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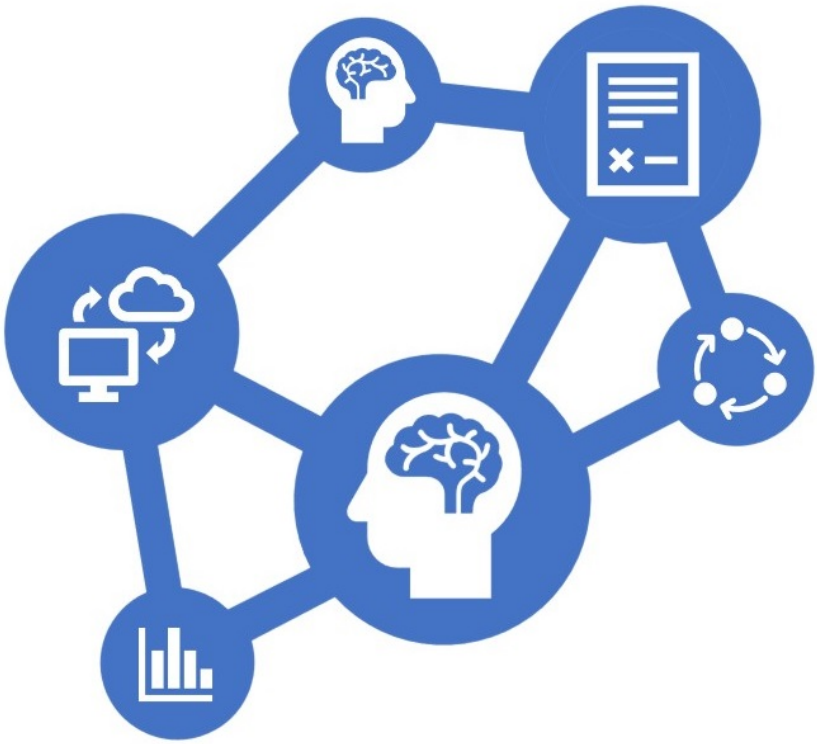

Knowledge Transfer Success

How to facilitate effective knowledge transfer to prevent recurring quality issues

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Abstract

Purpose: The purpose is to identify facilitators to effective knowledge transfer between two departments within a manufacturing company, whereof one is responsible for solving quality issues and one is responsible for implementing the solution in new development projects. These facilitators contribute to achieving knowledge transfer success, in this case defined as the prevention of recurring quality issues.

Research questions: To fulfil the purpose of the thesis, three research questions were answered: (1) What factors prevent an effective knowledge transfer process? (2) How does motivation and willingness affect knowledge sharing and transfer? (3) What are success factors to effective knowledge transfer?

Method: The study was of qualitative nature, and involved a deep investigation of the current knowledge transfer process at a case company by conducting interviews with employees at two relevant departments. Interviews were also held with academics to gain external insights on the subject. The research was complemented by extensive theoretical research, of which a large part of the analysis is based upon.

Results: Barriers lifted in the theoretical framework, such as the level of knowledge articulability and embeddeddness, different types of distance barriers, organisational culture, prioritisation, and leadership were also found at the case company. Four additional barriers were identified from the case study, namely resource misallocation and time constraints, employee turnover, missing verification method, and unclear process description. With regards to motivation and willingness to transfer knowledge, these were also found to have a substantial impact in terms of external and interval motivators, attitude and pressure to transfer knowledge, and control over the transfer process. Lastly, a set of success factors to effective knowledge transfer were also identified. These include establishing efficient and frequent communication, a sense of community and a common goal, a sense of urgency and connection to the problem, and continuous transfer of knowledge to colleagues and the organisation.

Conclusion: Having an organisational culture favouring knowledge transfer combined with a common purpose and goal, a connection to the issue, a sense of urgency, and frequent and efficient communication between teams are believed to be key factors to facilitate effective transfer and achieve knowledge transfer success. Furthermore, knowledge need to consistently be preserved within the organisation, provided resources need to be sufficient and aligned with requirements and stated knowledge transfer goals, and a clear description of the transfer process is required.

Keywords: knowledge transfer, knowledge sharing, quality in NPD, prevent recurring quality issues, barriers to knowledge transfer, successful knowledge transfer, effective knowledge transfer, willingness to share knowledge, motivation to transfer knowledge

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Amelia Wall & Rebecca Lippel
Gothenburg, January 2020

Contents

1
Introduction

This chapter intends to introduce the reader to the topic, and provide a rationale to the thesis project. First, a background to the research topic is presented, accompanied by a brief description of the relationship between knowledge transfer and sustainability. Then, the purpose and aim of the thesis is described, followed by research questions, project background, and lastly limitations.

1.1 Topic background

Knowledge has long been argued to be a vital resource to a company's competitive abilities (De Luca and Cano Rubio, 2019; Liyanage et al., 2009; Shin et al., 2001), and contributes to the development of value-creating products and services and increases the effectiveness of operational processes (North and Kumta, 2018). For instance, knowledge about its customers enables a company to meet current and future customer needs, while knowledge about competitors provides learning from them and the ability to position itself accordingly. Moreover, process know-how and best practise increase productivity and quality. Hence, a business's success will be highly linked to the knowledge workers' ability to develop and apply knowledge productively and efficiently (Handzic, 2005). When succeeding with the utilisation of knowledge, a company can achieve long-lasting competitive advantages, especially if it is difficult to replicate or transfer the knowledge (North and Kumta, 2018; Liyanage et al., 2009). Liyanage et al. (2009) even claim that knowledge is one of the most critical resources because of its competitiveness. According to Goh (2002), difficulties associated with effective knowledge management pose significant challenges for organisations, and highlights that it indeed is a key necessity for organisational success and competitive advantage. Furthermore, Goh (2002) underpins that knowledge transfer and organisations' ability to transfer knowledge are key factors within knowledge management. Generally, organisations have a stated knowledge transfer process which should be followed when transferring knowledge. However, simply having a knowledge transfer process in place is believed by the authors to not be sufficient to achieve knowledge transfer success. Rather, it is equally important for organisations to also facilitate the application and utilisation of such a process. Following this, the central theme of this thesis is the facilitation of effective knowledge transfer.

