



**CHALMERS**  
UNIVERSITY OF TECHNOLOGY



# Enhancing Knowledge Transfer for Optimized Product Development in Manufacturing Organizations

Master's thesis in the Management of Economics and Innovation programme

Erik Armensjö  
Leo Axelsson

Department of Technology Management and Economics  
Division of Entrepreneurship and Strategy

---

CHALMERS UNIVERSITY OF TECHNOLOGY  
Gothenburg, Sweden 2024

[www.chalmers.se](http://www.chalmers.se)



MASTER'S THESIS 2024

# Enhancing Knowledge Transfer for Optimized Product Development in Manufacturing Organizations

Erik Armensjö

Leo Axelsson



**CHALMERS**  
UNIVERSITY OF TECHNOLOGY

Department of Technology Management and Economics  
*Division of Entrepreneurship and Strategy*  
CHALMERS UNIVERSITY OF TECHNOLOGY  
Gothenburg, Sweden 2024

Enhancing Knowledge Transfer for Optimized Product Development in Manufacturing Organizations

ERIK ARMENSJÖ  
LEO AXELSSON

© ERIK ARMENSJÖ 2024.  
© LEO AXELSSON 2024.

Supervisor: Gunnar Wramsby, Department of Technology Management and Economics  
Examiner: Gunnar Wramsby, Department of Technology Management and Economics

Master's Thesis 2024  
Department of Technology Management and Economics  
Division of Entrepreneurship and Strategy  
Chalmers University of Technology  
SE-412 96 Gothenburg  
Telephone +46 31 772 1000

Printed by Chalmers Reproservice  
Gothenburg, Sweden 2024

Enhancing Knowledge Transfer for Optimized Product Development in Manufacturing Organizations

ERIK ARMENSJÖ

LEO AXELSSON

Department of Technology Management and Economics

Chalmers University of Technology

## **Abstract**

This thesis explores the difficulties individuals face and strategies organizations can utilize to enhance knowledge transfer in the context of product development within manufacturing organizations. Knowledge has a critical role as a strategic asset regarding creating and maintaining a competitive advantage, hence, the importance of effective knowledge management and transfer practices is vital. This research is a single case study, examining knowledge transfer processes regarding both explicit and tacit knowledge among employees engaged in product development. The study employs a qualitative research approach, primarily utilizing semi-structured interviews with relevant employees for data collection. The findings indicate different barriers depending on whether the knowledge ought to be transferred is explicit or tacit. Regarding explicit knowledge, the main challenges lie in storing, organizing, and retrieving knowledge. For tacit, it is rather about the challenge of finding the person with the already existing knowledge. To address these challenges, the study proposes a set of strategies aimed at improving knowledge transfer. Regarding tacit knowledge it includes enhancing inter-departmental communication by mapping out the knowledge in a structured way by connecting knowledge to tangible concepts, items, or activities. As for explicit knowledge, the storing, organizing, and retrieving of knowledge should be handled by a centralized technological tool. The proposed solutions not only aim to optimize product development processes but also seek to harness the full potential of organizational knowledge. This thesis enriches the existing literature on knowledge transfer within manufacturing settings and offers practical insights for similar organizations facing knowledge management challenges.

Keywords: Knowledge Transfer, Product Development, Manufacturing Organizations, Tacit Knowledge, Explicit Knowledge, Organizational Culture



## Acknowledgements

This master thesis could not have been completed without the invaluable support of numerous individuals. We express our deepest thanks to Gunnar Wramsby, supervisor at Chalmers University of Technology, for his insights and guidance. Additionally, our sincere gratitude to the case company and its dedicated employees, who consistently made us feel welcome and provided support at every step of our journey.

Erik Armensjö and Leo Axelsson, Gothenburg, May 2024



# List of Acronyms

Below is the list of acronyms that have been used throughout this thesis listed in alphabetical order:

AI	Artificial Intelligence
FMEA	Failure Mode and Effect Analysis
PDI	Product Development and Improvements
R&D	Research and Development
TQM	Total Quality Management



# Contents

<b>List of Acronyms</b>	<b>ix</b>
<b>List of Figures</b>	<b>xiii</b>
<b>List of Tables</b>	<b>xv</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Background . . . . .	1
1.2 Company Background . . . . .	3
1.3 Purpose . . . . .	3
1.4 Problematization and Research Questions . . . . .	4
1.5 Delimitations . . . . .	4
<b>2 Methods</b>	<b>5</b>
2.1 Research Approach . . . . .	5
2.2 Research Design . . . . .	6
2.3 Ethical Aspects . . . . .	8
<b>3 Theory</b>	<b>9</b>
3.1 Knowledge . . . . .	9
3.1.1 Tacit and Explicit Knowledge . . . . .	9
3.1.2 Knowledge and Innovation . . . . .	12
3.1.3 Product Life Cycles and Competition . . . . .	12
3.1.4 Knowledge and Quality . . . . .	14
3.1.5 Knowledge and Culture . . . . .	14
3.2 Knowledge Transfer Practices . . . . .	15
3.2.1 Knowledge Transfer in Manufacturing Organizations . . . . .	16
3.2.2 Knowledge Storage . . . . .	18
3.2.3 Knowledge Transfer Barriers . . . . .	18
3.2.4 Knowledge Transfer Technologies . . . . .	19
3.2.5 Knowledge Mapping . . . . .	20
3.3 Knowledge Transfer Framework . . . . .	21
<b>4 Empirical Findings</b>	<b>23</b>
4.1 Organizational Context . . . . .	23
4.1.1 Departments . . . . .	24
4.1.2 New Product Development Projects . . . . .	25

4.1.3	Culture . . . . .	26
4.2	Knowledge transfer practices . . . . .	29
4.2.1	Technological Tools . . . . .	36
4.2.2	Lessons Learned . . . . .	37
4.3	Knowledge Transfer Barriers . . . . .	38
4.4	Improvements . . . . .	44
<b>5</b>	<b>Analysis</b>	<b>47</b>
5.1	Organizational context . . . . .	47
5.2	Knowledge transfer practices . . . . .	49
5.3	Knowledge transfer barriers . . . . .	51
5.4	Improvements . . . . .	52
<b>6</b>	<b>Conclusion</b>	<b>55</b>
6.1	Research objective . . . . .	55
6.2	Limitations and recommendations for future research . . . . .	56
<b>7</b>	<b>Bibliography</b>	<b>57</b>
<b>A</b>	<b>Attachment - Interview guide</b>	<b>I</b>

# List of Figures

3.1	The four patterns of interaction from Nonaka (1994). . . . .	11
3.2	Implication of new product life cycle from Vesey (1992). . . . .	13
3.3	Knowledge Mapping Framework from Driessen et al. (2007). . . . .	21
3.4	Theoretical framework (Own illustration). . . . .	22
4.1	Net Sales of Business Area (Year-end report 2023, 2024). . . . .	24
4.2	Departments of the line organization in the case study (Own Illustration). . . . .	25
4.3	How New Development Projects are run by cross-functional teams (Own Illustration). . . . .	26



# List of Tables

2.1	List of interviews and their respective roles. . . . .	7
3.1	Different types of Organizational Knowledge from Spender (1996). . .	12



# 1

## Introduction

This section offers an introductory overview of the study. It begins with an examination of the challenges associated with knowledge transfer, followed by an introduction to the background of the case company studied. It then progresses to the problematization of knowledge transfer issues and introduces the research questions that will guide the investigation. The chapter concludes by outlining the study's purpose and its delimitations.

### 1.1 Background

Throughout recent decades, the critical role of knowledge within organizations and its pivotal role in establishing sustainable competitive advantages has been acknowledged (e.g. Azeem et al., 2021; López-Sáez et al., 2021; Spender, 1996). A reason for the increased interest is the idea of knowledge being one of the most important resources for firms to gain and uphold a competitive advantage (Azeem et al., 2021). Further, Spender (1996) states that tangible resources are easy to replicate by competitors, while intangible resources like organizational knowledge are difficult to copy and simultaneously add more value to the firm. The difficulty in replicating knowledge lies in the fact that much of the knowledge within organizations is tacit, meaning it is deeply embedded in individuals' skills, experiences, and understandings (Teece, 2000). Additionally, the author argues that tacit knowledge has been accumulated through years of experience with trial and error, which is time-consuming for competitors to replicate. According to López-Sáez et al. (2021), the key to gaining competitive advantage is knowledge integration rather than knowledge itself. The authors argue that it is crucial to ensure seamless transfer of internal knowledge among various departments in order to unlock its full potential. Regarding manufacturing organizations, they possess a specific type of challenge as much potential for improvements lies in the hands of front-line employees with deep specialist production knowledge (Cornelius et al., 2021).

The interest in organizational knowledge has largely been sparked by its effect on innovative capabilities, where du Plessis (2007) states that innovation is crucial for competitiveness while being dependent on the amount of knowledge available. According to the author, changes in customer needs and a higher basis for knowledge within companies have made the innovation process more complex. Tamer Cavusgil et al. (2003) further explain that new knowledge is generated as a consequence of the innovation process, and existing knowledge is used as a resource for innovation.

The mindset of using existing knowledge is strengthened by O'Reilly and Tushman (2011), who argue that firms must leverage existing competencies and resources to gain and sustain a competitive advantage. Additionally, they expand the argument by emphasizing the concept of ambidextrous organizations, where the balance of both exploiting their current competencies as well as exploring new possibilities lies in focus.

Another interesting aspect of knowledge is concerning the quality management of a firm. Improving quality in an organization requires the creation of new knowledge, and understanding knowledge should be fundamental concerning activities that lead to organizational improvement (Linderman et al., 2004). Hence, improving organizational knowledge should lead to increased organizational quality. Honarpour et al. (2012) further state that not only does knowledge management improve quality in the context of innovation, but quality management, in turn, generates knowledge concerning performance.

When discussing organizations, innovation, and processes it is inevitable to not include culture. The underlying culture of an organization significantly influences every aspect of its operations, from internal communication and leadership styles to decision-making processes and conflict-resolution strategies (Schein, 2010). An innovative culture will continuously grow as it invites capabilities from the whole organization to contribute, thus, culture will impact the organization's financial results (Kanter, 2006). However, culture is not static, it is influenced by both internal and external factors (Hofstede, 2001). The author further discusses how cultural dimensions depend on power distance, individualism versus collectivism, and how uncertainty avoidance within organizations can be impacted depending on how the organization is structured, indicating that culture is indeed shaped and changed over time.

Organizations frequently experience gaps regarding knowledge flow between operational departments and strategic management levels, resulting in knowledge being confined within the boundaries of operational departments and not utilized to its full potential (Hadi et al., 2022). Knowledge is often stored in individuals, however, the challenge of distributing and improving knowledge utilization is ever present (Szulanski, 1996). Hence, organizations must strive to transition from being dependent on individuals to creating a system that ensures knowledge transfer and therefore limits the risk of losing one knowledgeable individual (Tece, 2000). Historically, the knowledge transfer that was seen as necessary was the one flowing out from the Research and development (R&D) department (Tece, 2000). However, Lauren and Pigg (2016) points out that knowledge flows are not unidirectional but knowledge transfer rather occurs during the collaboration and cooperation between individuals with different backgrounds and expertise. Thus, creating a need to develop dynamic processes for knowledge transfer. Additionally, learning in organizations takes place continuously over time, establishing a need for processes that ensure the continuous spread of knowledge between individuals and departments inside organizations (Söderlund, 2008).

To analyze knowledge transfer in this project, a definition of the subject must be set. The definition used in this project comes from Argote and Ingram (2000), who states that “*Knowledge transfer in organizations is the process through which one unit (e.g., group, department, or division) is affected by the experience of another.*”. This definition provides the right scope for the analysis, where knowledge transfer occurs on an organizational level between different groups. Moreover, it can be difficult to describe the difference between knowledge and skill. This thesis will use the descriptions from Winterton et al. (2006); Knowledge is conceptual, representing the understanding of information in relation to different situations. Skills are instead practical, representing the ability acquired and developed through practice with a specific goal for its application.

Establishing functioning new product processes is key to reaching successful product development (Cooper & Kleinschmidt, 1991). One such common structure for developing new products is organizing in project-based teams, an approach that fosters a sense of urgency, thus accelerating the process (Vesey, 1992). The author further argues that the speed created is critical to maximizing the potential profits, as payback will start earlier in the product life cycle. However, as products move to the mature state in the product life cycle, competition will be based on differentiation and price (Levitt, 1965), creating the challenge of balancing between developing new products and improving the existing fleet.

## 1.2 Company Background

This thesis has been made in collaboration with a case company that develops and produces heating and cooling systems for different kinds of properties to secure a pleasant indoor climate. The main business areas are the development and manufacturing of heat pumps, air conditioning, heat recovery, ventilation, and water heating for homes, apartment blocks, and commercial properties. The case company has recognized the potential of their employees’ immense product knowledge throughout the organization. However, they have also recognized the challenge of translating employees’ knowledge into creative concrete products that generate profits for the organization. This study may act as a guide for manufacturing organizations with similar challenges to improve structures and processes that facilitate knowledge transfer between actors within the organization.

## 1.3 Purpose

The purpose of this thesis is to describe and analyze the challenges and potential improvements considering knowledge transfer in manufacturing organizations.

## 1.4 Problematization and Research Questions

Effective knowledge transfer in manufacturing organizations presents a complex challenge (Cummings & Teng, 2003). The reason for this challenge lies in the nature of the knowledge itself, where tacit knowledge often is embedded in the individuals who have learned through experience (Polanyi, 1962). The author argues that tacit knowledge is often vital for the project's success, yet it is difficult to articulate and transfer. The transfer of knowledge is further exaggerated as it is dependent on the cultural and structural aspects of the organization (Nonaka, 1994). However, it is crucial in the context of quality management, as it ensures maintaining of quality standards and consistent performance (Honarpour et al., 2012; Linderman et al., 2004). As organizations are built up by individuals, they are crucial for the creation and leverage of knowledge (Nonaka, 1994). This is why the understanding of individuals is important in order to understand the organization, which leads to the first research question guiding this study:

***Research Question 1:** What difficulties do individuals in manufacturing organizations experience in the process of knowledge transfer and why?*

For organizations to be successful they need to create strategies to overcome their challenges (Grant, 2021). This creates the need for organizations to address knowledge transfer difficulties, as it affects the results of inconsistencies in product or service quality, impacting customer satisfaction and trust (Linderman et al., 2004). Bakker et al. (2011) highlight the complexity of knowledge transfer, particularly how knowledge needs to be managed in both relational and organizational processes. Tacit knowledge, unlike explicit knowledge, cannot be easily codified or taught (Polanyi, 1962). Hence, to navigate this complex environment, organizations need to develop and implement structured processes and channels that facilitate knowledge sharing at all stages of a project, shaping the second research question:

***Research Question 2:** What strategies and mechanisms can be implemented to enhance knowledge transfer in a manufacturing organization?*

## 1.5 Delimitations

This study considers the internal knowledge transfer within a manufacturing organization, focusing on the dynamics between departments involved in the development and manufacturing of products. It only considers internal knowledge, hence no external source has been used in the empirical findings. The geographical scope of the case study has been confined to a single location, encompassing product development and manufacturing activities. It has been conducted within a singular organization, focusing on examining the processes and interactions that influence the transfer of knowledge between the departments of research and development, quality, procurement, and manufacturing.

# 2

## Methods

In this section, the research methodology used in the study will be outlined. The structure of this segment is designed to provide a comprehensive description of the methodological approach. It starts with an explanation and justification of the research approach, followed by an in-depth discussion of the research design, which includes the explanation behind the selection of respondents and the organization of the case study. A description of the ethical guidelines guiding the study concludes the chapter.

### 2.1 Research Approach

Knowledge transfer is a topic acknowledged as a vital part of a business's success and has been highlighted from different perspectives in several academic studies (e.g. Argote & Ingram, 2000; Azeem et al., 2021; Cummings & Teng, 2003; Landaeta, 2008). Hence, the approach for this research began by creating a basis for the empirical study by examining literature in order to collect, interpret, and reflect on the most interesting findings in the area of study (Bell et al., 2022). The examination of literature was performed to obtain knowledge of previous studies in order to create a theoretical framework that aimed to improve the focus and direction of the study. When conducting the examination, the predominant keywords during the search were Knowledge Management, Knowledge Transfer, Quality Management, and Culture.

Studying knowledge transfer within an organization requires both flexibility and an in-depth study of real-world examples, which can be achieved with a qualitative study (Bell et al., 2022). According to the authors, qualitative study is: *"Seeing through the eyes of the people being studied"* and is descriptive yet emphasizes context, processes, and flexibility while having a limited structure, where concepts and theory are grounded in data. However, Bell et al. (2022) discuss some criticisms of the qualitative approach which are risks of being too subjective, difficulty in replication, problems of generalization, and lack of transparency. All the mentioned issues have been taken into account during the study. Furthermore, as knowledge transfer consists of both sender and receiver, the success of knowledge transfer will be influenced by the relations between actors within organizations (Bakker et al., 2011). Hence, to achieve an accurate knowledge transfer assessment, the study has focused on the perspective of individuals from departments involved in the development and manufacturing of products.

