knowledge transfer methods, it is vital for consulting engineering firms to execute an analysis of the current state of the organizations. To elucidate, an organization must understand its needs in terms of knowledge transfer processes prior to embarking upon the implementation of new processes or prerequisites.

To successfully transfer knowledge, it can be concluded to be of importance that sufficient prerequisites must be developed within the organization. Firstly, such prerequisites include striving for a more homogenous culture that put great emphasis on the importance of knowledge transfer. Moreover, striving towards a more homogenous culture also includes improving the continuity and structure regarding knowledge transfer processes within the organization. For instance, seen from the senior management perspective, there must be requirements of how knowledge transfer should be documented and how frequently. Consequently, this would result in more standardized knowledge transfer processes among the different departments at the company, and thereby a more homogenous culture. Also, striving towards more standardized processes can be claimed to be of great importance since finding a common thread between departments regarding how accumulated knowledge should be transferred is crucial.

However, it can also be argued that it is important that the company finds a balance regarding how controlled and structured the transfer of knowledge should be, especially tacit knowledge

since it is more naturally rooted in individual experiences. Also, it has been observed that employees develop systems based on the unique circumstances of the company as a result of the freedom among departments to structure its knowledge transfer procedures, which are implemented with a bottom-up approach. Therefore, this further highlights the importance of finding an equilibrium regarding the amount of structure versus independence to guarantee that innovation is not held back.

Yet, increased structure regarding requirements also results in employees must be given sufficient time to transfer knowledge. It can be reasoned that an organizational culture that puts great emphasis on knowledge transfer and providing a constructive environment is fundamental to develop a natural exchange of knowledge, as well as an understanding of the importance of it among employees. Moreover, it can be argued to result in increased motivation and willingness among employees to transfer knowledge. However, it is important to highlight that employees need to be provided with allocated time to transfer knowledge and that it should be a part of their work tasks. Additionally, delegating the responsibility for knowledge transfer to an employee within each department could result in favorable results in terms of increased regularity. However, this requires that the responsible employee is given allocated time to execute knowledge transfer assignments as a part of their working tasks. Likewise, it requires that the designated employee possesses a genuine interest in the importance of knowledge transfer as well as sufficient knowledge within the respective knowledge area.

Lastly, it can be concluded that the findings presented in this report provide a solid basis for working with knowledge transfer procedures. To explicate, the implementation of knowledge transfer methods cannot be done in isolation, as it requires having the correct tools and prerequisites in order to succeed. Thus, it is vital to have a comprehensive understanding of the concept, emphasizing the need to move beyond project-centric approaches and, instead, embrace a rather holistic perspective. Knowledge transfer must be a continuous and natural part of an organization that wants to learn and improve.

## **7. Recommendations**

In the subsequent chapter, recommendations for the company are presented. These have been developed from the discussion and conclusion, and are aimed at the senior management, group managers, and subordinates. Lastly, recommendations for future research are presented.

### **7.1 To the Senior Management**

The senior management has the possibility to implement requirements that establish the foundation and prerequisites for adequate knowledge transfer. Thus, the recommendations for the senior management are as follows:

- Implement further requirements for knowledge transfer processes. Such requirements should, for instance, include obligations regarding mandatory project reviews as well as instructions for how lessons learned from these meetings should be documented.
- Implement requirements to ensure that employees are provided sufficient time to work on knowledge transfer tasks.
- When implementing requirements, they must be clearly communicated. Employees must understand the importance of these and their part in complying with them.
- Be adherent to bottom-up approaches regarding how existing knowledge transfer procedures might be improved. The senior management has a lot to benefit from understanding organizational improvement potentials from lower levels in the organization.

### **7.2 To the Group Managers**

The group managers have an essential role to ensure that requirements are fully implemented and followed within the organization. Correspondingly, they have an important role to motivate employees to transfer knowledge by emphasizing its importance. Group managers additionally need to be responsive to inputs from subordinates. Thus, the recommendations for the group managers are as follows:

- Delegate an employee within their respective business department who is responsible for knowledge transfer. This person must have a genuine interest in knowledge transfer tasks, as well as expertise within the business area in order to understand what knowledge should be transferred.
- Be responsive toward subordinates regarding how existing knowledge transfer procedures might be improved and evolved. Also, forward valuable information regarding how existing procedures might be progressed to the senior management.
- Allocate sufficient time for the employees to work with knowledge transfer tasks and make sure that it becomes a part of their working tasks and not one added task.

### **7.3 To the Subordinates**

The subordinates have an important role to adhere the implemented requirements for knowledge transfer. Moreover, subordinates have a key role in creating an organizational culture where employees help each other and build relations of knowledge transfer. Thus, the recommendations for the subordinates follow as below:

- Communicate analyzed improvements that might be implemented to evolve existing knowledge transfer processes. Subordinates have a good insight into organizational shortcomings and how existing processes might be improved based on current circumstances.
- Communicate and set pressure regarding how much time is necessary to be able to follow implemented knowledge transfer processes.
- Be a part of contributing to an organizational culture where employees support each other, build relations on knowledge transfer, and are open to sharing knowledge.

### **7.4 Future Research**

Lastly, as the Master's thesis has been conducted, several areas of future research have been identified. Firstly, a significant amount of research must be focused on knowledge transfer in the context of consulting engineering firms as it has been identified as a lacking dimension in knowledge transfer literature. Building upon this reasoning, a future area of research could be to investigate knowledge transfer frameworks and procedures in other sectors which potentially could be adopted in the engineering industry. Furthermore, there is also a moderate need for analyzing knowledge transfer from a holistic perspective rather than interpreting it with a process-centric approach. This would provide a greater understanding of necessary prerequisites, as well as the interrelationships and interdependence among knowledge transfer activities and procedures.

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# Appendix

## Appendix I – Interview Template I

### *Current Practices*

On a scale from 1-5, how well does knowledge transfer currently work within your company?

On a scale from 1-5, how much does the company emphasize knowledge transfer?

During project start-ups, how do you take advantage of tacit and explicit knowledge from previous projects to solve any eventual problems?

When you finish a project, how do you transfer tacit and explicit knowledge to future projects?

On a scale from 1-5, how familiar are you with current knowledge transfer practices used in the company?

What methods do you have for knowledge transfer?

How does knowledge transfer differ in terms of explicit and tacit knowledge?

### *Incentives and Motivation*

On a scale from 1-5, how much does the company encourage you to share knowledge?

What incentives do you have for knowledge transfer?

On a scale from 1-5, how motivated are you to ensure that knowledge is transferred at the end of a project?

What motivated you to share knowledge?

### *Potential Improvement, Challenges, and Positive Outcomes*

On a scale from 1-5, to what extent can knowledge transfer processes be improved?

What can you do differently to improve knowledge transfer processes?

What are the biggest challenges with successful knowledge transfer?

What are the positive outcomes of successful knowledge transfer?

Do you have anything more to add?



## **Appendix II – Interview Template II**

From a management perspective, how much emphasis is placed on the company to encourage knowledge transfer? Are there any shell requirements or is the issue decentralized out into the organization?

How do you ensure that knowledge transfer is an ongoing process and not just a one-time event?

What do you think are the biggest challenges with effective knowledge transfer between projects?

What can you do differently within your company to improve knowledge transfer processes?

What are the positive outcomes of successful knowledge transfer between projects?

Do you have anything more to add?



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