De Luca and Cano Rubio (2019) argue that even if knowledge is kept within a company, the knowledge also needs to be transferred within the organisation to fully utilise the associated benefits and create value. Such benefits include for instance increased innovation (Cohen and Levinthal, 1990), increased effectiveness of operational processes (North and Kumta, 2018), and reduced risk of "reinventing the wheel" (Pandey, 2016). The benefit of successful knowledge transfer that this paper is focused on is the prevention of reoccurring quality issues, by investigating how effective knowledge transfer between a quality assurance department and a product development department can be facilitated. The authors of this thesis argue that there is a connection between product quality and knowledge transfer. First, since one of the criteria for receiving the quality award Deming Prize is 'Collection and analysis of information and accumulation and utilization of knowledge' (Union of Japanese Scientists and Engineers, 2015). Secondly, Bergman and Klefsjö (2010, p. 19) explain that 'Companies with an innovative and systematic way of working with quality and quality improvements have often achieved great success on the market, lower internal costs, and a shorter design and development phase of new products'. Here, an effective knowledge transfer process could constitute such a systematic way of working with quality and quality improvements. Lastly, Radovilsky et al. (1996) argue that to have an effective quality program, a company must facilitate good communication between departments. Therefore, it is believed that effective knowledge transfer between a quality assurance department and a product development department is essential to prevent recurring quality issues in new products. This since effective knowledge transfer will contribute to knowledge transfer success, which in this paper is defined as the complete transfer of required knowledge needed to implement the solution to a quality issue in new product development (NPD) projects, which thereby prevents recurring quality issues.

The role of NPD is also commonly viewed as key in order for companies to be competitive with regards to quality. According to Leonard-Barton (1992), knowledge embedded in employees is strongly linked to NPD, and De Luca and Cano Rubio (2019) further highlight that company performance is highly dependent on its ability to transfer knowledge. Particularly, Hoopes and Postrel (1999, p. 844) highlight that 'Product design is especially sensitive to gaps in shared knowledge', and underpin that insufficient knowledge sharing can lead to suboptimal decision-making regarding the product. This in turn results in valuable man-hours going to waste due to rework, which could have been avoided with proper knowledge sharing (Hoopes and Postrel, 1999). This reasoning implies that the ability to transfer and share relevant knowledge to employees involved in product development significantly impacts product performance and quality levels.

Since both quality and NPD affect the competitiveness of a company, it is reasonable to assume that a company's success and competitive abilities is strongly dependent on its capability to transfer and utilise existing knowledge within the organisation, when designing and developing new products. As such, the effectiveness of the transfer of knowledge has a direct influence on product quality and development, as well as on financial performance (see e.g. Hoopes and Postrel (1999)). This paper

aims to complement existing research on knowledge transfer by explicitly studying how effective knowledge transfer between a product development team and a quality assurance team can be facilitated, and present recommendations aiming to close knowledge gaps between such teams and prevent recurring quality issues within manufacturing companies.

1.1.1 Sustainability and knowledge transfer

Handzic (2005, p. 5) claims that '... knowledge rather than financial capital, land or labour is the major source of continued economic growth, value and improved standards of living'. This suggests that the value generated from knowledge goes beyond that of organisations' competitiveness, to also have a significant impact on social and financial sustainability. This could for instance be reflected by new products realised by knowledge, which benefit people and society from a greater perspective.

As described in the previous section, Bergman and Klefsjö (2010) argue that working with quality improvements, such as transferring knowledge between a quality department and a product development department, will lead to greater market success, lower internal costs, and a shorter design and development phase. Thus, producing low-quality products could clearly have a negative impact on a firm's financial performance, since this could require exchange or maintenance of broken products or even loss of customers, which induce extra costs or result in declining revenue. Furthermore, shorter development time makes it possible for products to hit the market faster, which can lead to higher sales and revenue compared to later market introduction (Debardelaben et al., 1997). Moreover, as cited above, Hoopes and Postrel (1999) state that product design is sensitive to gaps in shared knowledge, which can result in suboptimal products and might cause less satisfied customers or quality issues besides production or assembly challenges – all of which can result in a decrease in revenue. Hence, in addition to clearly compromising on environmental sustainability, scrap and rework can contribute to financial unsustainability.

1.2 Purpose and aim

The purpose of this thesis is to identify facilitators that can enable effective knowledge transfer between two departments, whereof one is responsible for solving quality issues and one is responsible for implementing the solution in new projects. By facilitating effective knowledge transfer, these factors also contribute to knowledge transfer success – in this case reflected by the prevention of recurring quality issues.

1.3 Research questions

In order to fulfil the purpose of the thesis and identify how effective knowledge transfer between such departments can be facilitated in order to prevent recurring quality issues, three research questions were constructed and formulated as follows:

1. What factors prevent effective knowledge transfer?
2. How does motivation and willingness affect knowledge sharing and transfer?
3. What are success factors to effective knowledge transfer?

1.4 Project background

This thesis was carried out in collaboration with the organisation Global Product Development (GPD) at Volvo Buses in Gothenburg. Specifically, the study focuses on the transfer of knowledge between the two organisations Delivery Assurance (DA) and Platform Development (PD) within GPD. DA is responsible for finding the root-cause to quality issues and developing the appropriate solution to it, while PD is responsible for implementing this solution in new development projects. The research builds on a recent study by Almér et al. (2019), but takes a more narrow focus on the technical division EATS (Exhaust-After-Treatment-System). The employees within EATS are experiencing recurring quality issues, related to for instance installation, which they believe is to a great extent related to their existing knowledge transfer. Therefore, on behalf of GPD, this study involves investigating their current knowledge transfer and process, and identifying potential improvement areas which can prevent quality issues from reoccurring. A description of the case can be found in Chapter 4.

1.5 Limitations

Due to limited resources and time constraints, the number of interviews to be conducted was consequently affected, which could possibly limit the amount of valuable information to the study. However, this risk was mitigated by aiming to perform a sufficient number of interviews until reaching a point where the new obtained information did not significantly deviate from the information provided from previous interviews.

2
Theoretical framework

This chapter introduces the fundamental theoretical parts of the research area, which form the foundation for the upcoming analysis of the empirical findings in Chapter 6. The chapter commences with a brief overview of relevant terminology and key areas, followed by a deep-dive into knowledge transfer, including a description of an existing theoretical framework, strategies, and barriers. Lastly, motivation and willingness to share knowledge is also addressed.

2.1 Knowledge Management

According to North and Kumta (2018), the field of *knowledge management* treats the process of creating, sharing, and applying knowledge among individuals, teams, and organisations to reach strategic and operational objectives. From another perspective, Liyanage et al. (2009) describe knowledge management as the process of knowledge capture, knowledge sharing, knowledge transfer, knowledge application, and organisational learning and innovation. These two definitions both include "sharing" and "applying", but differ in the starting step where North and Kumta refer to "creating", whilst Liyanage et al. refer to "capturing" and also include "knowledge transfer" and "organisational learning and innovation". Existing literature provides numerous definitions of what constitutes a knowledge management process, which can be viewed in Figure 2.1 composed by Shin et al. (2001). The figure also describes how the terminology varies when describing a knowledge management process, which arguably reflects the difficulties of defining the areas of knowledge management.