Semi-structured interviews were chosen as the primary method of data collection, however, to ensure validation of the interviews, the data was verified against process documents and observations in the organization. This approach is confirmed by the concept of triangulation, described by Bell et al. (2022) as the use of more than one method to verify the data, enabling the possibility of findings to be cross-checked, thus strengthening the validity of the findings.

Findings from the empirical study were later extensively analyzed from a theoretical standpoint based on the initial examination of the literature. This was one of the most critical parts of the study as it determined the subjectivity, replicability, generalizability, as well as transparency. Therefore, the study took an abductive approach in analyzing respondents' answers, which allowed the study to explore new aspects of the theme of knowledge transfer through real-world examples, as well as cognitive reasoning in theory building (Bell et al., 2022). The authors argue that the abductive approach should be seen as a continuous dialogue between the data and the researcher's pre-understandings regarding the subject. Hence, the researchers should remain open to the possibility of being surprised by the data, rather than exclusively using the data for confirmation. This study did not aim to develop a process of knowledge transfer that works in every manufacturing organization. The ambition has rather been to contribute to the theory of knowledge transfer by studying the topic from a new perspective, enabling deepening knowledge that both manufacturing organizations and future researchers may incorporate in their work.

## 2.2 Research Design

To gain insight into how knowledge transfers between different units in an organization, a case study has been made on the departments that develop and produce heat pumps. A case study is according to Denzin and Lincoln (2018) a detailed and intense analysis of a particular setting (e.g. project, institution, or system) in a real-life context. Moreover, semi-structured interviews have been conducted with open questions in order to gain a thorough understanding from every interviewee chosen from the company. Most of the interviewees chosen were white-collar workers since they are responsible for the development and manufacturing of products. A semi-structured interview approach uses an interview guide where the interviewer is flexible with the order questions are asked, allowing freedom for the interviewee to answer according to their experiences (Bell et al., 2022). A semi-structured interview guide was constructed before the interviews to make sure the questions generated appropriate answers for the research. However, an interview-related risk involves the potential for misinterpretations of the gathered information (Bell et al., 2022). To reduce this risk, all interviews were recorded to prevent any loss of information and to enable re-listening of the data throughout the study. To verify the findings from the semi-structured interviews, process documents on the organization's intranet were studied. Additionally, observations on the process of knowledge transfer were made during the time spent at the case company.

For sampling, purposive sampling and more specifically a snowball sampling approach was used. The snowball sampling method was chosen to provide the study with flexibility in interviewing relevant experts depending on what direction the study would take. Snowball sampling is according to Bell et al. (2022) a sampling approach where the units of analysis are selected based on criteria that allow a research question to be answered. Initially, a small group of interviewees was selected based on the initial contact persons at the case company. These interviewees further acted as guides towards more interesting individuals for the research. The interviewees were selected only from departments working on the development and manufacturing of products. Bell et al. (2022) argue that it is difficult to know in advance how many interviews are needed to reach theoretical saturation. However, interviewees stopped providing new data after around 15 interviews which was validated as 18 interviews were conducted in total, ranging between 38 to 61 minutes each. Table 1 provides a list of all interviews, the length of each interview and a description of each respondent's role.

**Table 2.1:** List of interviews and their respective roles.

<b>Respondent</b>	<b>Role</b>	<b>Length of interview (min)</b>
R1	Department Manager	52
R2	Department Manager	56
R3	Department Manager	42
R4	Department Manager	48
R5	Project Manager	38
R6	Department Manager	55
R7	Design Engineer	40
R8	Design Engineer	46
R9	Project Manager	42
R10	Design Engineer	40
R11	Design Engineer	37
R12	Design Engineer	46
R13	Project Manager	47
R14	Project Manager	61
R15	Project Manager	48
R16	Department Manager	43
R17	Department Manager	45
R18	Project Manager	40

To facilitate the analysis of the interviews, they have been transcribed. Bell et al. (2022) mention that a challenge in qualitative research comes from its dependence on unstructured language, such as transcripts, which generates large and complex datasets. To counteract the challenge and make the transcription process more efficient, the software program provided by Microsoft Teams for automatic transcription was used. After the transcription process was finished, the findings had to be structured. Patterns of themes in the data were created with the use of coding,

as answers from the different interviewees were structured into themes. Moreover, after the transcription and coding processes, the data was analyzed by using the grounded theory approach. According to Bell et al. (2022), grounded theory is defined as “*theory that was derived from data*” which means that new findings and theories, or the strengthening of previous theories, will be based on the theoretical framework combined with empirical findings from the case study. Denzin and Lincoln (2018) further mention the fact that grounded theory is an iterative process and that data collection is done simultaneously with analysis. In this case, empirical categories were altered iteratively as the interviews continued. Furthermore, to present the findings from the analysis and empirical data collection, visualization of the data has been used. Van Wijk (2005) states that data visualization enables efficient insight e.g. researchers, analysts, and the general audience due to the human visual system’s unique ability to detect patterns and features quickly. One such visualization was used to illustrate narratives from interviews by using quotes. These quotes provide some evidence behind the reasoning made in the conclusions. The interviews were conducted in Swedish, hence, the quotes presented in the empirical findings are translated into English meaning minor alterations were done to present the essence of the citations.

### 2.3 Ethical Aspects

It is important to consider ethical aspects when collecting and handling empirical data (Bell et al., 2022). The author emphasizes that respondents from the interviews should be provided with comprehensive information and transparency throughout the study. Additionally, interviews have been recorded to provide the opportunity to transcribe and review them afterward. However, Bell et al. (2022) argue that recording imposes some ethical prerequisites as consent from respondents is needed. Further, respondents have been anonymized to ensure that their answers are confidential and solely to be used for research purposes. To minimize the risk of misinterpretations, the thesis has been sent to the respondents before publication for review. Additionally, the risk of being affected by conducting the case study at the case company and thus being biased by their specific challenges and points of view is addressed.

Further, data secrecy is not only important for individuals but for the company as well, Argote and Ingram (2000) argue that knowledge is an important aspect of competitive advantage. The case company expressed in the early phases of this study, their willingness to limit what can be published should it pose a risk of harming the company in any way. This is an understandable concern, which has been accepted and an agreement of confidentiality was signed. Which resulted in the case company deciding on making itself anonymous after the study was completed.

# 3

## Theory

To establish a strong theoretical foundation for this study, it was necessary to gather extensive information from several sources. Due to the complexity of the subject under study, the theoretical framework will serve two purposes: Firstly, it will serve as a resource for the reader, clarifying some key concepts and facilitating an overall comprehension of the research subject. Secondly, it will serve as a foundation for analyzing the empirical findings to gain a better understanding of the issues associated with knowledge transfer within an organization.

### 3.1 Knowledge

Knowledge plays a crucial role as a strategic asset, thus managers must focus on enabling the production and acquisition of new knowledge as well as the movement, retention, and application of present knowledge (Spender, 1996). However, knowledge as a resource is complex and it is hard to determine where different knowledge is applicable and what new knowledge needs to be acquired (Grant,1996). A parameter that adds to the complexity of knowledge is that it is stored in individuals within the organization (Teece, 2000). Therefore, the author argues that organizations must create systems that limit the risk of losing a knowledgeable individual by integrating and diffusing knowledge between members of the organization. The process of acquiring or learning new knowledge is dependent on the experience and analytical ability of the apprentice as well as the communicative ability of the teacher (Spender, 1996).

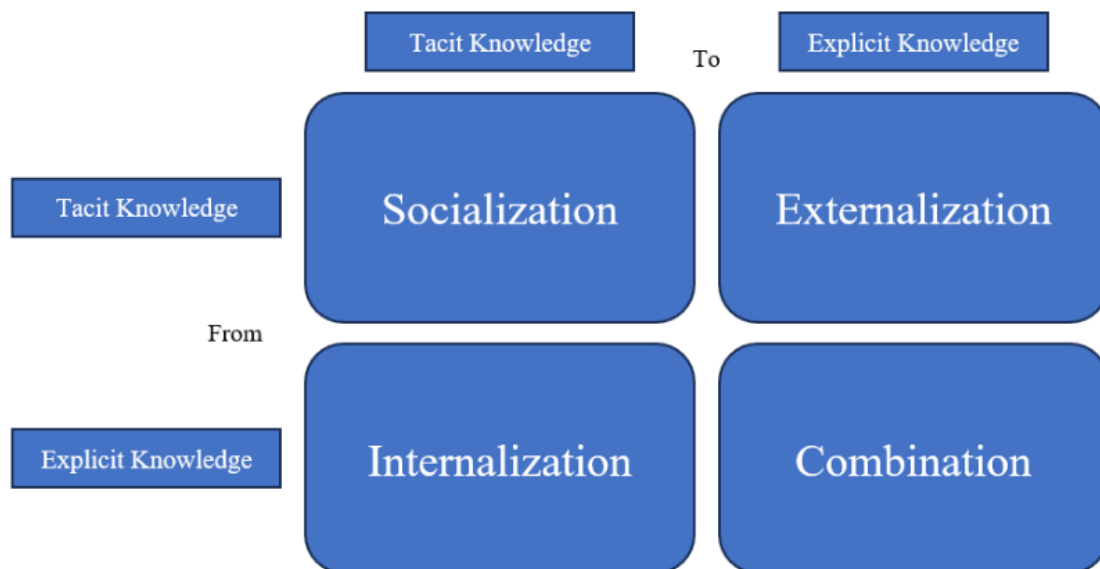
The human brain has a limited capability of acquiring, storing, and processing knowledge, resulting in the efficiency of knowledge production depending on specialized individuals in particular knowledge areas (Grant, 1996). Further, Winterton et al. (2006) delineate the distinction between knowledge and skill, describing how knowledge emerges from the interaction between intelligence and context, whereas skill is a competence developed through practice aimed at achieving a particular objective.

#### 3.1.1 Tacit and Explicit Knowledge

To gain some understanding concerning the complex nature of human knowledge, some scholars divide knowledge into two different categories, tacit and explicit knowledge (e.g. Nonaka, 1994; Polanyi, 1962; Jasimuddin et al. 2005). Polanyi (1962)

explains that explicit knowledge is defined as codified knowledge, which is information that can be communicated using formal, structured language. Alternatively, tacit knowledge is difficult to define and communicate since it is deeply ingrained in behavior, commitment, and engagement within a particular setting. Because of the complex nature of tacit knowledge, it is difficult for competitors to replicate (Teece, 2000). According to Lam (2000), the difference between tacit and explicit knowledge can be defined in three major areas. The first area is knowledge transferring where explicit knowledge can be codified and formalized, and tacit knowledge is intuitive and unarticulated. The second area is the main methods of gathering knowledge where explicit knowledge is gathered using logical deduction and formal studies, and tacit knowledge is gathered using *learning by doing*, meaning that knowledge is gathered through practical experience in the relevant context. Finally, the third area concerns the centralization and accessibility of knowledge where explicit knowledge can be centralized in one location, preserved in objective formats, and accessed without the involvement of the individual who initially possessed it. Tacit knowledge is individualized and context-dependent, to utilize its complete potential requires the close engagement and collaboration of the individual possessing the knowledge.

Although tacit and explicit knowledge varies in nature and requires different management approaches, the two categories can be utilized simultaneously in a company (Hansen et al., 1999). The authors mention that the two approaches can coexist within a single firm with distinct business units, but only in those where the business units function independently of one another. Nonaka (1994) further mentions that the process of generating organizational knowledge involves an ongoing conversation between tacit and explicit knowledge. The author states that four patterns of interaction are used to analyze the character of this knowledge transfer, shown in Figure 3.1. The first pattern is the spreading of tacit knowledge through interaction between individuals called *socialization*. This mode of interaction emphasizes shared experience in knowledge transfer since tacit knowledge is difficult to understand without embedded emotions and nuanced contexts. The second pattern is about converting tacit knowledge into explicit knowledge called *externalization*. Externalization expresses the concept that tacit and explicit knowledge complement each other and uses metaphors as an attempt to codify tacit knowledge. The third pattern is called *internalization*, which is about converting explicit knowledge into tacit knowledge. As with externalization, internalization emphasizes that the two knowledge types complement each other, however, internalization uses actions to utilize explicit knowledge practically. The fourth and final pattern concerns the spreading or addition of explicit knowledge called *combination*, where individuals share and merge knowledge through exchange mechanisms such as meetings or chats. Additionally, combination concerns reconfiguring existing information such as adding or sorting information which can lead to the creation of new knowledge.



**Figure 3.1:** The four patterns of interaction from Nonaka (1994).

Utilizing and categorizing the different knowledge types seems to be one of the main problems that organizations encounter, and managers need to approach (Jasimuddin et al., 2005). The authors explain that tacit knowledge is resilient to illegitimate exploitation, but is not easily accessible by authorized personnel in an organization. They further argue that explicit knowledge has the opposite problem, while easily accessible by the personnel, it is vulnerable to illegitimate exploitation. Lam (2000) states that since tacit knowledge is rooted in firms' organizational routines and mechanisms, it plays a big role in their competitiveness concerning technological innovation and organizational learning. Firms need to leverage both tacit and explicit knowledge to be successful, however, the boundary between the two is flexible as individuals shift between the two while performing daily activities (Spender, 1996).

As organizations depend on utilizing knowledge from specialized individuals, Spender (1996) has developed a framework illustrated in Table 3.1. The framework aims to describe the interaction between tacit and explicit knowledge on an individual and social level. Spender (1996) argues that while individual knowledge is transferable between individuals, social knowledge is embedded into the routines, processes, and relationships of the organization. Individuals can consciously use explicit knowledge as it can be codified and stored while tacit knowledge is automatically used by instinct. Social groups utilize explicit knowledge by objectifying the use of institutional mechanisms, while tacit knowledge is rather the collective learning and application of different group members' knowledge into a merged solution. It is this tacit knowledge embedded in a social collective arrangement that implies the most strategically important knowledge for organizations (Spender, 1996). Hence, to utilize the existing knowledge within an organization for the most strategic gain, organizations must focus on the coordination and cooperation between experts in different areas within the organization (Grant, 1996).

**Table 3.1:** Different types of Organizational Knowledge from Spender (1996).

	Individual	Social
Explicit Knowledge	Conscious	Objectified
Tacit Knowledge	Automatic	Collective

### 3.1.2 Knowledge and Innovation

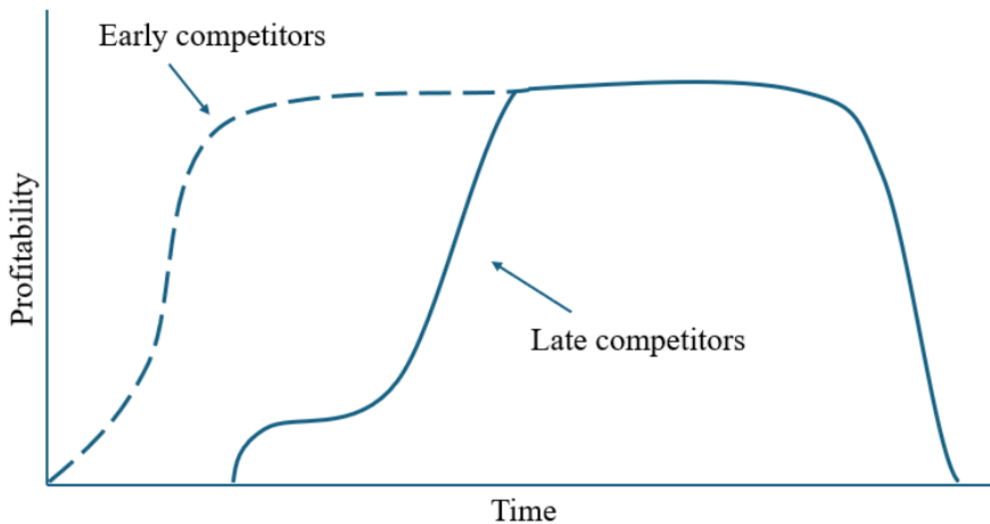
Innovation is important for organizations of today to stay competitive, however, due to the increased amount of knowledge available to organizations the complexity of innovation has increased (du Plessis, 2007). Darroch (2005) further emphasizes the importance of securing the right knowledge as it will have an impact on both innovation and the overall performance of the organization. Tamer Cavusgil et al. (2003) point out the dual role of knowledge in the innovation process, new knowledge is created through the innovation process and can be seen as an output. Yet, to create innovation, organizations need to leverage knowledge, making it an input for the innovation process. However, it is not enough to just innovate, organizations need to leverage their knowledge in a way that lets them both explore new business opportunities while they simultaneously exploit their existing ones (O'Reilly & Tushman, 2011). An argument that du Plessis (2007) agrees with as she states: *“Companies that facilitate both radical and incremental innovation are more successful than organizations that focus on one or the other.”*. Foss and Pedersen (2002) argue that in such a perspective, the organizational design problem is to create organizational tools of control, motivation, and context. The authors emphasize that actors should be able to access and produce knowledge, and to facilitate this, communication must be arranged between actors who possess knowledge and those who require it.

That innovation is essential to become successful and how innovation is supported by knowledge are described in several articles (Darroch, 2005; du Plessis, 2007; O'Reilly & Tushman, 2011). However, sustaining success demands other parameters than those needed to become successful (Grant, 2021). Grant (2021) argues that once established, competitive advantage will erode over time if the firm does not succeed with its isolating mechanisms. The author argues that hindering other organizations from copying what made you successful is crucial, as it is the sustainable competitive advantage that ensures long-term success. Additionally, Raash and von Hippel (2013) argue that the rewards gained from the innovation journey are the learnings made, making knowledge the main output from innovative projects and not the product or service you end up selling.

### 3.1.3 Product Life Cycles and Competition

The sustained success and competitive advantage of an industrial organization heavily rely on the introduction of new products (Cooper & Kleinschmidt, 1991). According to Fincher (2015), the lifecycle of products has shortened drastically, i.e. less time for payback on the development effort of the product. Vesey (1992) argues that in order to maintain profit margins, organizations must accelerate their

product development and release their products quickly to stay competitive. Additionally, because of this shortened life cycle, if a product is delayed by six months before reaching the market compared to competitors, the organization will forfeit approximately one-third of the potential profits from the product throughout its lifespan. Figure 3.2 provides a visualization of the new product life cycle, where early competitors have more time to earn payback on their development and in turn gain more profits.



**Figure 3.2:** Implication of new product life cycle from Vesey (1992).

According to Zhang et al. (2020), speed in development affects the quality and cost of products and is important for the survival of an organization facing strong competition and shortened product life cycles. The authors argue that knowledge transfer within an organization improves knowledge integration, which in turn supports the development process of new products. They further argue that knowledge transfer has the power to accelerate the development time of new products and that the development speed has become a direct reflection of an organization's knowledge transfer efficiency. Another effort to reduce the development time of products is to organize in project-based teams, which is an approach that creates a sense of urgency in the organization and accelerates the product development process (Vesey, 1992). Moreover, after the product has been released and transitions to a more mature state in the product life cycle, competition will be based on price, differentiation, or both (Levitt, 1965). The author further argues that to have a greater chance of succeeding in this stage of the product life cycle, organizations can create a preplanned program for market expansion before the new product is introduced to the market. Creating such a plan can steer the course and speed of ongoing technical research for the product, and while adjustments to the plan might be necessary due to unexpected events and changes in decisions, having a plan can help the organization be proactive rather than reactive to events occurring in the market (Levitt, 1965). Finally, the author argues that planning should focus on extending the lifespan of the product, leading to sustained growth and increased profitability for the organization.

#### 3.1.4 Knowledge and Quality

To gain insight into the association between knowledge and quality, an explanation of the subject must be made. According to Bergman and Klefsjö (2012), quality is the ability to satisfy and preferably surpass customers' needs and expectations, where quality development in an organization concerns continuous improvement before, under, and after the production of products or services. The authors further explain that the management of quality and quality development has many names, but a collective name has been created called Total Quality Management (TQM). Furthermore, Mukherjee et al. (1998) explain that TQM procedures impact how individuals generate new knowledge, which ultimately determines the performance of an organization. Linderman et al. (2004) further explain that since TQM leads to the generation of new knowledge and knowledge in an organization is an essential resource and a source of competitive advantage, the link between TQM and firm performance can be explained. A different perspective comes from Honarpour et al. (2012), who state that TQM provides a positive association with innovation. According to the authors, both TQM and knowledge management are long-term strategies aimed at fostering innovation and gaining competitive advantage.

Manghani (2011) argues that quality is essential to accomplish business objectives, as it is a source of competitive advantage. To achieve high levels of quality the author elaborates on the importance of establishing an overarching and integrated quality system to achieve the appropriate quality standards. In order to achieve this, the author emphasizes the management's responsibility to provide training and the right environment where employees across departments can improve processes. Lillrank (2003) describes the importance of creating routines and processes, allowing organizations to cope with and model the aspects of complexity and uncertainty by building frameworks on how to handle challenges. The author argues that the more uncertainty between the iterative usage of the routine, the more adaptable the routine has to be to produce unpredictable yet high-quality outcomes. However, processes and routines must be followed to provide value, where both relationships and structures are important for the successful leading and following of processes (DeRue, 2011).

#### 3.1.5 Knowledge and Culture

Culture can be described as the foundation of our social order, the unspoken and spoken rules people abide by, and the language used when speaking to each other, creating predictability in how individuals act (Schein, 2010). Bjurström (2016) describes culture as how a group acts every day, making culture embedded into everything ongoing inside organizations. Spender (1996) connects collective knowledge and culture by explaining it as a background practice that holds together the activity system. McCarthy (2005) argues that knowledge is sensitive to culture as the language and interactions between individuals and groups influence it, hence individuals inside organizations are vital to achieving a knowledge-sharing culture. However, managers must create an environment in which trying new solutions is promoted, individuals are not afraid to make mistakes, and where it is okay to not have all the answers (Bjurström, 2016). The author argues that to learn new things

it is essential that individuals do things they have never done before. Facilitating conditions for a desired culture is more than a pleasant intent for the employees of the organization, where Kanter (2006) argues that culture has the power to impact financial results, as an inclusive culture invites capabilities from throughout the organization to contribute. Additionally, Hofstede (2001) describes how culture is continuously shaped and reshaped over time as it is driven by both external and internal factors. Further, Azeem et al. (2021) highlights the importance of organizational culture as it provides a supporting platform for knowledge sharing, thus being key factors for an organization's sustainable competitive advantage as it fosters innovative capabilities.

How knowledge is accessed, transferred, absorbed, and applied within organizations is greatly influenced by social relationships and networks (Phelps et al., 2012). As leaders can impact how an organization is structured and operates, it is their responsibility to establish a structure that facilitates a culture that fits with the organizational goals (Bass & Avolio, 1993). However, knowledge and culture are not only important for the organization's performance, they are just as important for the well-being of the individuals within the organization (Chang & Lee, 2007). The authors argue that the functions of a learning organization can be strongly and favorably impacted by both organizational culture and leadership, while simultaneously having a notably favorable impact on workers' job happiness.

## 3.2 Knowledge Transfer Practices

Knowledge transfer practices are multifaceted where the sender and receiver use several mechanisms simultaneously to facilitate knowledge transfer (Nokes, 2009). Bakker et al. (2011) agree with this view as they argue that not one factor in itself is sufficient to facilitate knowledge transfer. Hence, enabling knowledge transfer depends on the situation, what knowledge is intended to be transferred, and the distance between the sender and receiver (Nokes, 2009). Teece (2000) argues that knowledge transfer historically has been seen as an output from R&D projects. However, Lauren and Pigg (2016) argues that there has been a shift towards an emphasis on multidirectional knowledge transfer, creating new challenges on how to overcome knowledge barriers. The stickiness of knowledge transfer is determined by three factors: the absorptive capacity of the recipient, causal ambiguity, and the relationship between the source of the knowledge and the recipient (Szulanski 1996). However, Porter (1985) is skeptical that any lessons learned by one business unit can be transferred to another, although it is a common hope within organizations. Instead of focusing on the sending and learning capabilities of knowledge, organizations should focus on fostering relationships between organizational units while simultaneously emphasizing the importance of communication (Szulanski, 1996). This aligns with Argote and Ingram (2000) who argue that: *“By embedding knowledge in interactions involving people, organizations can both effect knowledge transfer internally and impede knowledge transfer externally. Thus, knowledge embedded in the interactions of people, tools, and tasks provides a basis for competitive advantage in firms.”* Hence, knowledge transfer practices are not only about sending and receiving

but rather about the iterative process of collective learning and collaboration that takes place within organizations (Argote & Ingram, 2000; Porter, 1985; Szulanski, 1996). Additionally, López-Sáez et al. (2021) argue that knowledge integration is the most critical source to gain competitive advantage rather than knowledge itself. The authors argue that a seamless transfer of internal knowledge among various departments is crucial to ensure knowledge unlocks its full potential. Further, Cummings and Teng (2003) argue that knowledge transfer depends on both the extent of interactions between source and recipient, as well as the ability of the articulation process in which the source’s knowledge is declared for the recipient. Additionally, Söderlund (2008) highlights that knowledge transfer takes place continuously over a period of time. The success of knowledge transfer will depend on the ability to understand the knowledge context and to know how and where knowledge is stored (Cummings & Teng, 2003). The preconditions of the knowledge that ought to be transferred will then determine the needs of the knowledge transfer process (Goh, 2002). Thus, the establishment of processes that enable knowledge transfer between individuals is vital to ensure the diffusion of the acquired knowledge within organizations (Söderlund, 2008).

Landaeta (2008) argues that when knowledge transfer between development projects is successful the capabilities within the absorptive project team will increase, hence, boosting the overall performance of succeeding projects. Further, Grant (1996) describes the vital role of individuals regarding knowledge transfer. The author highlights the importance of creating conditions where professionals from different areas inside an organization can integrate specialist knowledge as input to tangible outputs through an effective combination of coordination and cooperation in the product development process.

#### **3.2.1 Knowledge Transfer in Manufacturing Organizations**

The manufacturing organization constitutes a specific type of setting that imposes both challenges and opportunities for knowledge transfer, where Cornelius et al. (2021) argue that: “*While research and development (R&D) plays a prominent role in manufacturing innovation, many improvements are created by front-line employees with deep specialist production knowledge*”. du Plessis (2007) argues that one of the biggest challenges for organizations is to convert the knowledge inside the organizations into innovations that drive profits. To facilitate knowledge exchange communication channels, the relationship between actors and learning capability is vital (Szulanski, 1996). Hence, organizations create structures to operate efficiently and coordinate work, and how organizations structure their business, will depend on what the business aims to achieve (Mintzberg, 1980). Mintzberg (1980) further argues that businesses that mass-produce, focus on flow and effectiveness and create an obsession with control throughout the entire organizational structure. Additionally, the author explains that formal communication is favored and decision-making follows a formal authority chain.

Processes that facilitate knowledge transfer take several different shapes depending

on what type of knowledge is aimed to be transferred (Mascitelli, 2000). The author argues that organizations that harness tacit knowledge which is learned through a lifetime of experience and learning by doing, elevate the innovative capability of the organization. Learning by doing is a powerful tool as it often enhances the learning experience to the learning process as knowledge can be connected to real-world examples (Chuang, 1998). For manufacturing organizations, a group of people who hold a lot of knowledge connected to learning by doing are people working in production environments (Cornelius et al., 2021). The authors state that innovations related to shop-floor improvements rather than R&D-driven innovations have less risk related to patents. Hence, including the great product knowledge of workers more closely connected to the manufacturing floor, can increase the innovative power with a low risk of patent infringements (Cornelius et al., 2021).

Learning organizations are ones where employees can always improve their ability to produce the desired outcomes, where innovative and creative ways of thinking are encouraged, and where employees learn how to learn together (Senge, 1990). Kotnour (1999) argues that without the right capabilities, organizations will not be able to deliver a series of successful product development projects. The author further states that the three core capabilities of a project environment are project management, learning processes, and the product itself. To enhance learning and facilitate knowledge for future projects, managers often perform lessons learned (Kotnour, 1999). The author argues that the benefits are twofold, firstly, it provides a framework that helps team members to reflect on the projects' performance, and secondly, supports the transfer of knowledge to future projects. The importance of transferring knowledge between development projects is further emphasized by Landaeta (2008), who argues that the performance of succeeding project teams will increase if learning from one project can be integrated into the next.

von Zedtwitz (2003) highlights the importance of learning through hindsight reflection on projects, while simultaneously proposing the following framework on how to perform post-project reviews. Firstly, reviews should be run like mini-projects, with the setting of goals, allowing for creativity, and working as a team. Secondly, an independent facilitator especially trained to run these types of review projects should lead the work. Thirdly, ensure that the team is prepared for the review meeting. Fourthly, select the right time and environment for the review meeting. Fifthly, invite key stakeholders of both the specific project and future projects. Finally, summarize the post-review in a structured document focusing on concrete conclusions and include assigned responsibilities for any remaining tasks. This overlaps with Landaeta (2008) who argues that in order to be successful with the knowledge transfer, the author recommends that project teams should select which team members are responsible for the knowledge transfer. The transfer should be performed with some selected team members who should have previous experience from knowledge transfer in earlier projects, have the capacity to understand the knowledge created in the project, and have good social relationships with members in the absorptive project (Landaeta, 2008).

#### 3.2.2 Knowledge Storage

Every action or decision made in an organization generates knowledge that must be stored (Tubigi & Alshawi, 2005). Chou (2005) explains that the main reason for the necessity of knowledge storage is that much of the knowledge generated is forgotten. The author argues that storing, organizing, and retrieving organizational knowledge is among the most important aspects concerning efficient knowledge management within organizations. However, the stored knowledge must be usable in the present or the future in order for the knowledge storage process to be worthwhile (Chou, 2005). Jasimuddin (2005) states that an organization that hoards its knowledge without utilizing it, is essentially wasting its resources and consequently forfeiting chances to gain a competitive advantage. The author further explains that storing irrelevant knowledge fills up the storage space with useless information, making the retrieval of useful information more difficult. According to Chou (2005), knowledge storage can affect the gathering and retrieval of knowledge positively or negatively. The author emphasizes that a positive effect is that knowledge storage can retain and apply effective solutions through standards and procedures, potentially accelerating task completion. Alternatively, a negative effect is that individuals' decisions may be influenced by context-specific and situated knowledge, thus, an individual lacking such information may lead to biases in decision-making (Chou, 2005).

There are many different ways an organization can store knowledge (Jasimuddin, 2005; Tubigi & Alshawi, 2015; Chou, 2005). Chou (2005) emphasizes the importance of IT capabilities in organizing, storing, and retrieving knowledge, which includes e.g. e-mail, databases, intranet, and written documents. Another way to store knowledge is within the heads of individuals in the organization (Jasimuddin, 2005). The author explains that individuals typically generate knowledge through their working process that largely remains stored in their minds. However, it is unlikely that any single member of an organization serves as the sole repository of its collective memory (Jasimuddin, 2005). Finally, the author states that social networks can significantly impact the gathering and retaining of knowledge in an organization, helping individuals locate and access this information.

#### 3.2.3 Knowledge Transfer Barriers

According to Yih-Tong Sun and Scott (2005), previous research concerning barriers to knowledge transfer has mainly focused on the climate of an organization i.e. creating an organizational culture that emphasizes a psychologically safe environment. The authors argue that organizational barriers differ on different levels e.g. on individual and team levels. An example of an individual barrier is the fact that many individuals fall into their own comfort zone, which leads to scripted behavior (Yih-Tong Sun & Scott, 2005). Alternatively, the authors explain that team-level barriers are mainly caused when socio-emotional needs are not fulfilled, which leads to a lack of trust within the team, which in turn determines what information each member of the team is comfortable sharing. The barriers mentioned by Yih-Tong Sun and Scott (2005) are further strengthened by Disterer (2001), who emphasizes that barriers to knowledge transfer can be caused by soft factors such as individual

or social. The author argues that on an individual level, barriers can occur from a loss of power for the individual in terms of e.g. job security or respect. He further argues that on a social level, conflict avoidance might stop knowledge from being shared, especially if it includes new or creative ideas. Hadi et al. (2022) highlights that much knowledge often is trapped within operational units in an organization. To address this issue, the author emphasizes the importance of specialized roles that focus on the facilitation of multidirectional knowledge transactions. Additionally, to streamline the facilitators practice, the authors argue that the facilitator will need tools set up for the facilitator which informs what knowledge is available in the organization.

Furthermore, Szulanski (1996) argues that barriers related to knowledge transfer are a lack of absorptive capacity, causal ambiguity, and an arduous relationship between the source and the recipient of knowledge. A lack of absorptive capacity means that recipients struggle to utilize external knowledge, which depends on their existing knowledge and their ability to effectively value, assimilate, and apply new knowledge for commercial purposes. Causal ambiguity means that the challenge of replicating a capability often arises from uncertainty regarding the factors of production and their interactions during the production process. Finally, Szulanski (1996) describes how success in knowledge transfer, especially when it comes to tacit knowledge, depends on the intimacy of the relationship between the source and the recipient of knowledge.