The purpose of presenting the figure here is merely to illustrate the broadness of the research topic, and that the terminology varies greatly among researchers. In this thesis, the process steps *Storage* and *Distribution* in the KM value chain will be investigated, although from now on referred to as *Transfer*. The definition of knowledge transfer and what constitutes the knowledge transfer process will be further explained below in Section 2.2.2. There are many reasons for why it is important to transfer knowledge. For instance, knowledge transfer provides a vital link between the individual within the organisation who possesses the knowledge and the level of the organisation where the knowledge is converted into economic and competitive

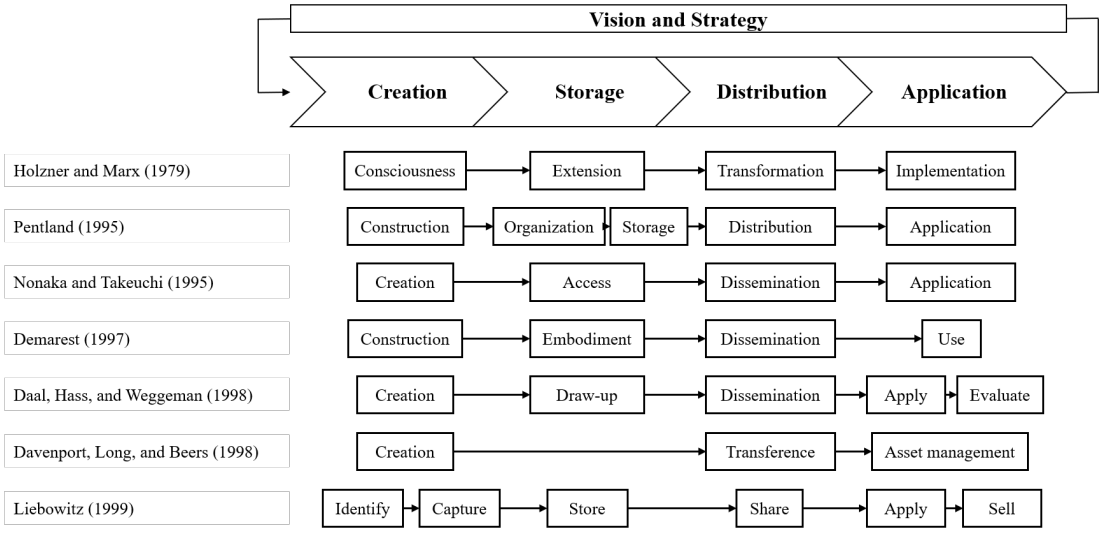

Figure 2.1: KM value chain (Shin et al., 2001, p. 341). Authors' own copyright.

values for the organisation (Hendriks, 1999). According to Lee and Al-Hawamdeh (2002), it is important to transfer knowledge since many industrial countries have an ageing population with a lot of accumulated knowledge that needs to be codified and passed on before people retire. Otherwise, the knowledge will be lost. Besides retirement, they also suggest other employment changes, like redundancy, resignation, and promotion as causes of lost knowledge, if not transferred. Furthermore, Lee and Al-Hawamdeh (2002) also highlight that organisations have huge knowledge assets, and keeping the knowledge in separate silos will lead to the inefficient event of reinventing the wheel. Such a situation occurred at Intel, which in a development process found that another team had already encountered more than 60% of the problems they faced. Lastly, Lee and Al-Hawamdeh (2002) state that the increase in online work with physical distance, different time zones, and so on might create knowledge transfer problems. In virtual contexts communication is important, but understanding the transferred meaning of a text message can be confusing where facial expressions, gestures, and vocal inflexions are removed. These factors and others stated above when highlighting the importance of working with knowledge management are all arguments for why companies today should focus on their knowledge transfer.

2.1.1 Definition of knowledge and information

The concept of knowledge can be defined in various ways. A well-known definition that at least goes back to Plato is that knowledge is *justified true belief* (Artemov, 2018; Hay, 2008). This implies that a proposition have to be true, believed in, and that there is justification in believing that the proposition is true. Only then, the proposition is defined as knowledge. This definition of knowledge as justified true belief is for instance used by Nonaka (1994). However, it has also been criticised (see e.g. Artemov (2018); Gettier (1963)), since justified true belief is argued by other researchers to not necessarily yield knowledge when the constructive character of

truth is taken into account. Moreover, Milton (2007) gives several other examples on how knowledge can be defined: a highly-structured form of information, what is needed to think like an expert, what separates experts from non-experts, and what is required to perform complex tasks. North and Kumta (2018) explain information and knowledge by first starting with the fundamental building blocks of communication, which is symbols. In order to make sense of the symbols, rules are needed, and these rules are called syntax. When combining symbols and syntax, they become data. Then, when adding meaning to the data, information is obtained. The definition of information used by North and Kumta (2018, p. 36) is: 'Information is organised data adding meaning to a message. This information is interpreted differently depending on the context, experience and the expectations of people'. Lastly, when adding context, experience, and expectations to the information, knowledge is gained. In this thesis, the definition of knowledge by North and Kumta (2018, p. 36) will be used, which is originally based on CBI (1995):

> Knowledge refers to the tacit or explicit understanding of people about relationships among phenomena. It is embodied in routines for the performance of activities, in organisational structures and processes and in embedded beliefs and behaviour. Knowledge implies an ability to relate inputs to outputs, to observe regularities in information, to codify, explain, and ultimately to predict.

The definition is believed to be suitable for this paper for several reasons. First, dividing knowledge into different categories makes it easier to understand the nature of knowledge, and furthermore the embedded challenges of knowledge. Second, the definition defines where knowledge can be found within an organisation, and thereby where to investigate when studying the field of knowledge. Lastly, the definition explains what knowledge implies, and thereby also determines the indispensable need of knowledge when performing certain tasks. Thus, the definition provides a thorough understanding of the concept of knowledge.

2.1.2 Dimensions of knowledge

In the chosen definition of knowledge, there are two types of knowledge specified, *tacit* and *explicit*. North and Kumta (2018) describe explicit knowledge as formal and structured, which can be shared by codifying it or transferred by formal systematic language. Furthermore, explicit knowledge can be stored in the media outside the brain. North and Kumta describe tacit knowledge as both built-up experience from executing tasks or projects, and insights gained from problem solving. Moreover, tacit knowledge is personal, context-specific, and often unconscious, which makes it hard to formalise and transmit. It is based on education, ideals, values, and feelings of an individual. Furthermore, North and Kumta argue that 'Subjective insights and intuition embody tacit knowledge that is deeply rooted in the actions and experiences of the particular person.' Thereby, tacit knowledge has a large impact on how people behave and act.

The fundamental idea of Polanyi (2013) is that "we can know more than we can tell". The author exemplifies this by saying that we can recognise a face among thousands, but we cannot verbally formalise this knowledge. Lee and Al-Hawamdeh (2002) also exemplify this phenomena by describing Babe Ruth's (a famous baseball player) ability to hit a homerun. As a possessor of the knowledge, Babe Ruth does not have to know what he knows, he can still utilise the knowledge. Due to the challenge of formalising tacit knowledge, explicit knowledge has an advantage over tacit knowledge since it is more easily transferred across individuals and settings (Ipe, 2003).