### **3.2.4 Knowledge Transfer Technologies**

Technology is essential for business operations, where the firm's capacity to gather and process information is a key driver in strategic competition (Spender, 1996). According to Albino et al. (2004), the value of technology in knowledge transfer relies on its alignment with various factors, including the cognitive processes, the cultural context of the transfer, and the objectives of the transfer itself. The authors argue that the approach to fostering knowledge transfer technologies may vary based on whether the knowledge is tacit or explicit, where explicit knowledge is more suitable for utilizing these technologies. They further argue that technology can enhance the efficiency of knowledge transfer by accelerating the speed of transfer and reducing costs associated with time and distance. However, in certain instances regarding tacit knowledge, technology appears to be insufficient in providing tangible value to the process (Albino et al., 2004). Furthermore, organizations must decide whether to create the knowledge transfer technologies themselves or to source them from an external service provider (Chang & Gurbaxani, 2012). According to Chang & Gurbaxani (2012), there has been an increasing number of organizations deciding on the latter and studies have shown that external knowledge transfer technologies contribute to enhanced productivity. The authors argue that large organizations with high amounts of data, gain a large benefit from using external services compared to smaller organizations with less data. Another aspect organizations must take into consideration is whether to use a centralized or peer-to-peer knowledge management system (Maier & Hädrich, 2006). According to the authors, a peer-to-peer knowledge

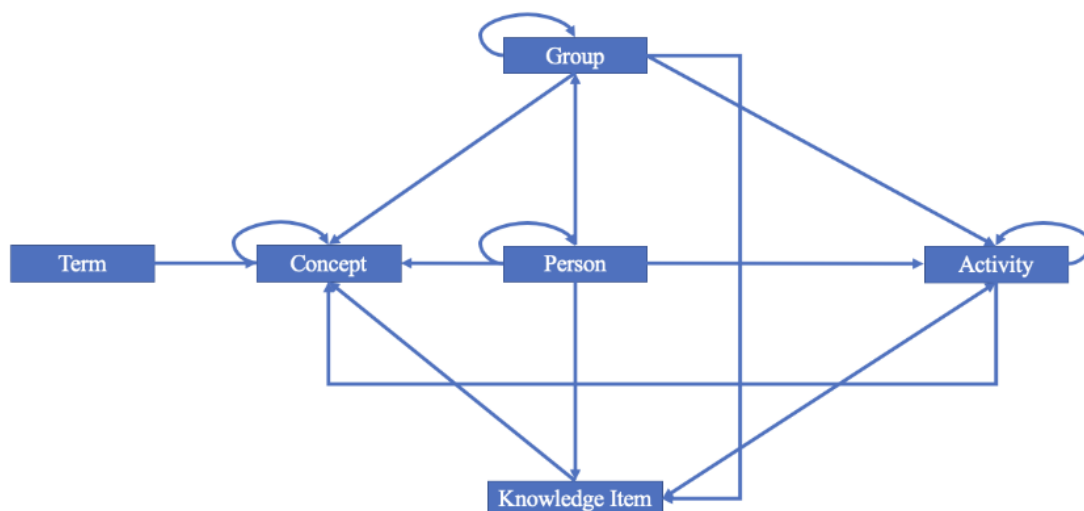
management system is less time consuming to build, yet suffers from technical and organizational issues such as a lack of structure and coordination between peers. They further argue that a more centralized knowledge management system, though time consuming to build and maintain, often satisfies the expectations organizations have concerning knowledge management.

#### 3.2.5 Knowledge Mapping

Organizations need the capacity to continually gather important knowledge in its various forms, adapt to new knowledge, and make it accessible to all members across different hierarchical levels in the most suitable formats (Vail, 1999). The author further states that they must cost-effectively accomplish this which can be achieved with knowledge mapping. According to Dang et al. (2011), knowledge mapping is especially important in fast-growing markets, where new knowledge is rapidly created. They explain that knowledge mapping portrays the overall knowledge within an organization, granting individuals support in searching for and understanding knowledge. Additionally, the authors argue that visualizations are essential for efficient knowledge mapping since they simplify the learning, exploration, searching, or analyzing of knowledge within an organization. Vail (1999) argues that knowledge mapping is an efficient way of capturing and sharing explicit knowledge as well as helping individuals find holders of tacit knowledge. He states that knowledge mapping offers essential support for ongoing organizational learning and that the map can act as the organization's evolving memory. Moreover, Driessen et al. (2007) add to the concept of knowledge mapping by arguing that organizations will require several different knowledge maps and that the variety as well as a wide range of possibilities to map knowledge, create the need for a simple framework.

The knowledge mapping framework of Driessen et al. (2007) illustrated in Figure 3.3 consists of two elements, *entities* and *relationships*. Entities represent the categories involved in the organization's knowledge processes. The categories presented in the framework are *Activity*, which represents any activity of interest that is performed by an organization. *Concept*, which serve as the basis for categorizing knowledge within the specified knowledge domain. *Term*, is all keywords that could be used to describe the given concept. *Group*, is any group of individuals that are of interest to the concepts, these could be formal organizational units or informal sets of individuals. Additionally, groups can also consist of more levels of groups. *Knowledge Item*, is objects that hold information considering knowledge or pointing to knowledge. *Person*, is individuals relevant to the concept both internally and externally of the organization. Relationships represent the interactions between the different entities depending on the knowledge situation, which are represented by arrows and are the following for each entity. Activity has three relationships. Firstly, it has a relationship with itself as activities can be hierarchically structured and have relations to sub-activities. Secondly, activities can produce knowledge connected to a knowledge item hence connecting the two entities. Thirdly, activities require expertise on certain concepts and are therefore connected to concepts. Concept can be associated with, or be sub-concepts of another concept and are therefore only

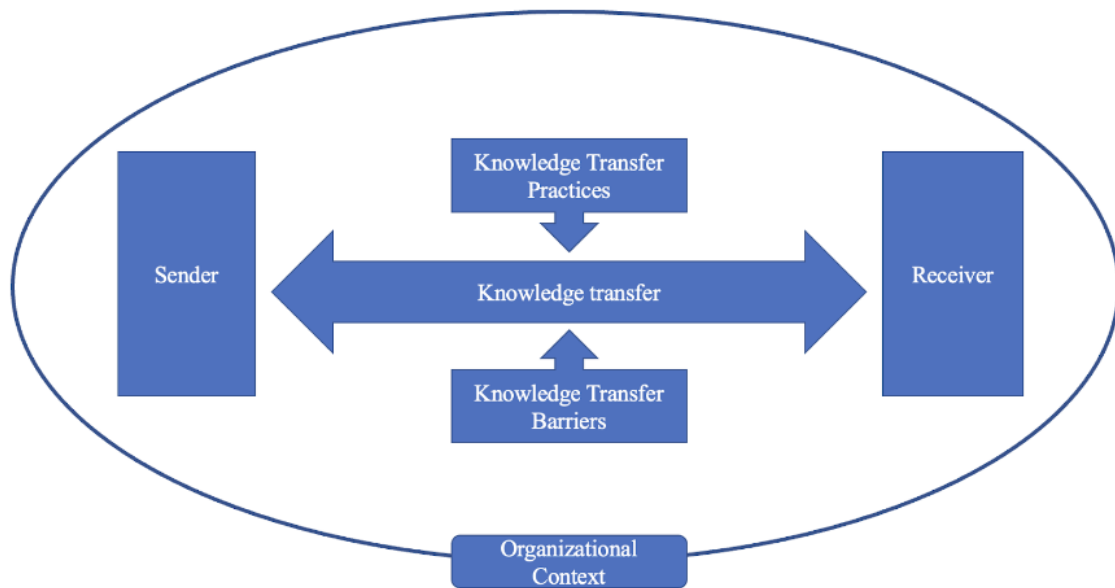
associated with other concepts. Group has three relationships. Firstly, they execute and hold expertise on activities and thus are related to activities. Secondly, they have expertise in concepts and thus are connected to concepts. Thirdly, they could be a subgroup of another group, thus being connected to groups. Knowledge Item has two relationships. Firstly, they may contain knowledge required to perform or describe certain activities and are thus related to activities. Secondly, the knowledge items are the product of a concept and thus are related to concepts. Person have five relationships. Firstly, individuals can access knowledge items, thus are related to knowledge items. Secondly, persons and groups create the knowledge items, thus relate to them. Thirdly, persons execute and hold expertise on activities, thus are related to activities. Fourthly, persons or groups that hold the expertise are interested in certain concepts, and thus are related to concepts. Fifthly, persons are a part of groups and thus are related to groups. The final category Term is different preferred ways of articulating the concept and thus are only related to concepts.



**Figure 3.3:** Knowledge Mapping Framework from Driessen et al. (2007).

### 3.3 Knowledge Transfer Framework

Figure 3.4 illustrates and aims to explain how the theoretical framework's concepts connect to the knowledge transfer process and its components. Furthermore, Figure 3.4 also serves as a framework to structure and analyze the empirical findings of the study.



**Figure 3.4:** Theoretical framework (Own illustration).

The knowledge transfer process consists as previously described of two sides, the sender and receiver of knowledge (Nokes, 2009). Thus, making up for the two actors in the framework. How well the knowledge transfer will work between these actors will be determined by the interactions of individuals inside organizations (Argote & Ingram, 2000). The flow of knowledge is a two-way street as knowledge transfer is not only about sending and receiving both tacit and explicit knowledge but also about the iterative process of collective learning and collaboration (Argote & Ingram, 2000; Nonaka, 1994; Porter, 1985; Szulanski, 1996). Hence, knowledge transfer is illustrated with a double-edged arrow to emphasize this interaction. Knowledge transfer will be directly impacted by knowledge transfer practices as the processes chosen to transfer knowledge must align with the preconditions of the knowledge that ought to be transferred (Goh, 2002). Further, knowledge transfer barriers directly impact knowledge transfer as recipients must have enough absorptive capacity to overcome the causal ambiguity, while the transfer throughout is impacted by the relationship between the sender and recipient (Szulanski 1996). Thus, these two factors are illustrated as arrows which affect the knowledge transfer. Additionally, knowledge transfer occurs in an organizational context that encompasses the structural and cultural environment that either facilitates or hinders the transfer (Foss & Pedersen, 2002). Therefore, the organizational context is illustrated as a frame that encapsulates the other activities that occur.

# 4

## Empirical Findings

The empirical findings sections will follow the structure of Figure 3.4 and begin by describing the organizational context of the case study, knowledge transfer practices implemented by the organization, knowledge transfer barriers described by respondents, additionally, improvements suggested by interviewees that could facilitate knowledge transfer are included to incorporate employees viewpoints of what could be improved.

### 4.1 Organizational Context

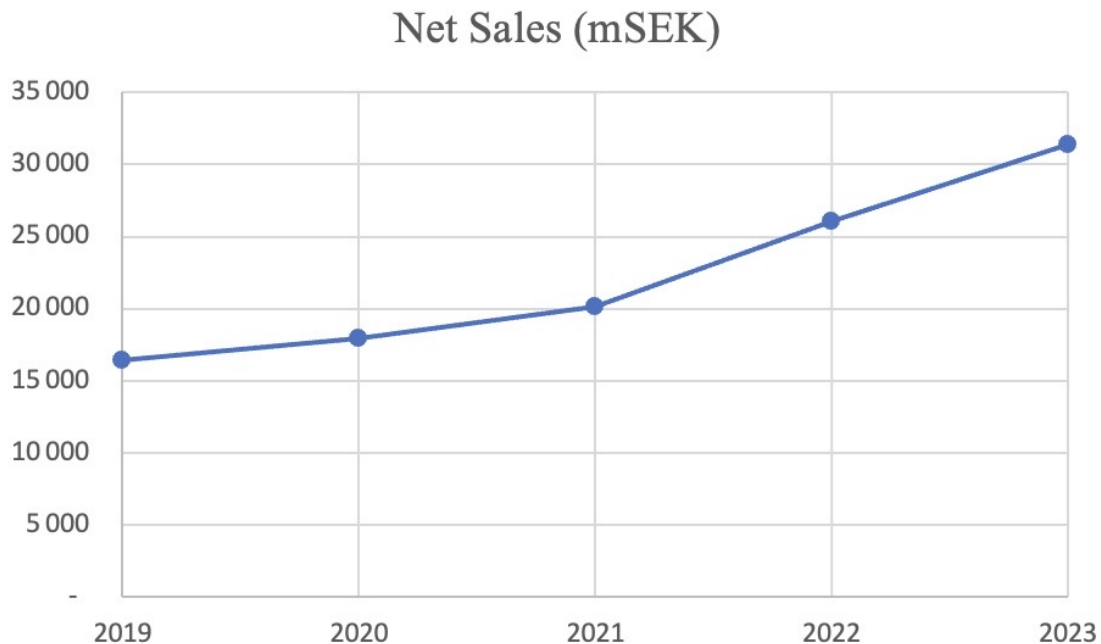
The case company is dedicated to achieving “*World-class solutions in sustainable energy*”. This commitment is demonstrated in the case study performed at the subsidiary which develops, produces, and delivers energy-efficient products that secure a comfortable indoor climate. The global shift towards sustainability has spotlighted the importance of heat pumps, a market that is experiencing rapid growth due to the increased awareness of the climate crisis, which forces people and companies to search for more sustainable choices (Executive Summary – *The Future of Heat Pumps*, n.d.). In this context, the technologies of the case company offer a sustainable energy solution as the heat pumps utilize energy already existing in the air or water and extract energy which leads to less electricity needed to heat or cool buildings.

The market’s swift expansion has been noticed by the employees at the case company, where respondents have noted growth across all organizational departments in recent years to meet the demand for their products. Consequently, several challenges have occurred as employees have struggled to keep up with the pace of growth. However, in the last months, there has been a decline in demand due to increased interest rates and fewer new house constructions, which has allowed employees to catch up and structure work processes to better suit an enlarged business climate.

*“Had you asked me about the company’s growth journey four months ago, I would have said that it has exploded in size. Currently, it has scaled back a bit, but since I started here, it has evolved from being a small large company to a large large company. The company has outgrown its suit several times over and the organization has struggled to keep pace with the rapid growth; it has almost felt like expanding too quickly without being able to meet the demand for its products, until now, when things have slowed down again. However, a lot of new processes and*

*work methods have been introduced, while many people were hired, and for a quite long period, the challenge was to get the structure in place. Only more recently has it managed to establish a structure that facilitates collaboration between departments within the larger company. [...] There have been growing pains for many years, which has been a very exciting development, and even though there's a slight dip in the curve right now, there is confidence that it will turn around.” (R15)*

Respondents' descriptions regarding the organizational growth are strengthened by the financial numbers of the business area. The net sales of the business area have increased from 16,430m SEK in 2019 to 31,373m SEK in 2023 (Year-end Report 2023, n.d). Figure 4.1 illustrates the growth in net sales between the years of 2019 and 2023.



**Figure 4.1:** Net Sales of Business Area (Year-end report 2023, 2024).

### 4.1.1 Departments

The case study examines the internal context of knowledge transfer at the case company, located in a Swedish village. However, due to the need for specialized knowledge not attainable in the village, the company has opened satellite offices in other Swedish cities. These offices are assigned to the specific departments at the case company, thus, not affecting the organizational chart. The departments studied are illustrated in Figure 4.2. Throughout the interviews, it was emphasized that the departments work as independent business units responsible for delivering their assigned tasks, and even though there has been an improvement in cross-functional collaboration, they still mainly focus on their departments. Thus, each department makes up a line in what respondents call the *line organization*.

*“People still tend to stay a bit within their departments and work on their specific functions, however, cross-functional collaboration has improved which has started to dissolve some tensions in the collaboration between departments.” (R15)*



**Figure 4.2:** Departments of the line organization in the case study (Own Illustration).

The method of choosing the siloed organizational method has its implications, departments tend to be effective in the execution of their task. However, the interviewees emphasize that there is a risk of sub-optimization as departments focus on their interests, not accounting for other departments’ needs.

*“The line organization structure is not always great due to the difficulties in communication between departments, which may lead to departments not always collaborating optimally.” (R8)*

#### 4.1.2 New Product Development Projects

The case company develops new products by running projects, where one product is developed by one project. During the development of products, participants from each of the siloed departments participate to ensure that their interests are taken into account. Products are segmented into different programs depending on the type of product it is, and strategic decisions are taken on a program group level. Although all staff within the departments can work on all types of new product development projects, the case company has chosen to allocate specific staff to each program group as projects within programs often build on each other, allowing for closer relationships within teams. This is a natural transition as one project often ends as another starts, and facilitates a climate that enables knowledge transfer from one project to the next. However, this way of working has some drawbacks as it demands practices for exchange learnings between program groups as there is less natural interaction between the program groups.

*“Product development takes place in a project format, with each project dedicated to developing a single product. [...] All project members are*

*capable of working across various types of product groups. [...] In recent years, there has been a recognition of the need to address the long-term strategic requirement for product groups. Consequently, program groups have been established to strategically oversee the overall direction that the product group should pursue.” (R4)*

How projects are run by cross-functional teams with employees representing each department of the organization is illustrated in Figure 4.3. The project’s team members balance between performing tasks that regard their departments’ daily operations and what is demanded by the projects. Hence, employees work both with the existing products of the organization as well as the products of the future. Thus, projects are dependent on the individuals who build up the project team to achieve the desirable outcome of the project.

*“The line organization is involved in the projects from the start, there should be representatives from every department involved. Then there is ongoing communication during the lifespan of the projects between representatives from every department. However, it is up to each individual to engage with the information provided by the projects.” (R10)*



**Figure 4.3:** How New Development Projects are run by cross-functional teams (Own Illustration).

### 4.1.3 Culture

The company as an organization works and spreads knowledge efficiently within its different departments, but has a harder time with cooperation across departments. When asking the interviewees about how this affects the organizational culture, many of them explained that the different departments work more like small companies within the bigger company and they use downpipes as a metaphor for this division.

*“The company is heavily divided between its downpipes.” (R2)*

Not only do the different departments work as small companies, but the individuals themselves behave like independent entrepreneurs. Thus, every individual is responsible for gaining the knowledge required for them to be effective in performing their work. Another part of the organizational culture is that every individual has their responsibilities and focuses their full attention on completing their assignments, without thinking too much about what other individuals do. The individuals become efficient in their area of expertise, but there are some instances where two individuals might work on the same thing without knowing it.

*“Everyone is like a small entrepreneur within the company. Sometimes it might lead to you stepping on other people’s toes.” (R8)*

Something that strengthens the entrepreneurial culture of individuals in the organization is the fact that the working area for white-collar workers is divided into individual offices. This improves the efficiency of individuals since they don’t get disturbed by others, but it also makes it more difficult and less comfortable for individuals to ask small questions to each other.