2.2 Distinguishing between two main terms

As mentioned, the process of defining and distinguishing the various areas within knowledge management is difficult, and knowledge transfer is no exception. For instance, Paulin and Suneson (2012) explain how the terms knowledge transfer and knowledge sharing are occasionally used synonymously, due to slightly varying definitions and meanings depending on how different authors view and interpret the terms. This is also highlighted by Liyanage et al. (2009), who explain that the two terms are often discussed together by many authors and researchers.

However, Liyanage et al. describe how their research suggests that knowledge sharing is a two-way process between individuals exchanging information, while knowledge transfer goes beyond simply utilising existing knowledge, to include how it should be acquired and stored to enhance efficiency and effectiveness. Moreover, they continue their argumentation by referring to the reasoning by Argote and Ingram (2000), and state that knowledge transfer exceeds the scope of knowledge sharing to also include the transfer of knowledge between for instance groups, departments, and divisions. In this thesis, focus will be on the transfer of knowledge between departments and teams. Hence, the two terms will be treated separately.

2.2.1 Knowledge sharing

It is only possible to make use of knowledge when people share their knowledge and build on the knowledge of others (Ipe, 2003). Therefore, knowledge sharing can be described as the act where knowledge is made available to others within the organisation. Moreover, Ipe (2003, p. 341) defines knowledge sharing between individuals as 'the process by which knowledge held by an individual is converted into a form that can be understood, absorbed, and used by other individuals'. Another definition of knowledge sharing presented by Bartol and Srivastava (2002) is stated as follows: 'We define knowledge sharing as individuals sharing organizationally relevant information, ideas, suggestions, and expertise with one another'. The different ways of how explicit and tacit knowledge can be shared between individuals will be described in the next section.

2.2.1.1 SECI model

In order to transmit knowledge to another individual, the knowledge has to be created at the recipient. The transmitting and creation of knowledge is described in the SECI model by Nonaka (1994), which is illustrated in Figure 2.2. The model describes how explicit and tacit knowledge can be transmitted in four different ways, or 'modes' as Nonaka defines them. The four modes, described below, are Socialisation, Combination, Externalisation, and Internalisation. According to Nonaka (1994), the model can be utilised in several ways, and describes that it can be viewed as a *Spiral of organisational knowledge creation*, where knowledge is created by interaction between the different modes. However, this interpretation of the model will not be applied in this thesis. Rather, the conversion modes will be treated separately, with the view that tacit and explicit knowledge can be transformed in four different ways.

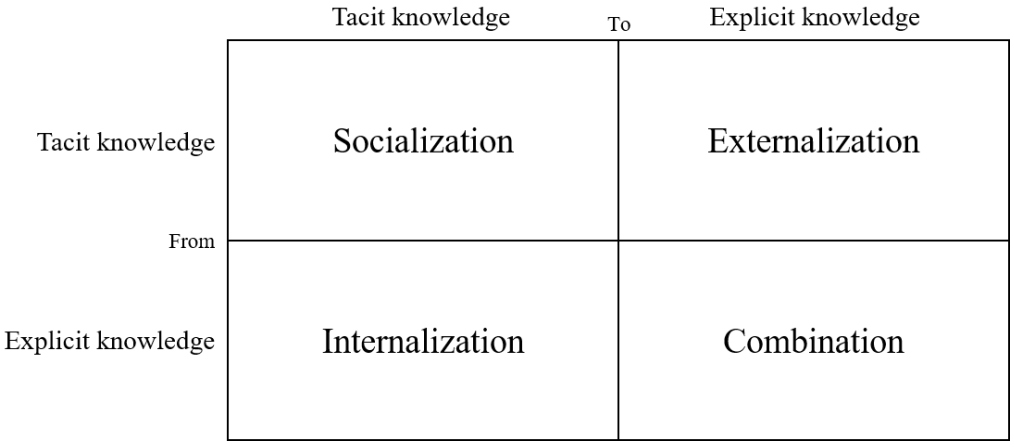

Figure 2.2: Modes of the knowledge creation (Nonaka, 1994, p. 19). Authors' own copyright.

Socialisation is explained by Nonaka (1994) as the process of converting tacit knowledge between individuals. The conversion is done via interactions like observation, imitation, and practice. Therefore, language does not necessarily need to be used in the conversion process. The primary goal when creating tacit knowledge at the recipient is to gain shared experience.

Combination is further described by the author as the process of combining explicit knowledge among different individuals to create new explicit knowledge. The creation of new explicit knowledge is done through sorting, adding, recategorising, and recontextualising the exchanged knowledge. The exchange of explicit knowledge among individuals can for instance be conducted through meetings or over the telephone.

Externalisation and *internalisation* is described by Nonaka as the conversions where both tacit and explicit knowledge is involved in a process of mutual interactions that can expand over time. Externalisation is the conversion of tacit knowledge into explicit knowledge, while internalisation is the conversion of explicit knowledge into tacit knowledge, which in some notations are known as learning. When transmitting

knowledge from one individual to another, externalisation will first be performed by the knowledge source, then the knowledge recipient will perform internalisation. As a result, knowledge have been created at the recipient and the transmitting of knowledge between the individuals has been conducted.

Chirico and Salvato (2016) argue that for firms to utilise necessary knowledge, team members must internalise their unique expertise. Furthermore, the team members' level of knowledge internalisation depends on their ability to recognise, assimilate, and exploit each other's unique knowledge. First, knowledge recognition is defined by Chirico and Salvato as team members' ability to identify and value colleagues' unique knowledge to prevent expertise from being overlooked. Secondly, knowledge assimilation refers to team members' ability to understand each other's unique knowledge and how the knowledge fits together. Lastly, knowledge exploitation denotes team members' ability to build on and use their knowledge for the collective knowledge to facilitate development. Tiwana and Mclean (2005) describe the creation of team creativity as an improvisational process where team members' ideas, perspectives, and skills collaboratively build and interrelate a system of creative actions. Thus, the act of internalisation will benefit team creativity. This is also supported by Cohen and Levinthal (1990), who argue that interactions between individuals with unique knowledge enhance the innovation ability of the organisation way beyond what an isolated individual can achieve. The internalisation process creates awareness regarding available knowledge among team members, which lowers interpretive ambiguities and disconnect individuals of the team from their thought worlds (Chirico and Salvato, 2016).