*“You sit in your own office, not in an open landscape. The exchange of knowledge is worse in individual offices as one does not ask the “speaking of” questions where one might only ask a small question.” (R15)*

Even though respondents emphasize that the communication between the departments seems to be lacking, it has improved a lot. However, the more time spent on communicating between the departments, the less time is spent on actual work within the departments.

*“Right now, a collaboration between the departments is developing in a way that has not been done before. [...] The more you talk to people outside your department, the less time is put on ‘actual’ work.” (R11)*

As previously mentioned, the company has grown into a large organization in a short amount of time. Because of this, respondents have described it as that the company has kept the spirit of a small organization even though it has become a large one. This spirit of a small organization is an open culture with a nice atmosphere, where people are not afraid to ask questions and do not feel judged for asking them.

*“We have an open culture if people have questions. [...] Now that there are so many of us, it is valued that we should feel like a team. [...] Keeping the small company in the large one.” (R12)*

The spirit of a small organization is also shown in the organizational process concerning decision-making. A metaphor several respondents have used to explain this is that the organization is the flattest pyramid in Sweden, meaning that the different departments in the organization are more or less independent, but they all to some degree depend on decision-making from high-level management.

*“It is the flattest pyramid in Sweden. A strong hierarchical organization which reflects on the various managers in the organization. You often*

#### 4. Empirical Findings

---

*have to take things high up in the organization to get approval on a request.” (R15)*

Something that emphasizes the importance of having an open and pleasant atmosphere in the organization is the keywords *hello*, *thank you*, and *sorry*. These keywords are the organizational values that lead to a prestigeless atmosphere where it is okay to make mistakes and help will always exist for anyone that needs it.

*“Hello, thank you, and sorry are our core values in how we act” (R12)*

Many of the interviewees argue that one aspect of the organizational culture is that problems get addressed when they emerge instead of trying to prevent them. This is clear when they are asked about education within the organization, where education seems to be done in an area where there is a need for it, and not strategically planned in advance.

*“Education within the organization tends to be run because it is needed at the moment, but then it is not followed up. There is no system for which courses need to be taken.” (R5)*

From the interviews, it is clear that relationships are an important aspect of knowledge transfer at the company, where many respondents argue that knowledge transfer heavily relies on utilizing soft values and making sure individuals work well together. Furthermore, interviewees emphasize the lack of systematic processes and procedures for knowledge transfer between project groups and the line organization. However, as earlier mentioned it is the same people who work on projects and in the line organization so the knowledge transfer rather occurs continuously throughout the projects than at the end. Thus, knowledge transfer between the departments occurs mainly because of the relationships of individuals working together to develop or improve products.

*“There is no systematic exchange of knowledge between projects to the line, but becomes more of a relationship-based exchange of knowledge.” (R9)*

It is clear from the interviews that working with new projects and working in production differs a lot. Respondents argue that for them to work and collaborate efficiently, they must be located close to each other.

*“You benefit from sitting in connection with each other as there are values that you cannot put money on having production close to your product development. If you are close to production, you can be more successful with your product development.” (R16)*

An attempt to help knowledge transfer by placing individuals from different departments close to one another is the construction of the case company’s new innovation center. According to respondents, this building was created because the organization became too spread out due to its rapid growth and they wanted to centralize the development of new products to one building as well as having lab testing close

by. They further argue that the innovation center makes social interaction between individuals from different departments more natural when they sit close to each other.

*“The new innovation center supports knowledge transfer. [...] One of the most important parts of ensuring knowledge transfer is to construct social environments so that those who work on the same things can sit together and talk about the topics.” (R6)*

## 4.2 Knowledge transfer practices

The importance of leveraging existing knowledge within the organization, to develop new products or improve the current product portfolio was emphasized by the interviewees. The ability to transfer knowledge between departments and projects enhances innovative capabilities as well as prevents the risk of repeating mistakes.

*“The diffusion of knowledge throughout the organization is of great importance as it decreases the risk of reinventing the wheel, hence, saving both time and money.” (R6)*

Throughout the interviews, the respondents shed light on the importance of work processes and routines to facilitate knowledge transfer. However, the respondents collectively emphasize the challenges of consistent process adherence and describe how the company has quite a few processes that are up to individuals to interpret how to implement. While flexibility in the process framework enables the applicability of the process to real-world challenges, there is a risk that employees make too many deviations from the routines.

*“If you compare with other industries, we have quite free and relatively few processes. However, the first step is to follow them, and there lies a bit of the challenge in getting everyone to actually do what they are supposed to do. Then, it’s okay to make exceptions, but you should know why you are deviating from the processes.” (R4)*

Additionally, respondents did not only emphasize the freedom of interpretation of processes but also expressed the problem of leveraging the existing processes. The respondents have argued that the issue might not be that there is not a specific process of procedure but rather an issue with adherence to that process.

*“A typical issue for this company is that you come in as a new employee, identify a problem, and conclude that to solve the problem you need to create a new process. However, the issue is that there already is a process that could handle the problem, but the process is not followed by the employees.” (R2)*

The processes of the company are documented based on earlier experience and reflections. They often take the form of checklists that are used to ensure the com-

prehensive coverage of necessary tasks while simultaneously facilitating the transfer of knowledge from previous projects.

*"The processes that are documented reflect our past experiences. [...] We work a lot with checklists, and that is also a way to document and spread knowledge for future tasks, ensuring that aspects of future tasks are checked against things we already know can go wrong." (R6)*

However, the checklist might be applicable for specific repeatable tasks but when it comes to new challenges respondents explain that the search for new knowledge is much up to each individual. An approach that imposes responsibilities on individuals to find a way, having to navigate themselves to find the accurate knowledge for the challenge they face. Thus, employees repeatedly express the lack of continuity and lack of standardization of practices.

*"Historically, one has had to find ways to learn things, which is something that persists, meaning that people often have to teach themselves by doing things. [...] The lack of standardized methods for performing various tasks results in a wide variation in how different individuals carry out their work." (R13)*

Individualistic thinking when it comes to how things are done has had its advantages as it allows individuals to set up a system that works for them and enables a way of working that suits their way of learning. However, it simultaneously creates pressure on individuals to search for knowledge.

*"We believe in the individual-based approach to both assimilate and convey knowledge, where each person reflects on what works for them. And there probably isn't a one-size-fits-all approach; instead, each individual must find their way to best acquire knowledge." (R16)*

However, not everything is up to individuals as departments have set up specific routines and work processes in which employees work and share experiences. The interviewees all described structured work processes which are set up as different types of meetings within departments that are used to update each other about what they currently work on. These meetings are aimed at sharing experiences with the help of different ways of storytelling. Ranging from an oral description to whiteboard meetings where the team members of the R&D department have quick standing checkups with predetermined topics that they cover to easily and visually describe who is working on what in the upcoming week. Even though interviewees repeatedly described structured working processes inside departments that facilitate knowledge transfer, they simultaneously emphasized the deficient processes between departments. They emphasized that there was no clear routine in how to share information, that there was unclarity in what to share, and that although there are no secrets between departments there are possibilities for more knowledge sharing.

*"There is no explicit routine for how and what information you need to communicate to another department. Thus, there are sometimes uncer-*

*tainties about what needs to be shared. [...] It's not about keeping secrets, but there are sometimes problems with routine communication.” (R10)*

Furthermore, much of the knowledge transfer between departments occurs through project meetings, where individuals from the different departments can discuss e.g. if changes are planned to be made on the product. When asking the interviewees, it is clear that many of them like these meetings and emphasize the importance of having conversations with every involved department in an early stage of the project to minimize costs and improve efficiency. Furthermore, these meetings take place continuously throughout the project.

*“Meetings take place continuously all the way to a finished product. [...] Trying to solve as much as possible, as early as possible.” (R7)*

However, having all these project meetings across departments is time-consuming, which means that less time is spent on actually working on the project.

*“We have a lot of different meetings with different people. [...] A disadvantage can be that you only sit in meetings and do not get anything done yourself.” (R12)*

Respondents have emphasized that the lack of an explicit routine on how knowledge is shared favors those with comprehensive social and professional networks within the organization. The most common way for employees to find knowledge is to ask an expert on the topic. However, it can be hard to find the right balance for collaboration as if you put too much effort into networking you will take time off from your main tasks. Additionally, respondents have emphasized that this way of doing things allows them to become experts and simultaneously very efficient in what they do, but it can be frustrating when you do not find the right person to provide the information that you need to overcome the challenge you currently face.

*“It's a big advantage if you know a lot of people and have been here for a long time, so you know who to talk to if there aren't any routines for it, and unfortunately, that's often the case. So, we have also started to focus more on documenting routines and guidelines that exist in people's heads or might be on some document somewhere where it can't be found, so it's not officially available. [...] Additionally, it's difficult to get the cooperation between the different groups to the right level.” (R7)*

However, the description of there being no explicit routine is not entirely true as new product development projects are structured in a standardized way. Thus, creating natural meeting points during different periods of the project. The respondents have emphasized that the process of building early versions of the new products is an especially important aspect of the project. The prototype buildings gather stakeholders from different departments and facilitate an environment where feedback is input to the projects. However, as these constructions are just on a few occasions during the project, there is a need for other continuous cross-functional interactions. One stakeholder especially important for facilitating the collabora-

tion between the departments involved in new product development projects is the project manager for industrialization. They work to establish communication channels between stakeholders, trying to incorporate feedback into the project as early as possible throughout the project. However, even though there is a standardized routine that they follow, each project manager works and communicates a bit differently.

*“Much rests on the industrialization project manager to ensure that communication is managed between the departments. [...] Production engineers try to be involved as early as possible in the project. It varies between projects and project managers how well the information exchange works. [...] Depending on the project managers’ experience, they work in slightly different ways, and then there can be friction in the communication and cooperation between the stakeholders of the project group.”*  
(R13)

The respondents have emphasized that it is when they are working on a task in collaboration with others that they learn new things. They believe that it is by doing things they learn, not by getting something presented to them orally or through text. Instead being a part of a team that faces and overcomes a challenge makes it easier to repeat the task if it occurs again in another project. Further, as new development projects are done in a stage-gate model, the ones who collaborate will be determined depending on which stage the project is in.

*“Being involved in the project and doing things is what’s important for achieving knowledge transfer. That one knows where in the project they are, who to collaborate with, and what to do in different phases of the projects. [...] Every activity you do on your own is supporting activities for the project. However, it’s when tasks are performed that one can learn from what you are working on.”* (R16)

When new product development projects are finished, the responsibility for the further development of the product shifts within the R&D department. The project moves from being in the hands of the project organization to being in the hands of Product Development and Improvements (PDI). There is a formal handover where the project has aligned the known issues that will be transferred to the PDI department. However, there is not a specific process for knowledge transfer during this handover. During the handover, the projects create an issue list regarding the remaining issues, which due to time limits will need continuous work after the product is released to the market. The issue lists vary in size and comprehension, hence, not one project handover is the same as the other.

*“There is a handover between the project and line organization when the projects are concluded. [...] The handover is formal, however, there are a lot of potential improvements to be made regarding the topic of knowledge transfer.”* (R10)

The collaboration between departments does not limit itself to only occur in the

context of new product development projects, it also happens continuously through the daily operations. Respondents have emphasized that there might be a lack of predetermined channels of communication that facilitate this collaboration, rather the collaboration is based on the personal relationships and networks each employee has established at other departments.

*“There is contact between the lines in the organization, not only in the projects but also in the daily operations. There might not be a formal channel of communication between the different departments, but one often uses personal relationships to go directly to the source, which works in many cases, but sometimes some parts of the chain are missed. Hence, personal contacts are vital at the company to find the right person directly.” (R17)*

Respondents have described that knowledge is exchanged and learning occurs mainly when tasks are being performed collectively with other stakeholders. It is during the execution of a task that you can leverage your expertise and complement each other’s roles that you learn and gain an understanding of stakeholders from other departments’ skills and challenges. However, you can not collaborate at all times as each actor must perform their specific task to prepare and enable the possibility to get together and learn. Even though you might not exchange competencies each day you make sure to utilize the knowledge you have learned through the interactions with other stakeholders. Thus, respondents have argued that the ability to perform the work your specific occupation requires could be seen as a supportive activity that supports both the project to move forward and the learning process.

*“It’s when we do things together that we best utilize our competencies. When we set up the specifications to create a new heat pump with specific properties and start working together, only then can we ensure that we’re utilizing the competencies inside the company.” (R16)*

Interviewees have emphasized that strong personal networks spanning multiple departments are key to attaining results within the organization. The reason for this has been explained that a lot of information is transferred through word of mouth instead of taking more formal routes. When it works it creates speed and a call for action on the problems you face. However, it can be difficult for individuals to know what route to take for the information. Additionally, if the interaction takes place in isolation, important stakeholders might miss out on some important information.

*“A lot of information is spread via word of mouth at the company, which means that you must know who holds what types of competencies. This can lead to new employees having to be bounced around for a while before they find the right path towards who holds what competence.” (R13)*

Respondents continuously emphasized how knowledge transfer often takes place when working together on tasks. People gather when they work together on a problem they face, therefore problems are essential to achieve knowledge transfer. Problems can also be used during the storytelling about what individuals have worked

on as they share a break with a colleague, thus, creating a setting where newly won knowledge can be shared. However, the interviewees all highlighted that there is a lack of a standardized and systematic approach to achieve knowledge transfer.

*“Knowledge transfer usually happens between individuals spontaneously over a coffee. That’s where I tell a colleague about the things I have experienced in what I am working on today. [...] A lot of knowledge transfer also occurs when things go badly, there and then it becomes a type of knowledge dissemination. But what’s missing is the systematic approach that creates added value.” (R1)*

The interviewees continuously mention the importance of personal networks within the company. This has led to individuals having to build up networks to perform in the business climate of the company. However, as the networks are established, information tends to flow quickly and reach a lot of stakeholders.

*“At the company, knowledge spreads very quickly when something is very successful. To give an example, just six months ago, we made a new invention where we achieved much better results than we expected, and then the information spread quickly without needing to say anything to spread the word.” (R8)*

Another topic when it comes to knowledge transfer regarding communication is the inclusion of a why when pursuing changes in all types of forms. Heat pumps are complex products and there could be reasons why something must look a certain way in a certain product but differently in another. Hence, respondents explain that they would like to have a description of why a decision is taken as it has been done. If you could include a why, individuals can accept more significant alterations to the products and stakeholders at least know that their interest is taken into account.

*“It’s important that we state why we are making a change. Finding a reason for doing things provides clarity and explains why something is being changed. [...] A reason why something is important in one case versus another provides clarity as to why it must be done.” (R3)*

Respondents have explained that the line organization at the company creates an environment that allows for specialization and that each department becomes efficient in performing its assigned task. However, this creates a problem as the environment allows for a few employees to hold core competencies in special areas. Hence, creating a bottleneck and dependency on a few very knowledgeable individuals, which has to be consulted depending on what the issue regards.

*“I would say that we are not very skilled at documenting, it’s not so easy to find information. I mean, it’s just that people have information stored in their heads so it’s about asking the right question to the right person to find out things. [...] I see that there are very big risks in the company that some people hold a lot of knowledge, and when they leave, the knowledge disappears because it hasn’t been documented. Then there’s*

*a lot of knowledge that is hard to document, but maybe it should be done to a certain level.” (R9)*

The company comes from a period of growth where a lot of new employees have joined the organization in all types of positions. Regarding white-collar workers, the interviewees emphasized that the expansion has made them question why they perform their job the way they do, as new employees have asked those types of questions. However, it is not in the training programs that new employees learn the majority of their new jobs at the company. Respondents have instead emphasized how they believe in learning by doing and how they allow people to make mistakes and then correct them. Although this has impacted a bit of the gradual learning curve and much responsibility has been placed on the employees to learn their new profession, it has also allowed engaged employees to rapidly get up to speed at their new job.

*“It’s through mistakes that we develop. It’s not that we should encourage mistakes, but when they do happen, that’s when we should learn from them. That’s what leads to our development and builds knowledge. [...] We’ve lost some of the gradual knowledge transfer during new employee orientation because we’ve grown so quickly lately, and also because we are now located in multiple places.” (R9)*

However, the greatest expansion and turnover of new employees in recent times has been regarding blue-collar workers. This has created the need for a standardized three-day introduction program. The respondents have described how they have set up what has gotten the name of the company’s school, intending to introduce new recruits to the company values and make them learn the tools and practices they will need as they work in production. The three-day program sets up new employees with the right skills to allow them to work proficiently in production. However, training does never end as there are always more stations and skills to learn and when you can do more it increases the flexibility of the whole team. The production managers document which stations the employees can perform in an Excel sheet. This sheet is then used so the production manager can determine which stations require more training.