2.2.2 Knowledge transfer

There is a wide range of literature describing different levels of knowledge transfer, which Duan et al. (2010) classify into four main levels: knowledge transfer at *transnational* level, at *inter-organisational* level, at *intra-organisational* level, and at *individual* level. The main focus in this paper will be on knowledge transfer at the intra-organisational level, which can be defined as the access to a resource a firm already possesses, the resource being knowledge within the organisation (Perrin and Rolland, 2007). A similar definition is proposed by Argote and Ingram (2000, p. 151), who claim that knowledge transfer in organisations is 'the process through which one unit (e.g. group, department, or division) is affected by the experience of another', which can be either explicitly or implicitly. In addition to this definition of knowledge transfer on an organisational level, the intra-organisational knowledge transfer process can also be viewed on an individual level, which Argote and Ingram describe as the effect of having experience in one task has on the performance of another.

2.3 A knowledge transfer framework

Plenty of research within the field has been performed over the years, and academics have continuously introduced new perspectives on the transfer of knowledge

and developed improved models and explanations aiming to describing the process[1]. Albino et al. (1999) suggest that four distinct components can generally be identified in a knowledge transfer process: the *actors* involved (in this paper referred to as *source* and *recipient*), the *context* where the interaction takes place, the *content* transferred between the actors, and the *media* utilised to carry out the transfer. Other researchers (e.g. Perrin and Rolland (2007); Davenport and Prusak (1998)) highlight that there are two separate actions involved in a knowledge transfer process: the *transmission* of knowledge and the *absorption* of knowledge. Therefore, Perrin and Rolland (2007) and Davenport and Prusak (1998) argue that knowledge that has not been absorbed has not been transferred. Cummings and Teng (2003) similarly underpin that knowledge transfer is only effective if the knowledge is retained by the receiver. This is a vital point adopted in this paper, since the definition of successful knowledge transfer here also involves the absorption and use of new knowledge.

Several existing frameworks have undergone review, with the aim to identify a suitable model to apply on the case study of this thesis. When deciding upon a theoretical framework, several criteria had to be fulfilled. The framework should:

- Be considered to be of high validity;
- Reflect knowledge transfer on an intra-organisational level;
- Be consistent with this paper's definitions of relevant terms;
- Be applicable on the case study to enable a proper analysis

The view of Cummings and Teng (2003) on the process of knowledge transfer fulfilled all of the above criteria and was therefore selected as the most suitable framework for this thesis. The meaning of introducing this model is to familiarise with the concept of knowledge transfer, and gain insight into what components, activities, and mechanisms constitute a knowledge transfer process. This model will also be applied when analysing the findings from the case study, and will constitute the foundation for the development of recommendations on how to facilitate effective knowledge transfer.

Figure 2.3 below provides a reworked, slightly simplified, illustration of Cummings and Teng's (2003) take on the process of knowledge transfer, which they base upon several research streams (e.g. Zander and Kogut (1995); Kostova (1999); Davenport and Prusak (1998)). Cummings and Teng aim to describe the process by dividing it into four domains: knowledge context, relational context, recipient context, and activity context. Each of these domains represent independent factors which affect the outcome of the dependent outcome *knowledge transfer success*. The model describes knowledge transfer as a set of interconnected domains accompanied by various factors that form a cumulative effect on the success of the knowledge transfer process. The importance of treating knowledge transfer as a process rather than an act is

[1]See e.g. Liyanage et al. (2009), Gilbert and Corden-Hayes (1996), Albino et al. (1999), Wehn and Montalvo (2018), Szulanski (2002), Cummings and Teng (2003), De Luca and Cano Rubio (2019), Argote and Ingram (2000)

supported by Szulanski (2000), in order to enable the incorporation of associated difficulties into the model.

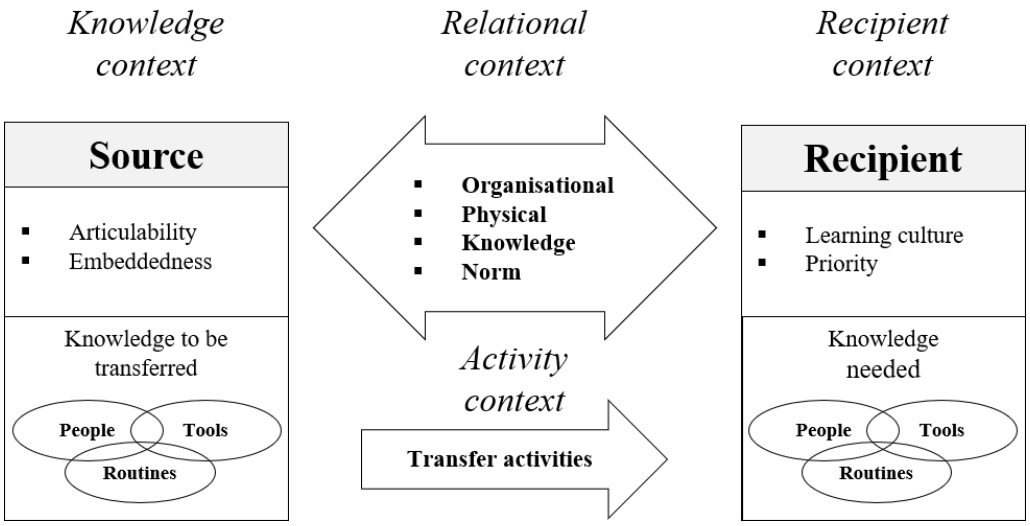

Figure 2.3: KT process (unit-to-unit) (Cummings and Teng, 2003, p. 40). Authors' own copyright.

Szulanski further explains that by looking at the transfer as a process, one enables a deeper scrutiny of how difficulties evolve over the different stages. Moreover, it supports the development of organisational mechanisms that can contribute to knowledge transfer. As can be seen in the figure, the framework comprehends several key factors related to each context. In this section, the overall model will be briefly described, since it provides an appropriate way of thinking about how knowledge is transferred for the specific context of this thesis, while the nine factors will be revisited in Section 2.4.

Knowledge context

In order to achieve knowledge transfer success, Cummings and Teng suggest that both sides participating in the process, the source and the recipient, need to have an understanding of where and how the required knowledge can be made accessible. Following this, the authors explain how this first domain comprises the transferred knowledge's *embeddedness* and *articulability*. With regards to the former, previous research implies that knowledge can mainly be embedded in people, tools, and routines, and in the associated subnetworks (Cummings and Teng, 2003; Argote and Ingram, 2000). Furthermore, the degree to which knowledge can be articulated also has a high impact on knowledge transfer success.

Relational context

The model incorporates four elements within the relational domain that can highly influence the degree of knowledge transfer success. The first element is *organisational distance*, which refers to the level of integration between the units. Second,

the *physical distance* between the source and recipient taking part in the process is described as 'the difficulty, time requirement, and expense of communicating and getting together face-to-face'. The third factor affecting knowledge transfer success, *knowledge distance*, constitutes 'the degree to which the source and recipient possess similar knowledge' (Cummings and Teng, 2003, p. 46). Lastly, the final element *norm distance* is explained as how well the source and recipient share the same values and organisational culture.