*“A new employee in production receives a 3-day introduction before starting work in production. Day 1 is about the guiding principles: Hello, thank you, and sorry - guiding principles. Days 2 and 3 are the first days at the company school - Here we teach the basic skills about how to work with the tools and the terms that will then be used in daily work. There is also an opportunity to test the tools. Additionally, training on other necessary tasks is provided. Day 4 is the introduction to production. Safety - Quality - Quantity, in that order, is how we work in production. A mentor is assigned who determines when one is a worthy team member so that one can replace another. Then, further training is provided so that one can learn other stations. One never learns the entire line; there should never be someone who only knows one station, but one needs to*

*know a few stations well to build flexibility to handle absences for various reasons.” (R3)*

### 4.2.1 Technological Tools

Most interviewees emphasized the importance of utilizing technological tools to help with storing and spreading knowledge in the organization. Additionally, they argue that information should be easily accessible by the authorized personnel in the organization and that technological tools can be used for this purpose.

*“It should be easy to search and find information, therefore technological tools are of great importance.” (R4)*

Technological tools for knowledge transfer at the company seem to be lacking when asking the interviewees, but they know that they must improve in this area, and see the potential for improvement.

*“It can help immensely with technological tools. Today there is not much, but we can see great potential for improvement.” (R5)*

As previously mentioned, the different departments work more or less independently and have different processes and work routines. Similar to this, there is no centralized routine for using technological tools within the organization. This means that each department uses the tools that work for them, which might be different from what is used by other departments.

*“The company has a slightly decentralized way of thinking when it comes to using tools. Different departments choose and use tools according to their needs.” (R4)*

An example of the decentralization of technologies is that R&D uses their own database for storing and retrieving knowledge. The data is available for individuals from other departments, but they use different systems to search and find the information they need.

*“The information from our database is there for other departments as well.” (R7)*

However, in the production department, technological tools do not seem to be very important regarding knowledge transfer. In this department, it is mostly managers in collaboration with the quality department that utilize technological tools to solve problems that might be detected in products.

*“For the production staff, technological tools are not very important. Technological tools are instead used more on the supervisor side, who together with the quality department collaborate to solve problems.” (R3)*

Technological tools that are used for knowledge transfer throughout the whole organization do exist to some extent, one of them is Microsoft Teams. This tool is

used at the company to create online meetings within and across departments to make interactions more flexible in case individuals are not in the same location. Additionally, conversations from Teams can be logged and stored, however, this is not a centralized work routine and is mostly used within departments.

*“It’s starting to get better when trying to have conversations and log data in tools like Teams, but it’s more in smaller groups internally in departments.” (R13)*

Another technological tool used by most individuals in the organization is their file server, where e.g. information from previous projects is stored. This is an expansive data set with many folders within folders, which makes navigating and retrieving information challenging for individuals who don’t know where to look.

*“There is a file server where we document and create a knowledge bank to understand how things have been solved in the past. [...] We have a folder structure that is not so modern.” (R6)*

An attempt has been made to make a centralized technological tool where every department can store knowledge for the whole organization through their new management system. With this system, many documents have been updated. However, it is clear from the interviews that the system must be used and updated continuously, otherwise the individuals from the organization will stop using it.

*“We have a new management system and it could have been used more and better. It is important that you have live documents that say where you can find certain data.” (R9)*

## 4.2.2 Lessons Learned

A process used at the company for knowledge storage is something called *Lessons learned*, which according to the respondents, is a way for project participants to reflect on what they have learned and what they could have improved after a project has ended. This is a process that must be done at the end of each project, but respondents feel like little effort is put into making them.

*“Learning logs are part of the final report, but they are hardly used anymore.” (R6)*

According to respondents, the lessons learned documents are easy to understand for the people who wrote them, but not for others who did not.

*For the person who writes, it is obvious what it is about, while for the person who reads, it is difficult to understand what is meant. (R5)*

Another thing highlighted by the respondents is the fact that the process is done at the end of a project, which means that many of the potential lessons learned might be forgotten by the time it is supposed to be documented.

*“It’s too late to just do lessons learned at the end of a project.” (R9)*

However, an attempt to make the lessons learned more useful has been made with the usage of Failure Mode and Effect Analysis (FMEA), which are documents for each product where potential risks and consequences are analyzed. In the FMEA’s, links to lessons learned from previous projects have been attached which are used in the analytical process.

*“We have previously written lessons learned that have been put into a document, now we link it into the FMEA and it feels like a very strong tool that can update changes directly in the projects.” (R14)*

The FMEA’s are all run by the same employees, one employee for the design FMEA’s and one for production FMEA’s. These two are the facilitators who ensure that the process of running FMEA’s is standardized. Every situation regarding the product under development is documented and the product requirement is decomposed into the products subsystems. However, not all issues need to have actions taken on them as sometimes it is enough to have noted a risk and settled on that it is okay to move forward anyway. In today’s FMEA process, each FMEA is done independently but respondents have explained that they would like to link FMEA’s to easier find related issues between new product development projects.

*“I run FMEA meetings and drive new projects’ FMEA’s. I am a facilitator who ensures that the process is followed within the development department’s FMEA work. We document what happens in the projects in routines and through FMEA’s, we document and break down requirements in the subsystems and link it to a verifying activity so that we ensure that we achieve what we want and need.” (R18)*

### 4.3 Knowledge Transfer Barriers

Throughout the interviews, respondents have emphasized several different types of barriers that hinder the transfer of knowledge. The most recurring issue respondents returned to was the issue of documentation, codification, and saving of knowledge. Other common topics regarding the knowledge transfer barrier were cultural, work process, and growth-related dimensions.

*“There is a lot of knowledge among the employees here, but it is not very well documented” (R18)*

Interviewees emphasized that there is no systematic way of saving data, thus the interviewees often save their data but have issues when trying to find information in other people’s documents. There is a lack of user-friendly interfaces in the different digital systems used at the company and respondents have emphasized that there is potential for improvements in how digital systems aid the search for information. Interviewees have emphasized that if there was an easy way to save and document information and that information that has been saved was leveraged, the employees

would better document and use the saved information. Additionally, all departments have their method of saving information and it also differs between individuals within departments. Hence, there is a lot of sub-optimization where people find a way to do their parts better rather than standardizing a way of saving information. The information is often saved, however, the individuals searching for information often have trouble finding it. Additionally, respondents have provided examples where there have been unclarities in what different fields in the Enterprise and Resource Planning System are interpreted as. Thus, respondents have emphasized the importance of communicating between departments to ensure that technological tools and information are used in the intended way.

*“The technological tools available lack user-friendly views, and there is potential to make them easier to use. [...] If things were easy to find, it would provide an incentive to actually document and save since it could be used later. [...] Much focus is on sub-optimization where the focus is on what is best for each department rather than the company as a whole.”*  
(R9)

Respondents have explained that information needs to be structured, yet it can be difficult when you grow as an organization as the routines that used to work do not anymore. What used to be a structured way of saving information has become cluttered as a lot of data has been added into a system that is not prepared to handle it. Respondents have emphasized that the new management system which is currently under implementation will provide structure and facilitate a better understanding of the processes of the different departments, however, for it to provide the intended value it has to be maintained and updated continuously.

*“When things are no longer maintained, people lose faith in their ability to find what they are looking for in the management system. If one does not know where to look, they do not search.”* (R10)

As a lot of knowledge exchange within the organization is based upon personal networks, respondents have highlighted that knowledge exchange is more complex in a larger organization. Thus, interviewees see the need for complementary tools that could help facilitate the exchange of knowledge in a structured way. However, to be able to implement a technological tool without the risk of sub-optimizing to suit one specific department's needs, respondents have emphasized that there is a need for a comprehensive tool including the needs of every department. Additionally, after the implementation of such a tool at one site, one respondent expressed that it would be possible to broaden the use of the tool to exchange knowledge and learnings between the subsidiaries of the company.

*“Pure information needs to be structured, and that becomes difficult as an organization grows. This also applies to knowledge transfer, which becomes more difficult in a larger organization. [...] One probably needs to create a project that presents a holistic view for the company. It's easy to implement a solution for one part of the organization that doesn't work in other parts. [...] We could start with this site, but if we want to*

*expand, the system could later be expanded to other parts of the group if we would like to increase the collaboration inside the group, however, we should probably start with only this site in focus.” (R9)*

Further, technological development has enabled more ways of working and the organization has set up satellite offices in several cities in Sweden, as well as opened up possibilities of working from home. However, this development has not only been positive as respondents have explained that the exchange of knowledge is harder when you do not meet in person. Also, the respondents have described that the way of communicating has changed when you do not bump into each other every day over a cup of coffee, resulting in less speaking of questions thus putting more pressure on individuals to share their learnings.

*“Working from home has made knowledge transfer more difficult.” (R1)*

The chosen method of organizing is that projects are run with employees who are also responsible for activities connected to the current products in production. This leads to the employees taking over their own work in projects as they end. Respondents have emphasized both pros and cons with this way of working as it allows individuals to learn new products comprehensively before they gain the responsibility of producing it. However, it may also mean that individuals are less concerned with the documentation surrounding the project as they have learned through experience instead. Further, the chosen way of organizing also impedes that there are sometimes conflicts of interest between projects and the line organization. Many project members are defending the line organization due to their interest as employees of those departments, thus the line organizations interests are often prioritized. However, the reason for this model of organizing is to enable a dynamic work environment that is developing for the individuals within the organization, thus making it fun to work and the company can therefore keep competent employees for longer.

*“Those who carry out the new product development projects often take over the finished product themselves, which means that it is the same individuals in projects and the line organization, thus there is not a need to document so much. [...] However, there is a problem when there’s a conflict of interest between the line and the project, leading to the project organization sometimes being neglected, which could be a weakness. However, the chosen method of organizing has been made to create a dynamic work environment so that it continues to be enjoyable to work at the company and thus retain expertise for longer at the company. [...] It’s important that individuals are happy and develop because a company is only as good as the people in it.” (R6)*

Additionally, several respondents have explained that they seldom use process documents to guide them during the work. The reason they do not is that after a while of working they learn their routines, thus needing less guidance to produce wanted results. However, this can also result in less standardized practices as individuals act on experience. Nevertheless, respondents simultaneously emphasize that it is important to know each step of the process, hence why checklists and guides are

maybe the most important for new and less experienced employees.

*“After being at the company for a while, one does not use process documents as much anymore. However, this can lead to individuals doing things in their own way sometimes.” (R10)*

The freedom in the application and interpretation of processes has resulted in variations in how projects are run depending on the participants of the projects. This variability has led to respondents expressing that it is difficult to enable knowledge transfer processes efficiently.

*“There is a determined routine in how knowledge transfer in projects is supposed to be done, but it varies how the routines are interpreted and communication are done.” (R3)*

One important aspect mentioned by the respondents in the development of new projects is the importance of finding issues early in the projects. This allows the project team to solve the problems easier, faster, and cheaper than if problems are raised later in the new product development process. To be successful with the integration of knowledge early, it is important to collect knowledge from all affected stakeholders and design the product so that the issues are mitigated right from the start.

*“Spread and acquire knowledge early in projects so that it can be incorporated into the schedule, all time that can be saved early on translates to time saved at the end. Additionally, there are long delivery times for most things, so design changes on products need to be made in time.” (R7)*

One method respondents explained that could increase the speed of new development projects is better utilization of what has been documented from previous projects. Respondents further developed the argument for the need for better documentation with the dispersion of departments to more than one location. As the employees do not run into each other every day, they see a need to increase communication via other channels instead.

*“When it comes to speeding up projects, it’s noticeable that there is a lot of missing documentation. If documentation is well done in one project, it becomes easier for the next, which may rely heavily on the previous one. When documentation is done properly it becomes much easier to reuse things. One challenge has been to break the habit of corridor talk and instead get employees to really document what they have worked on.” (R18)*

Respondents have emphasized that the knowledge transfer between projects has historically functioned best when two new product development projects build on each other. When teams do not change between projects people can leverage their learnings from a previous project on the upcoming one. This recognition has created the strategic choice of creating program groups that keep development teams intact for

more than one project. However, something that does not work as well is to address all issues that need to be taken into account in an early stage of the project. Issues are often inherited from the previous products which the new product development projects build upon, this leads to issues in what should be the scope of the project. The knowledge of these issues often exists within the organization, however, there are problems in spreading the word to the appropriate people as projects start.

*“Knowledge transfer between projects has been most effective when the same individuals are used on projects that build upon each other. [...] What works less well is to early on grasp what needs to be addressed early in the development phase. It turns out that issues are often inherited from the previous product, but the information has not been spread to appropriate individuals. The knowledge often exists somewhere within the organization where the person who needs it cannot access it.” (R4)*

Furthermore, the emphasis from respondents on utilizing the existing knowledge broadens as they have explained that it is difficult to know what kind of knowledge exists, and tracking down the right knowledge is sometimes a tough challenge. This has resulted in cases where different groups have been working on the same task in different areas of the company without knowing it. Only later it is by coincidence that it is realized that they are working on the same thing. Thus, there are sometimes unclarities around who is working on and who is responsible for what.

*“We do not always know what knowledge exists within the company; the same thing can be worked on in two different departments within the company. [...] Work is done a bit in parallel, and it’s somewhat random when people realize they are working on the same thing. [...] There are some issues with clarity regarding who is working on what, and there are many gray areas regarding who is responsible for what.” (R13)*

However, the respondents have emphasized that knowledge transfer works best when individuals work collectively as a team to solve a problem or a task. It does not occur when your aim is to solely transfer knowledge from one person to another. Thus, respondents have throughout explained how the organization believes in the importance of learning by doing to create knowledge.

*“It seldom turns out well with knowledge transfer if you gather with the aim to share knowledge; it often turns out better when you gather around a task that needs to be solved.” (R16)*

Respondents have throughout emphasized that the last couple of years’ rapid growth has challenged the processes of sharing and finding the right knowledge within the organization. The company has grown from being a place where you meet your colleagues in person every day, to being spread out through five factories only in the village. Additionally, they have also set up several satellite offices where the R&D department has integrated specialized competencies. Respondents have said that this has complicated the way of sharing knowledge as their processes still build on personal networks but that it is hard to build and preserve relationships in the new

enlarged business climate. Additionally, a lot of knowledge is stored in certain key individuals who have been at the organization for a very long time and have gained knowledge about the products from a lifelong career. To transfer that historical knowledge is extremely challenging and respondents have explained that they must come up with a plan to do it as they stand in front of a generational change of employees.

*"R&D has grown significantly, making it difficult to find and share knowledge. Plus, there has been a spread of knowledge to various satellite offices. Additionally, many have worked for a long time, and we will face a challenge as we are on the verge of a generational shift of employees."*  
(R1)

Respondents have further emphasized that the strategies regarding knowledge transfer that worked when the company was smaller, are harder to apply in a larger organizational context. Individuals do not meet everyone over a cup of coffee in the staff room anymore and thus do not have a natural place where they exchange experiences. Thus, respondents have highlighted that the need for strategies to ensure knowledge transfer is greater in a larger organization. One way respondents have explained how to ensure encounters between workers is how to organize where offices are located and who sits close to each other. The company has currently chosen to locate employees from the same departments in the same office buildings. Respondents have explained that this is good for knowledge transfer concerning one's profession, however, it can simultaneously be a barrier to knowledge transfer between employees of different departments.

*"In the smaller company, it was much simpler, as problems were solved over a cup of coffee. In larger organizations, a clearer strategy is needed to achieve knowledge transfer."* (R2)

Further, respondents have pointed out the importance of finding the right balance between the focus on the line organization and the cross-functional work. If too much relies on cross-functional work to create knowledge, there is a risk of a disproportionate amount of competence assigned to projects rather than what is worked towards the line organization.

*"Traditionally, there has been a silo organization, recently efforts have been made to overcome the problems created by the choice of organization. There has been an attempt to work on projects and operate cross-functionally between the lines. However, it is important to decide how to deal with the line to ensure it is not overlooked. Focusing too much on projects can create problems for the knowledge within the line organization. There can be too much focus on projects compared to the knowledge in one's own line, which means that a balance must be found."* (R2)

### 4.4 Improvements

A problem at the company addressed by many of the interviewees is that the different departments use different technological tools and databases in their work routines. They suggest that the same tools and databases should be used throughout the whole organization. This would ease communication and make information more accessible across departments, which would increase the speed and efficiency of product development from projects. Additionally, they argue that this change must be initiated from the management level, otherwise it will not happen.

*“We need to connect the systems better to make faster and more fact-based decisions.” (R13)*

Another problem addressed by the interviewees is that it is not always clear how relevant the information in the documents is and how often or how recently the information has been updated. They suggest that this can be fixed with more focus on version management and that notifications should be sent to individuals involved in the project once changes are made to documents.

*“Documentation and version management are very much desired.” (R18)*

*“I wish that notifications would be sent when changes are being made.” (R4)*

The folder structure for documentation currently used at the company makes searching for specific information difficult according to the interviewees. Unless you know in which specific folder and document the information is located it is hard to find. A solution for this problem is suggested by Respondent 1 who argues that it could be solved with the implementation of an Artificial Intelligence (AI) chatbot that would train on the data available in the organization. Individuals could then ask the chatbot for specific information without having to spend time searching for the information in the folders and documents.

*“The implementation of AI can become a key parameter to succeed as a company in the new climate with AI.” (R1)*

Lessons learned are done at the end of every project, but according to the interviewees, much of the potential information that could be documented is forgotten by this time. They suggest that a logging routine or system should exist where lessons could be documented continuously throughout the project process.

*“It’s a bit late to do lessons learned at the end, it would have been better with a log where you can add things as you go.” (R9)*

A problem highlighted by the respondents concerning knowledge transfer, is that the different departments work more or less independently without a complete understanding of how the other departments work. Many respondents wish that there should be a rotation of the individuals from the different departments, where they

can work elsewhere for a while to get more insight into how other departments work. They emphasize that this would lead to individuals getting more knowledgeable of the organization as a whole and that they could help the other departments more in case their own department has excess capacity.

*“Maybe have more people rotating between departments than what we have today.” (R6)*

The communication in many cases is tied to the employees personal networks and the majority of respondents have emphasized that they see a lack of documentation in regard to the communications in which knowledge transfer takes place.

*“The documentation could be improved. Much today is word of mouth and often depends on the person you need to talk to being familiar with the current process.” (R11)*

More routines for knowledge transfer throughout the organization is something that respondents highlighted in the interviews. They emphasize that leaving knowledge transfer to happen on an individual level is too much responsibility to place on each individual.

*“Start by creating more guidelines, routines and reducing personal dependence.” (R7)*

Additionally, to reduce the individual responsibility for knowledge transfer, some respondents wish there were groups responsible for knowledge transfer across departments. These groups would have an overview of the organization as a whole to get a good insight into each department.

*“Have groups responsible for knowledge transfer between departments.” (R13)*

According to respondents, closed-off offices improve their focus on their own tasks, but it is also a barrier to knowledge transfer for the organization. They suggest that using open office areas would improve knowledge transfer since the individuals can collaborate more easily and they can ask each other questions more naturally. Additionally, they emphasized that it would be good to rearrange so that individuals from different departments sit together, alternatively, together with the new product development project team they are a part of. This could increase the collaboration and knowledge transfer between individuals from different departments.

*“An open office landscape would improve product development and communication between departments.” (R15)*

A problem mentioned by respondents at the company is that it is not always clear who knows what in the organization and the only way to find out is by asking other individuals who might know which person to speak to. The respondents suggest that some type of knowledge mapping should be created, to map out competencies or what type of projects the individuals have been part of previously.

*“Introduce knowledge mapping of what people know, in a larger system so it’s easier to understand what knowledge individuals have.” (R5)*

To improve the knowledge for the individuals and also the organization as a whole, many respondents wish there was more opportunity for education within the organization. This internal education could be in the form of digital education or in person with knowledgeable individuals. The respondents further argue that internal education can make it easier to map out the knowledge within the organization since it will be more clear what the individuals know. Additionally, internal education might encourage individuals to stay in the organization.

*“The company should get better at offering education. There is always something to gain from educating your staff. [...] The education should allow individuals to develop, so they are urged to stay at the company a longer time.” (R15)*

# 5

## Analysis

The analysis section is structured on the basis of Figure 3.4 and will analyze the organizational context of the case study, knowledge transfer practices, and knowledge transfer barriers. Lastly, the improvements suggested by interviewees, aimed at facilitating knowledge transfer, are included to incorporate employee perspectives on potential enhancements.

### 5.1 Organizational context

As described both during the interviews and strengthened by the financial numbers presented in Figure 4.1, the company has during the last couple of years undergone significant growth. This growth has impacted both its structure and processes in all areas of its business operations. The rapid growth has created structural challenges and increased the need for more structured work processes to ensure knowledge utilization within the company. Furthermore, the structural challenges will remain if the downturn in demand continues for a severe amount of time, hence, the structure of the organization will need to adapt to the environment in which it operates. This aligns with the theory pointed out by Spender (1996) that organizations must continuously focus on enabling the acquisition of new knowledge as well as the movement, retention, and application of the present knowledge of the organization. Changes in organizational structure due to growth or decline, create organizational design issues. Manufacturing organizations, as Foss and Pedersen (2002) suggest, need to develop tools of control and motivation, as well as continually update these tools to suit the current context. This is necessary to facilitate communication between those who possess knowledge and those who require it, in a constantly altering business climate.

The departments of the company operate as independent business units, where every department has its objectives and obligations. The siloed method of organizing was in interviews emphasized as creating knowledge specialization within the different departments. However, it could simultaneously lead to sub-optimization as departments prioritize their objectives on the potential expense of broader organizational ones. This aligns with the concepts of Hadi et al. (2022) who argue that a lot of knowledge often is trapped inside operational units. The authors further explain that to free up this trapped knowledge, organizations need specialized facilitators who work cross-functionally with multidirectional knowledge transactions. Hence, manufacturing organizations should assign the task of facilitating multidirectional knowledge transfer to a group of individuals and then give them the tools they need

to ensure their success.

The case company develops new products through projects, which include team members from various departments, and is used to ensure expertise and comprehensive input of knowledge for new product development projects. However, a lot of knowledge is also created as projects are run. This aligns with the theory of Tamer Cavusgil et al. (2003) who argues that knowledge has a dual role in innovation where new knowledge is created during the process, yet to create innovation, organizations must leverage their existing knowledge. Additionally, the utilization of cross-functional teams in new product development projects, promotes diverse input as individuals from different departments collaborate. Thus, knowledge connected to the project in manufacturing organizations is created on a team level as the problems, and also the learnings of a project, are faced on a project-team level. Hence, highlighting the importance of communication which matches the argument by Foss and Pedersen (2002), stating that communication channels between actors who possess knowledge and those who require it must be created to facilitate new knowledge creation.

The culture at the company seems to be heavily affected by the organization's massive growth in a short amount of time, which has resulted in a culture with the spirit of a small organization since the organization has not yet adapted to its current size. The spirit of a small organization fosters an open culture where questions are encouraged and mistakes are accepted. This aligns with Bjurström (2016), arguing that managers should create an environment that encourages experimentation with new solutions, where individuals can make mistakes, and where it is accepted to not have all the answers. Additionally, Chang and Lee (2007) argue that knowledge and culture are essential, not only for the organization's performance, but also for the well-being of its individuals, which is supported by the company's behavioral core values (hello, thank you, and sorry) promoting a collaborative and supportive atmosphere.

Furthermore, the culture concerning knowledge transfer between departments seems to be heavily dependent on relationships between individuals, without any formal system or procedure. The emphasis on relationships is shared by Phelps et al. (2012), who argue that networks and relationships greatly influence how knowledge is accessed, transferred, absorbed, and applied in organizations. However, without formal processes for knowledge transfer between departments, much responsibility is placed on an individual level. Individual responsibility seems to be heavily integrated in the organizational culture, where the individuals behave like entrepreneurs and every person is personally responsible for acquiring necessary knowledge. Personal responsibility can further be seen across departments, where every department behaves like its own small company within the bigger company. The organization is heavily divided between its downpipes and is called the flattest pyramid in Sweden by many of the respondents since the organization is flat within departments, but still has a strong hierarchical structure. This sense of control can be explained by Mintzberg (1980), arguing that enterprises engaged in mass production priori-

tize flow and efficiency, fostering an obsession with control across all levels of the organizational hierarchy.

## 5.2 Knowledge transfer practices

The importance of work processes and utilization of routines to enable knowledge transfer is seen as important by the employees at the company. This attitude towards the importance of processes is aligned with Söderlund (2008) as he argues that clear processes enable knowledge transfer between individuals. However, the company seems to have challenges in maintaining a consistent adherence to these processes, as it is often up to individuals to interpret and apply them, which causes a risk of deviations from the established routines. DeRue (2011) emphasizes that routines are valuable only when adhered to. Therefore, manufacturing organizations must establish processes that ensure work quality. However, since processes are valuable only when followed, these organizations should consistently revise and update the processes they employ to ensure they are up to date.

At the company there are standardized routines within departments that help individuals to share updates and experiences. These routines take different forms depending on the department of study but all utilize meetings of different types and focus on the interactions between employees. This aligns with the arguments by Szulanski (1996) who argues that organizations should focus on fostering relationships while simultaneously emphasizing the importance of communication to achieve knowledge transfer. However, there seems to be a lack of routines when it comes to cross-departmental knowledge transfer and uncertainties about what information should be shared and how. Thus, knowledge transfer works well in the organization where the relationships between individuals are strong but less well where they are weaker. To embed knowledge transfer in the interaction between people can be a powerful strategy, Argote and Ingram (2000) argue that knowledge embedded in the interactions of people and tasks provides a basis for competitive advantage. However, if employees depend on their cross-departmental networks to find expertise instead of using formal communication channels and the relationships are not strong, it could detract valuable time from their main tasks.

At the case company it is when employees collaborate, especially in facing challenges as a team, that they most effectively learn and gain knowledge for future solutions. This resembles the work of Bakker et al. (2011) in which the authors argue that it is not one factor in itself that facilitates knowledge transfer. Nokes (2009) explains that enabling knowledge transfer depends on the situation, what knowledge is intended to be transferred, and the distance between sender and receiver. In the organization, a lot of knowledge seems to be tacit in nature since the process of facing challenges as a team greatly aligns with Polanyi's (1962) description of tacit knowledge. The author argues that tacit knowledge is deeply ingrained in commitment and engagement within a specific setting. Furthermore, using Nonaka's (1994) framework in Figure 3.1, knowledge transfer at the company is mostly similar to the socialization pattern, which is the spreading of tacit knowledge through

shared experience between individuals. As the company's line organization allows for specialization within departments, some individuals hold a lot of knowledge, which can lead to bottlenecks and dependencies on these individuals to be available to assist with the problems other individuals face in their work. This highlights a complex challenge for manufacturing organizations, where tacit knowledge transfer is not always straightforward, and there often is a search before you find the people with the knowledge you search for. Hence, to speed up this search, there is a need for tools that effectively support the socialization process by connecting the sender and receiver of knowledge.

After the interviews, it is clear that the respondents recognize the need for improvement in utilizing technological tools for knowledge transfer, where the tools are seen as crucial for storing and transferring knowledge within the organization. This view is shared by Spender (1996), who argues that technology in business is a key driver for competitive advantage. However, at the company, different departments use different tools, making knowledge transfer between departments difficult. An attempt to make a more centralized technological tool has been created in the form of a new management system, but respondents have expressed that its effectiveness relies on continuous usage and updates from individuals in the organization. Using a centralized system for knowledge management is emphasized by Maier and Hädrich (2006), who argue that a centralized management system usually satisfies organizational expectations more than using a more decentralized system concerning knowledge transfer. However, the authors further argue that using a centralized knowledge management system is time consuming to build as well as maintain. Thus, manufacturing organizations with different departments must decide whether they should implement centralized technological tools for knowledge transfer. However, they have to understand that these tools are time consuming to build and manage, but are usually preferred as they often better satisfy their intended need.

Much of the knowledge contained in the individuals of the organization seems to be tacit in nature, explained by Lam (2000) as practical work experience and learning by doing. Albino et al. (2004) argues that the usefulness of knowledge transfer technologies varies whether the knowledge is tacit or explicit, where tacit knowledge is difficult to define and communicate, and can be too complex for knowledge transfer with the usage of technological tools. Should manufacturing organizations decide on utilizing more technological tools for knowledge transfer, it might be wise to consider what type of knowledge should be stored and transferred.

The lessons learned process at the company involves project participants reflecting on project outcomes and areas for improvement, which is stored and can be used as knowledge for future projects. Chou (2005) argues that the process of storing organizational knowledge is one of the most critical aspects concerning knowledge management in organizations. However, efforts put into documenting lessons learned is perceived as minimal by respondents and are rarely used again after the documenting process. Documenting without using the documented information in a future occasion is wasteful according to Jasimuddin (2005) who argues that or-

ganizations forfeit chances to gain competitive advantage when hoarding unutilized knowledge. Hence, manufacturing organizations must find a way to utilize their documented knowledge in some way, otherwise the process of documenting knowledge is a waste of time. An attempt at the company to better utilize the knowledge stored in lessons learned has been made with links in FMEA documents. The process of linking lessons learned in FMEA documents facilitate easier identification of related issues across new product development projects. Thus, providing a more actionable way to document knowledge than in a lessons learned document.

### 5.3 Knowledge transfer barriers

The most recurring knowledge transfer barrier emphasized by the respondents at the case company was the one of documentation. Both in terms of getting the employees to document efficiently, but also to utilize the existing documentation to improve both the quality and speed of development. Regarding the data-saving practices, there seem to be inconsistencies between the methods of saving information, both between departments and for individuals within departments. Furthermore, there are also issues regarding the interpretation of information which could be exemplified by how there are unclarities in how the same field in the enterprise and resource planning system is interpreted differently by two different departments. This matches with the theory of Chou (2005) who emphasizes how stored knowledge must be usable in either the present or the future if the knowledge storage process should be worthwhile. Jasimuddin (2005) adds to this argument by explaining that organizations that hoard knowledge without utilizing it are wasting their resources as it fills up storage space with irrelevant information. Thus, manufacturing organizations need to find a method of storing relevant knowledge in a way that is easily reused in future projects. However, they simultaneously must ensure that irrelevant information is left out as this can complicate the future search for the saved knowledge. Additionally, it is not only the saving and interpretation of data that hinders knowledge transfer. Respondents at the company have highlighted the lack of user-friendly interfaces in the digital systems as another barrier as it restrains the efficiency of search and utilization of saved information. This is in line with Chou (2005) who highlights the importance of IT capabilities in organizing, storing, and retrieving knowledge. Thus, manufacturing organizations need to integrate IT solutions that make it easy for employees to organize, save, and retrieve knowledge in an effective yet comprehensive process.

From the interviews, it was highlighted that knowledge transfer has become more complex as the organization has grown. This is due to knowledge transfer at the company has a great reliance on the employees' personal networks which are more difficult to maintain in a larger organization. Thus, the strategies that worked in a smaller organization setting struggle to scale in larger contexts as knowledge often is hard to find within the different departments. This aligns with Hadi et al. (2022) who highlight that knowledge often becomes trapped within operational units. To counteract this issue, manufacturing organizations should as Hadi et al. (2022) argue assign certain facilitators and give these the tools to effectively

work cross-functionally to unlock the knowledge trapped within the different operational units. The respondents emphasized how knowledge transfer at the company works best when employees work together as a team on a task rather than explicitly focusing on sharing the learnings made from one employee to another. When working together on a task it becomes easier to communicate and utilize the expertise of representatives from each department. This corresponds to Szulanski (1996) who describes how the success of the knowledge transfer will depend on the intimacy of the relationship between the source and recipient of knowledge. Thus, by creating cross-functional teams where representatives from different departments work together as a team, manufacturing organizations can foster better relationships between the employees and thus create an environment that facilitates knowledge transfer. Additionally, larger manufacturing organizations could benefit from adopting the company's strategic approach of forming program groups that maintain consistent project teams across multiple new product development projects. This strategy fosters stronger relationships as employees collaborate with the same colleagues over extended periods. However, this approach also presents some challenges, as relationships with other program groups might weaken. Therefore, it is essential to find the right balance between fostering deep connections within teams and facilitating collaboration across different program groups.

### 5.4 Improvements

Respondents at the company felt the need for more established routines and designated groups responsible for knowledge transfer between departments, in order to reduce individual responsibility as well as enhancing organizational knowledge sharing. Landaeta (2008) agrees with this argument, stating that individuals responsible for knowledge transfer should be selected in advance for organizations to be successful in their knowledge transfer process. Additionally, Lillrank (2003) emphasizes the importance of creating routines and processes in order for organizations to handle aspects of complexity and uncertainty. Hence, creating routines and responsible groups for knowledge transfer could help manufacturing organizations to manage their knowledge more efficiently.

A rotational program between departments was requested by respondents, which would make individuals more knowledgeable of the organization as a whole. This aligns with the argument made by Bjurström (2016), stating that individuals must do things they have never done before in order to learn new things and gain new knowledge. Hence, a rotational program could also serve as a form of internal education for manufacturing organizations, which would enhance individual and organizational knowledge, potentially increasing employee retention.

Implementing some sort of knowledge mapping for the organization, to ease with identifying experienced personnel, was emphasized by respondents. However, the production department already uses a similar approach by mapping out the skills of production personnel internally using an Excel sheet, keeping track of individuals' competencies and where they are positioned within the department. Respondents

wish that this type of documentation existed throughout the whole organization to identify individuals with the right competencies across departments. Vail (1999) agrees with this argument, stating that knowledge mapping is an efficient tool for finding individuals possessing tacit knowledge within an organization. The company's current working routines heavily revolve around spreading tacit knowledge, so implementing knowledge mapping would act as a tool for individuals to more easily find knowledge within the organization, without changing too much of their current routines. Additionally, Dang et al. (2011) argue that knowledge mapping is especially important in fast-growing markets since a lot of new knowledge is generated within them. Both the company as an organization, as well as the heat pump market, have seen rapid growth in the last few years, making knowledge mapping important for more efficient knowledge transfer. Hence, manufacturing organizations that experience rapid growth within their market and possess a lot of tacit knowledge, could benefit from using knowledge mapping to ease the search of finding individuals with the right knowledge. However, the benefit of knowledge mapping is twofold, it does not only provide clarity in what knowledge is located where in the organization. It also provides a framework for what competencies might be missing, providing management with a better tool in the search and securing of the appropriate knowledge and capabilities.