Recipient context

This context includes two factors, *project priority* and *learning culture*. According to the authors, these factors can significantly impact knowledge transfer success in the way different projects are prioritised, how resources are allocated, and to the extent of which learning is prioritised by the source and the recipient. Moreover, the level of success is also dependent on how learning is facilitated and encouraged by the organisation in general. That is, whether there are sufficient activities and mechanisms in place to enable organisational learning (Cummings and Teng, 2003).

Activity context

The last domain described by Cummings and Teng comprises the essence of transfer activities to reach knowledge transfer success. More specifically, the number of activities that are in place, and how frequently they are utilised. The authors emphasise the connection between these activities and organisational learning, and explain that their research indicates that organisations with a well-developed learning culture require higher standards with regards to their knowledge transfer activities.

The view of Cummings and Teng (2003) on the process of knowledge transfer combines several research streams into a broad yet comprehensive understanding of how knowledge is transferred from source to recipient, from one unit to another. Their model described in this section is deemed to facilitate a good understanding of what a knowledge transfer process is, and provides a suitable context for the upcoming sections of this chapter.

2.3.1 Knowledge transfer strategies and mechanisms

Albino et al. (1999) describe knowledge transfer as 'a communication process with information processing activities, where the actors involved can carry out the transfer of knowledge using an appropriate mechanism' (Jasimuddin, 2007, p. 295). According to Jasimuddin (2007), the two main knowledge transfer mechanisms are *personalisation* and *codification* – here referred to as knowledge transfer *strategies* rather than mechanisms, in line with Hansen et al. (1999). *Mechanisms* are here instead defined as ways to transfer knowledge, in line with Perrin and Rolland (2007). Jasimuddin (2007) states that the utilisation of a suitable knowledge transfer strategy will contribute to a well-functioning knowledge transfer process. Hansen et al. (1999) further explain that while either personalisation or codification should be chosen as the main strategy, the other strategy should be used to support the main.

Hansen et al. describe that firms pursuing a codification strategy focus mainly on storing knowledge in databases, which makes it easily accessible for everyone within the company. The authors refer to this as a "people-to-documents" approach, which enables people to reuse the knowledge without having to reach out to the original developer of the documents. They further explain how knowledge that is easily codifiable is usually explicit. On the contrary, tacit knowledge is as described earlier personal and hard to formalise and transmit, since it is gained through personal experiences (Hansen et al., 1999). Therefore, firms that rely on tacit knowledge should pursue a personalisation strategy, which involves sharing knowledge mainly through personal communication channels. That is, personalisation corresponds to a "person-to-person" approach. In this case, codified knowledge merely serves the purpose of getting people up to speed before directly contacting the original creator of the knowledge.

According to Perrin and Rolland (2007), three commonly used knowledge transfer mechanisms are documentation, technology, and face-to-face communication. From a broader perspective, Ipe (2003) differentiates between *formal* and *informal* opportunities to transfer knowledge and facilitate knowledge sharing within organisations. According to Ipe, formal mechanisms are most suitable for transferring explicit knowledge. Such mechanisms are structured and also provide the tools needed to conduct the transfer. Informal knowledge transfer mechanisms on the other hand are deemed more appropriate for transferring tacit knowledge, since these involve personal relationships and networks, and are meant to facilitate face-to-face communication.

2.4 Barriers to knowledge transfer

Barriers to knowledge transfer can be defined as factors that increase the difficulty and complexity of transferring knowledge within an organisation (Mu et al., 2010). As illustrated in Figure 2.3 in Section 2.3, Cummings and Teng (2003) present nine factors their research suggests affect how well knowledge is transferred to a recipient. The barriers presented in this section are to a great extent based upon these, although they will be referred to as *potential barriers* in this paper, since whether or not they form barriers depends on their level. Additional barriers that are also commonly emphasised within the field of knowledge transfer and are perceived as highly relevant for this paper will also be described below.

2.4.1 Knowledge articulability and embeddedness

The degree of articulability determines how well and how easily knowledge can be communicated (Cummings and Teng, 2003). Poorly articulated knowledge is difficult to store and share and can be ambiguous (Akram et al., 2011). Based on Polanyi (2013), Cummings and Teng describe that people actually possess more knowledge than what they can explain in words, in the form of tacit knowledge. Research has revealed that tacit knowledge, which is hard to articulate, is consequently more difficult to transfer, in relation to explicit knowledge which is easier to articulate and

codify (Cummings and Teng, 2003; Bresman et al., 1999; Zander and Kogut, 1995). In the meantime, however, although explicit knowledge is easier to transfer, it can also be more difficult for the recipient to internalise such knowledge (Cummings and Teng, 2006).

The degree of knowledge embeddedness can also form a potential barrier, where the term embeddedness involves how difficult the knowledge is to transfer, and how well it is known where the knowledge resides. It is argued that the deeper knowledge is embedded, the harder it is to transfer (Cummings and Teng, 2003). As mentioned, knowledge can be embedded in the elements people, tools, and routines, and combined in subnetworks (Argote and Ingram, 2000) and these 'define the setting in which knowledge originates' (Cummings and Teng, 2003, p. 44). A knowledge transfer process should therefore involve how these elements might also need to be transferred in order to achieve a high degree of knowledge transfer success, since this is affected by the level of total knowledge embeddedness (Cummings and Teng, 2003), exemplified in the paragraphs below.

Research has shown that particularly tacit knowledge embedded in people can easily be lost when employees leave an organisation (Droege and Hoobler, 2003). This implies that the transfer of knowledge embedded in people occurs by transferring the specific individuals possessing the knowledge (Cummings and Teng, 2003). However, some researchers argue that this applies for both explicit and tacit knowledge (e.g. Cummings and Teng (2003)) while Droege and Hoobler (2003, p. 53) state that 'codified knowledge is not at risk when employees leave'.

According to Argote and Ingram (2000), tools within this particular context involve technology such as software and hardware. Knowledge embedded in technology is explicit in nature, since it is codified. In line with the definition above, Teece (2000, p. 41) states that 'Efficiently organised information is not knowledge. It is simply efficiently organised information – a helpful tool, but little more'. This implies that just because information has been transferred, it does not necessarily mean that it has been transformed into knowledge. As mentioned above, knowledge that has not been absorbed has not been transferred (Perrin and Rolland, 2007), and research suggests that explicit knowledge is harder for recipients to internalise (Cummings and Teng, 2006). As such, a barrier to the transfer of knowledge embedded in tools could arise due to difficulties associated with internalisation.

Lastly, Teece (2000) emphasises that knowledge embedded in organisational processes, routines, and subnetworks is due to tacitness very difficult to transfer without transferring the group of people who have established the working routine. Cummings and Teng (2003) further underpin how research have shown that groups increase their performance levels when aware about "who-knows-what". Not knowing where knowledge resides, as a result of for instance reassignment or employee turnover, has been shown to consequently diminish group performance (Moreland, 1999).

2.4.2 Four types of distance barriers

Based on a combination of various research streams, Cummings and Teng (2003) identify four potential barriers related to distances. These are organisational distance, physical distance, knowledge distance, and norm distance.

First, ***organisational distance*** relates to the level of integration between the parties involved in the intra-organisational relationship. This barrier is emphasised by Cummings and Teng to be highly determined by the strength of social ties, free flow of communication, consistency in administrative controls, and the level of trust between the source and recipient. In a more recent paper, they also state that the effectiveness of knowledge transfer increases when the source and recipient have a closer relationship (Cummings and Teng, 2006). As such, a lower level of integration results in greater organisational distance between the source and recipient, which subsequently undermines the possibility of successful knowledge transfer. The essence of informal social ties in knowledge transfer has been further emphasised by many researchers such as Bresman et al. (1999) and Raegans and MacEvily (2003).

Previous research (e.g. Athanassiou and Nigh (2000)) have shown that face-to-face meetings outperform other transfer formats and medias in terms of for instance effectiveness, as well as richness and tacitness of knowledge. Increasing the ***physical distance*** between the parties in the transfer process consequently also increases the difficulty, time requirement, and expense of communicating and facilitating face-to-face communication (Cummings and Teng, 2003). Moreover, Cummings and Teng underpin that when intense interaction is required, close proximity between the units participating in the transfer process is necessary. Thereby, physical distance could constitute a barrier to knowledge transfer.

The third potential barrier is ***knowledge distance***. The research by Cummings and Teng implies that knowledge transfer is facilitated if the source and recipient share a similar knowledge base. They found how there is an inverse relationship between knowledge distance and transfer success, meaning that the degree of knowledge transfer success decreases with increased knowledge distance. Additionally, if the knowledge distance between the source and recipient becomes too wide, the learning potential is undermined (Hamel, 1991). Szulanski (2000, p. 15) underpin that the 'absorptive capacity of the recipient, i.e. the ability to utilize new knowledge, depends on its existing stock of knowledge and skills', which introduces the commonly used concept of *absorptive capacity*. Cohen and Levinthal (1990) describe that this concept incorporates three abilities, namely the recipient's ability to recognise relevant new information, assimilate it, and apply it. These abilities, they argue, are based on the recipient's current knowledge base. Hence, the degree to which knowledge can be completely transferred depends on the recipient's existing knowledge base. Following this, a too wide knowledge distance between the source and recipient could potentially result in a barrier to successful knowledge transfer.

The final barrier here is ***norm distance***, which reflects how well the source and recipient share the same organisational culture and values, as well as to what degree they have a common understanding about the knowledge transfer process (Cummings and Teng, 2003). Dhanaraj et al. (2004, p. 429) introduce the term *relational embeddedness* and explains that 'A relationship between actors can be characterized in terms of the strength of their social ties, their level of trust, and the extent to which they share common processes and values'. High relational embeddedness as such encourages the exchange of knowledge between the parties, contributes to proper knowledge transfer, and supports the creation of shared norms (Dhanaraj et al., 2004).

Dhanaraj et al. further highlight that shared values is key in the transfer of knowledge between organisational units. Moreover, Cummings and Teng (2006) explain that the communication between the source and recipient will increase in line with increasing social similarities between them. This in turn has a positive effect on knowledge transfer. Transferring knowledge between parties 'who can readily interact in a well-coordinated fashion' (Cummings and Teng, 2003, p. 58) is easier than if the parties have a greater norm distance. The research by Tushman (1977) further suggests that lack of shared norms and values hinder communication between units, which can impede knowledge transfer (Cummings and Teng, 2006).

2.4.3 Organisational culture and prioritisation

'Culture is rooted in the organization's core values and assumptions' (McDermott and O'Dell (2001, p. 77), and it is emphasised by a wide range of researchers that organisational culture is a factor that highly influences how a firm transfers knowledge and the effectiveness of it. Goh (2002) for instance, highlights that having an organisational culture that encourages learning has a positive impact on knowledge transfer. Consistent with this, the research by Cummings and Teng (2003) implies that lack of a learning culture could result in knowledge not being properly retained, nurtured, or further developed, hence forming a barrier to knowledge transfer. Therefore, they underpin that recipients within a learning culture who are provided with the capacity and routines appropriated to support all parts of the transfer process can achieve greater knowledge transfer success. Furthermore, Goh (2002) argues that there needs to exist a strong collaborative culture, with an inherent high level of trust, where the employees see it as natural, and not merely a responsibility, to share knowledge to achieve mutual success, if to establish effective knowledge transfer.

Lai and Lee (2007) argue that all aspects to knowledge management in general need to become an integrated part of the organisational culture if to be reflected in "how work gets done". Furthermore, Lai and Lee (2007, p. 308) state that 'widely shared and strongly held values enable management to predict employee reactions to certain strategic options thereby minimizing the scope of undesired consequences'. This reasoning implies that the organisational culture forms how employees instinctively react when faced with a need to make a decision, which relates to another potential

barrier – prioritisation. Cummings and Teng (2003) explain that different projects, including knowledge transfer projects, can have different levels of priority. They state that a project perceived by the recipient to be of high priority will receive more support and attention, and the recipient will be more motivated to carry out that project, compared to a project perceived as less important. Consequently, the level of prioritisation can act as a barrier to knowledge transfer success for projects considered to be of low priority.

2.4.4 Leadership and management

A potential barrier highly related to organisational culture and the way different projects and tasks are prioritised among employees, is leadership. According to Warrick (2017, p. 397), 'organizational cultures primarily reflects their leaders'. Davenport et al. (1998) furthermore list senior management support as a major factor that contribute to knowledge project success, and describe that senior managers can highly influence the degree of knowledge orientation within an organisational culture. Based on an extensive study on knowledge management projects, Davenport et al. (1998, p. 54) identified particularly three facilitators to efficient knowledge management projects:

- Sending messages that knowledge management and organisational learning are critical to company success
- Providing funding and other resources for infrastructure
- Clarifying what types of knowledge are most important to the company

These imply that managers play a key role in achieving successful knowledge management by both providing a clear direction for the employees and the required resources to move in that direction, as well as integrating the importance of knowledge management within the organisational culture. Similarly, Bell DeTienne et al. (2004) argue that knowledge management practices is something that need to be an integrated part throughout all levels of an organisation. This since managers have a direct influence on culture and the whole organisation's perception and view on knowledge management, and underpin that 'Without managers stressing the importance of KM programs, employees will assume that KM is just a passing fad, and not something that needs to be taken too seriously' (Bell DeTienne et al., 2004, p. 34). Consequently, insufficient leadership or resources misaligned with strategic intentions by management can clearly form a substantial barrier to successful knowledge transfer, in terms of both influence on organisational culture as well as the ability to communicate the importance of knowledge management to the organisation.