To improve the accessibility of knowledge transfer and speed up the development of new products, respondents suggested a standardization of technological tools and databases across departments. Maier and Hädrich (2006) have a similar approach, arguing that a centralized management system generally meets organizational expectations better than a decentralized system would do for knowledge transfer. However, knowledge transfer using technological tools is better suited for explicit knowledge since the knowledge can be codified, preserved in objective formats, and accessed without the participation of the individual who originally possessed it (Lam, 2000). Additionally, Albino et al. (2004) argue that technology can optimize the efficiency of knowledge transfer by accelerating the transfer speed and reducing costs regarding time and distance. Thus, manufacturing organizations seeking to enhance their explicit knowledge transfer with the use of technological tools, should adopt a more centralized system throughout the whole organization.

The importance of efficient knowledge transfer is emphasized by Zhang et al. (2020) who argue that it can accelerate the development of new products, where development speed directly reflects an organization's efficiency in knowledge transfer. Speed in development is of utmost importance since the lifecycle of products has shortened dramatically in recent times (Fincher, 2015). According to Vesey (1992), organizations must accelerate product development and rapidly release their products to preserve profit margins and remain competitive. Hence, for manufacturing organizations to stay competitive and keep their profit margins, they must accelerate their product development process, and to accomplish that, facilitating efficient knowledge transfer is vital.



# 6

## Conclusion

The final chapter of this thesis is divided into two main parts. Initially, it presents the conclusions derived from the research objectives of this study. Subsequently, it discusses the limitations of the study and suggests areas for future research.

### 6.1 Research objective

The purpose of this thesis stated in the introduction chapter, has been to describe and analyze the challenges and potential improvements considering knowledge transfer in manufacturing organizations. From this purpose, the following two research questions were derived.

***Research Question 1:** What difficulties do individuals in manufacturing organizations experience in the process of knowledge transfer and why?*

***Research Question 2:** What strategies and mechanisms can be implemented to enhance knowledge transfer in a manufacturing organization?*

Considering Research Question 1, this thesis presents different difficulties manufacturing organizations experience in knowledge transfer depending on whether the knowledge is tacit or explicit. For tacit knowledge, transfer is done through socialization and this transfer is dependent on the source and recipient of knowledge having a proficient network of contacts within the organization. Thus, manufacturing organizations put a lot of responsibility on the individuals in the search for the appropriate tacit knowledge, which can be challenging. Additionally, tacit knowledge transfer seems to occur mainly during the execution of a task. Hence, it is difficult to transfer tacit knowledge from one individual to another if there is not a possibility for participants to use the knowledge they have been taught. Considering explicit knowledge, individuals in manufacturing organizations primarily face challenges with documenting knowledge, which encompasses the storage, organization, and retrieval of organizational knowledge. Storing knowledge poses challenges because it depends on individuals and how they choose to document. Organizing knowledge becomes problematic if there is not one standardized process all members of the organization follow. Furthermore, retrieving knowledge is difficult if the storage and organizing are ineffective, leaving individuals uncertain about where to find the information they need.

Regarding Research Question 2, manufacturing organizations need strategies and mechanisms to enhance the flow of tacit knowledge transfer between departments. One possibility is to implement a knowledge mapping tool, suggestively the one presented in Figure 3.3. The use of knowledge mapping allows individuals in organizations to faster maneuver and find the expertise they search for even though they do not have the greatest of networks within other departments of the organization. For explicit knowledge, it is the standardization of a predetermined work method that is important. This standardization of the work process can be supported by technological tools that ensure the appropriate storage, organizing, and retrieval of explicit knowledge.

The thesis contributes to the theory in two aspects. The first aspect is how individuals face different difficulties regarding knowledge transfer depending on whether the knowledge to be transferred is tacit or explicit. Secondly, this thesis contributes to manufacturing organizations as it provides suggestions on specific actions that can affect their knowledge transfer, which might lead to increased profitability.

## **6.2 Limitations and recommendations for future research**

This study has some limitations, which can prompt further exploration. Since the thesis is conducted as a case study for a single organization, it derives its conclusions from only one source, thus constraining the extent to which its findings can be applied broadly. Therefore, it is recommended to examine additional manufacturing organizations to assess the transferability of these findings across multiple settings, such as manufacturing organizations in different countries, sizes, and markets. Additionally, the study could expand its scope from focusing solely on one company to developing a knowledge transfer strategy for an entire corporate group.

As this thesis mainly has covered what manufacturing organizations should focus on to enhance knowledge transfer, another topic to further research could be how manufacturing organizations should implement the changes. Where one example could be how manufacturing organizations should act to ensure adherence to the established routines of the company.

To gain a more comprehensive understanding of the long-term effects of the suggested changes to knowledge transfer practices, it is suggested that longitudinal research should be conducted. This could provide valuable insights into the sustained effects of these practices over time, shedding light on their efficiency regarding organizational knowledge transfer.

# 7

## Bibliography

Albino, V., Garavelli, A. C., & Gorgoglione, M. (2004). Organization and technology in knowledge transfer. *Benchmarking: An International Journal*, 11(6), 584-600.

Argote, L., & Ingram, P. (2000). Knowledge Transfer: A Basis for Competitive Advantage in Firms. *Organizational Behavior and Human Decision Processes*, 82(1), 150-169.

Azeem, M., Ahmed, M., Haider, S., & Sajjad, M. (2021). Expanding competitive advantage through organizational culture, knowledge sharing and organizational innovation. *Technology in Society*, 66, 101635.

Bakker, R. M., Cambré, B., Korlaar, L., & Raab, J. (2011). Managing the project learning paradox: A set-theoretic approach toward project knowledge transfer. *International journal of project management*, 29(5), 494-503.

Bass, B. M., & Avolio, B. J. (1993). Transformational leadership and organizational culture. *Public administration quarterly*, 112-121.

Bell, E., Bryman, A., & Harley, B. (2022). *Business Research Methods* (6th ed.). Oxford University Press.

Bergman, B., & Bengt Klefsjö. (2012). Kvalitet från behov till användning. *Studentlitteratur AB*.

Bjurström, J. (2016). Bortom Lean: 12 steg för en verksamhet i världsklass. *Roos & Tegner*.

Chang, S. C., & Lee, M. S. (2007). A study on relationship among leadership, organizational culture, the operation of learning organization and employees' job satisfaction. *The learning organization*, 14(2), 155-185.

Chang, Y. B., & Gurbaxani, V. (2012). Information technology outsourcing, knowledge transfer, and firm productivity: an empirical analysis. *MIS quarterly*, 1043-1063.

Chou, S. W. (2005). Knowledge creation: absorptive capacity, organizational mechanisms, and knowledge storage/retrieval capabilities. *Journal of Information Sci-*

ence, 31(6), 453-465.

Chuang, Y. C. (1998). Learning by doing, the technology gap, and growth. *International economic review*, 697-721.

Cooper, R. G., & Kleinschmidt, E. J. (1991). New product processes at leading industrial firms. *Industrial Marketing Management*, 20(2), 137-147.

Cornelius, P. B., Gokpinar, B., & Sting, F. J. (2021). Sparking manufacturing innovation: How temporary interplant assignments increase employee idea values. *Management Science*, 67(4), 2231-2250.

Cummings, J. L., & Teng, B. S. (2003). Transferring R&D knowledge: the key factors affecting knowledge transfer success. *Journal of Engineering and technology management*, 20(1-2), 39-68.

Dang, Y., Zhang, Y., Hu, P. J.-H., Brown, S. A., & Chen, H. (2011). Knowledge mapping for rapidly evolving domains: A design science approach. *Decision Support Systems*, 50(2), 415-427.

Darroch, J. (2005). Knowledge management, innovation and firm performance. *Journal of knowledge management*, 9(3), 101-115.

Denzin, N. K., & Lincoln, Y. S. (2018). *The Sage Handbook of Qualitative Research* (5th ed.). Sage.

DeRue, D. S. (2011). Adaptive leadership theory: Leading and following as a complex adaptive process. *Research in organizational behavior*, 31, 125-150.

Disterer, G. (2001). Individual and social barriers to knowledge transfer. In *Proceedings of the 34th annual Hawaii international conference on system sciences* (pp. 7-pp). IEEE.

Driessen, S., Huijsen, W. O., & Grootveld, M. (2007). A framework for evaluating knowledge-mapping tools. *Journal of knowledge Management*, 11(2), 109-117.

du Plessis, M. (2007). The role of knowledge management in innovation. *Journal of Knowledge Management*, 11(4), 20-29.

Executive Summary – *The Future of Heat Pumps* (n.d.). IEA. Retrieved 1/18 from <https://www.iea.org/reports/the-future-of-heat-pumps/executive-summary>

Foss, N. J., & Pedersen, T. (2002). Transferring knowledge in MNCs: The role of sources of subsidiary knowledge and organizational context. *Journal of International Management*, 8(1), 49-67.

- Fincher, M. (2015). Impact of Shortening International Product Life Cycle. In *Proceedings of the 1996 Multicultural Marketing Conference* (pp. 73-76). Cham: Springer International Publishing.
- Goh, S. C. (2002). Managing effective knowledge transfer: an integrative framework and some practice implications. *Journal of knowledge management*, 6(1), 23-30.
- Grant, R. M. (2021). Contemporary strategy analysis. *John Wiley & Sons*.
- Grant, R. M. (1996). Toward a Knowledge-Based Theory of the Firm. *Strategic Management Journal*, 17(S2), 109–122.
- Hadi, A., Liu, Y., & Li, S. (2022). Transcending the silos through project management office: Knowledge transactions, brokerage roles, and enabling factors. *International Journal of Project Management*, 40(2), 142-154.
- Hansen, M. T., Nohria, N., & Tierney, T. J. (1999). What's Your Strategy for Managing Knowledge? *Harvard Business Review*.
- Hofstede, G. (2001). Culture's consequences: Comparing values, behaviors, institutions and organizations across nations. *sage*.
- Honarpour, A., Jusoh, A., & Md Nor, K. (2012). Knowledge Management, Total Quality Management and Innovation: A New Look. *Journal of Technology Management & Innovation*, 7(3), 22–31.
- Jasimuddin, S. M. (2005). An integration of knowledge transfer and knowledge storage: an holistic approach. *Journal of Computer Science and Engineering*, 18(1), 37-48.
- Jasimuddin, S. M., Klein, J. H., & Connell, C. (2005). The paradox of using tacit and explicit knowledge: Strategies to face dilemmas. *Management decision*, 43(1), 102-112.
- Kanter, R. M. (2006). Innovation: the classic traps. *Harvard business review*, 84(11), 72.
- Kotnour, T. (1999). A learning framework for project management. *Project management journal*, 30(2), 32-38.
- Lam, A. (2000). Tacit Knowledge, Organizational Learning and Societal Institutions: An Integrated Framework. *Organization Studies*, 21(3), 487–513.
- Landaeta, R. E. (2008). Evaluating Benefits and Challenges of Knowledge Transfer Across Projects. *Engineering Management Journal*, 20(1), 29–38.

- Lauren, B., & Pigg, S. (2016). Toward multidirectional knowledge flows: Lessons from research and publication practices of technical communication entrepreneurs. *Technical Communication*, 63(4), 299-313.
- Levitt, T. (1965). *Exploit the product life cycle (Vol. 43)*. Cambridge, MA, USA: Graduate School of Business Administration, Harvard University.
- Lillrank, P. (2003). The quality of standard, routine and nonroutine processes. *Organization studies*, 24(2), 215-233.
- Linderman, K., Schroeder, R. G., Zaheer, S., Liedtke, C., & Choo, A. S. (2004). Integrating quality management practices with knowledge creation processes. *Journal of Operations Management*, 22(6), 589-607.
- López-Sáez, P., Cruz-González, J., Navas-López, J. E., & del Mar Perona-Alfageme, M. (2021). Organizational integration mechanisms and knowledge transfer effectiveness in MNCs: The moderating role of cross-national distance. *Journal of international management*, 27(4), 100872.
- Mukherjee, A. S., Lapre, M. A., & Van Wassenhove, L. N. (1998). Knowledge driven quality improvement. *Management Science*, 44(11-part-2), S35-S49.
- Nokes, T. J. (2009). Mechanisms of knowledge transfer. *Thinking & reasoning*, 15(1), 1-36.
- Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5(1), 14-37.
- Maier, R., & Hädrich, T. (2006). Centralized versus peer-to-peer knowledge management systems. *Knowledge and Process Management*, 13(1), 47-61.
- Manghani, K. (2011). Quality assurance: Importance of systems and standard operating procedures. *Perspectives in clinical research*, 2(1), 34.
- Mascitelli, R. (2000). From experience: harnessing tacit knowledge to achieve breakthrough innovation. *Journal of Product Innovation Management: an International Publication of the Product Development & Management Association*, 17(3), 179-193.
- McCarthy, E. D. (2005). Knowledge as culture: *The new sociology of knowledge*. Routledge.
- Mintzberg, H. (1980). Structure in 5's: A Synthesis of the Research on Organization Design. *Management science*, 26(3), 322-341.
- O'Reilly, C. A., & Tushman, M. L. (2011). Organizational Ambidexterity in Action: How Managers Explore and Exploit. *California Management Review*, 53(4), 5-22.

- Phelps, C., Heidl, R., & Wadhwa, A. (2012). Knowledge, networks, and knowledge networks: A review and research agenda. *Journal of management*, 38(4), 1115-1166.
- Polanyi, M. (1962). Tacit knowing: Its bearing on some problems of philosophy. *Reviews of modern physics*, 34(4), 601.
- Raasch, C., & Von Himmel, E. A. (2013). Innovation process benefits: the journey as reward. *MIT Sloan Management Review Vol.55 no.1*
- Schein, E. H. (2010). *Organizational culture and leadership (Vol. 2)*. John Wiley & Sons.
- Senge, P. M. (1990). The art and practice of the learning organization.
- Spender, J.-C. . (1996). Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal*, 17(S2), 45–62.
- Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*, 17, 27-43.
- Söderlund, J. (2008). Competence dynamics and learning processes in project-based firms. *International Journal of Innovation Management*, 12(1), 41-67.
- Tamer Cavusgil, S., Calantone, R. J., & Zhao, Y. (2003). Tacit knowledge transfer and firm innovation capability. *Journal of business & industrial marketing*, 18(1), 6-21.
- Teece, D. J. (2000). Strategies for managing knowledge assets: The role of firm structure and industrial context. *Long Range Planning*, 33, 35-54.
- Tubigi, M., & Alshawi, S. (2015). The impact of knowledge management processes on organisational performance: The case of the airline industry. *Journal of Enterprise Information Management*, 28(2), 167-185.
- Vail, E. F. (1999). Knowledge mapping: getting started with knowledge management. *Inf. Syst. Manag.*, 16(4), 1-8.
- Van Wijk, J. J. (2005). The value of visualization. *In VIS 05. IEEE Visualization*, 2005. (pp. 79-86). IEEE.
- Vesey, J. T. (1992). Time-to-market: Put speed in product development. *Industrial Marketing Management*, 21(2), 151-158.
- von Zedtwitz, M. (2003). Post-project reviews in R&D. *Research Technology Management*, 46(5), 43.

Winterton, J., Delamare-Le Deist, F., & Stringfellow, E. (2006). *Typology of knowledge, skills and competences: clarification of the concept and prototype* (Vol. 64). Luxembourg: Office for Official Publications of the European Communities.

*Year-end Report, 2023.* (n.d.).

Yih-Tong Sun, P., & Scott, J. L. (2005). An investigation of barriers to knowledge transfer. *Journal of Knowledge Management*, 9(2), 75–90.

Zhang, H., Zhang, X., & Song, M. (2020). Does knowledge management enhance or impede innovation speed?. *Journal of Knowledge Management*, 24(6), 1393-1424.

# A

## Attachment - Interview guide

### Presentation of our Master Thesis

- Request permission for recording and transcription of the interview.

### Introduction Question

- Can you tell us a little about yourself and your role at the company?
- Can you describe how the company has developed during the time you have been part of the organization?

### Questions about RQ1

- How do you ensure that you utilize the knowledge available at the company?
- Describe how knowledge transfer works between projects and the line organization? Also, what works well and what does not?
- Describe specific difficulties or areas that need improvement within knowledge transfer?
- Describe a concrete example of when you felt that the knowledge transfer worked particularly well or poorly?
- Describe the corporate culture around knowledge transfer? How has it changed since you started at the company? Why do you think it has changed?
- Describe what role technological tools play in knowledge transfer?
- How often do you use process documents or other stored data in your work?
- How do you store your knowledge? Do you write/edit documents, or do you just remember using your memory?

### Questions about RQ2

- How would you like information to be presented to be useful to you?
- What strategies/mechanisms are there to streamline knowledge transfer?
- Do you have a method for measuring whether the knowledge transfer is successful or not?
- What do you think should be done to improve the utilization of knowledge at the company?

### Concluding Questions

- Is there anything else you would like to add?
- Are you satisfied with the interview?
- Is there anyone else you think we should talk to?
- Is it okay if we come back to you if additional details are needed?

DEPARTMENT OF TECHNOLOGY MANAGEMENT AND ECONOMICS  
DIVISION OF ENTREPRENEURSHIP AND STRATEGY  
CHALMERS UNIVERSITY OF TECHNOLOGY

Gothenburg, Sweden

[www.chalmers.se](http://www.chalmers.se)



**CHALMERS**  
UNIVERSITY OF TECHNOLOGY