2.4.5 Transfer activities

Previous research has shown that successful knowledge transfer requires many types of activities which serve the purpose of supporting the sharing and transfer of knowledge. Therefore, Cummings and Teng (2003) suggest that increasing the number and forms of transfer activities also increase the recipient's chance of internalis-

ing the knowledge – which subsequently contributes to knowledge transfer success. Cummings and Teng (2003, p. 49) define knowledge transfer activities as 'those focused on assessing the form and embeddedness of the knowledge; those focused on establishing and managing an administrative structure through which differences and issues between the parties can be accommodated and reduced, and those focused on transferring the knowledge', where assessing the form of knowledge refers to determining the tacitness of the knowledge. Due to interdependence between these three types of transfer activities, it is vital to focus on all in order to achieve successful knowledge transfer (Cummings and Teng, 2006). This reasoning implies that neglecting one or several of the activity areas can impede knowledge transfer success, thus forming a barrier.

2.5 Motivation and willingness to share

Lee and Al-Hawamdeh (2002, p. 52) wonder, since knowledge is so valuable, 'who would want to share it?'. Without strong personal motivation people will not transfer knowledge according to Stenmark (Winter 2000/2001), and certainly not without concerning what they might gain or lose by doing so. Lee and Al-Hawamdeh (2002) identify the phenomenon of not being willing to share knowledge due to personal implications as *kaisu*, meaning "fear of losing out". According to Ipe (2003), there is an increasing amount of empirical evidence regarding the importance of people and people-related factors as critical to the organisational knowledge processes. In this section, factors that enhance employees' willingness and behaviour to share knowledge will therefore be investigated. By identifying important motivators and map factors influencing the willingness to share, these can be incorporated into the final recommendations on how to facilitate effective knowledge transfer. Thereby, the benefits of the factors can be utilised.

2.5.1 Motivational factors

Motivational factors can be divided into *external* and *internal* factors. Ipe (2003, p. 354-356) defines them, with a sharing perspective, as 'External factors include relationship with the recipient and rewards for sharing' and 'Internal factors include the perceived power attached to the knowledge and the reciprocity that results from sharing'. Amabile (1998) describes an external motivator as something a person does to attain something desirable or to avoid something painful. Examples of external motivators can be money, promotion, or a prize. Internal motivators, on the other hand, primarily stem from interests, satisfaction, and challenge of work (Amabile, 1998). Examples of internal motivators are the drive to solve a problem no one have solved before, and acknowledgement of work. According to Hau et al. (2013), there is mixed evidence regarding the effects of external motivators. Some studies have suggested that external factors motivate knowledge sharing, while other studies have indicated that external motivators have a negative effect on knowledge sharing. Meanwhile, internal factors have consistently shown a positive impact on knowledge sharing according to previous research (Hau et al., 2013).

Hendriks (1999) has found Hertzberg's two-factor theory relevant when pinpointing motivational factors that influence knowledge sharing. Hertzberg's two-factor theory consists of two factors: the *hygiene* factors and the *motivation* factors. Hygiene factors do not motivate behaviour when present, but will on the other hand still cause dissatisfaction and therefore decreased motivation when absent. Salary, status, and company policies are examples of such factors. As motivators, Hertzberg includes the following five factors: sense of achievement, sense of responsibility, recognition of job done, promotional opportunities, and challenge of work. However, Hendriks (1999) has chosen to also include a sixth motivational factor, the desire for operational autonomy, since he believes that it has been proven relevant as a motivator in other studies. When the motivators are present, they lead to an increase in motivation. When absent, the previous increase in motivation is not maintained or further developed, and thereby returns to status quo. However, no dissatisfaction is gained when the motivators are absent. In Figure 2.4 below, the relationship between the hygiene factors, the motivational factors, and behaviour is illustrated.

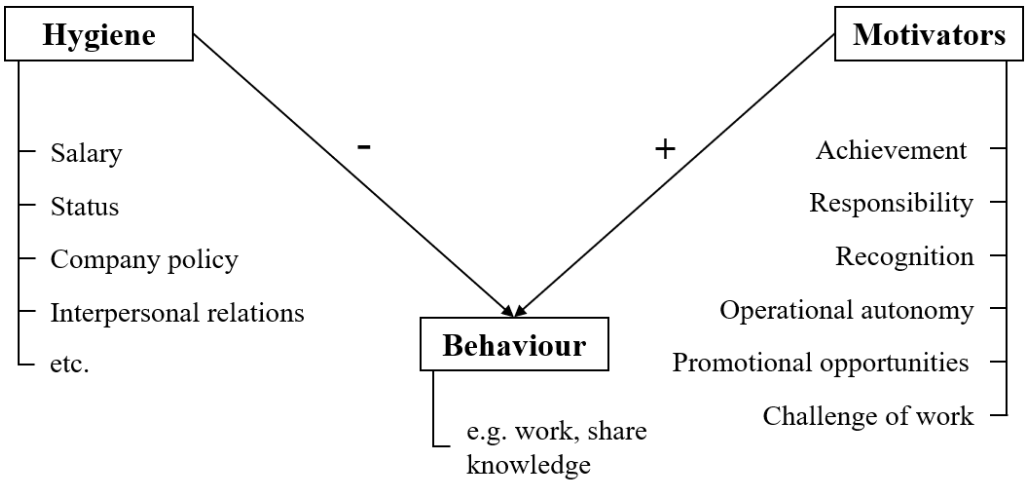

Figure 2.4: Herzberg's two-factor theory modified by Hendriks (1999, p. 95). Authors' own copyright.

Hendriks (1999) argues that when wondering why employees share knowledge, one look at the list of motivational factors, not the hygiene factors. Because, for instance, bonuses are unlikely to result in an increase in knowledge sharing itself and as another example, if knowledge possession implies status, knowledge sharing is less likely to occur. Hendriks further states that the motivators, on the other hand, seem to trigger knowledge sharing. Lastly, he believes that different motivator factors motivate the knowledge sources and knowledge recipients to participate in knowledge sharing. Knowledge sources might expect recognition, promotional opportunities, or feel responsible to share in first hand. Also, they might share because they expect or hope for reciprocity, while knowledge recipients might want operational autonomy, challenge of work, or gain promotional opportunities.

Another study performed by Liu and Fang (2010) investigated the correlation between different external, internal, and hygiene factors, and the willingness and behaviour of sharing knowledge. They referred to the behaviour-based hygiene factors by Herzberg and had similar definitions of internal and external motivational factors as stated in this thesis. The outcome of their study showed that motivation and altruistic characteristics of internal motivation as well as reputation and mutual-benefit factors were significantly and positively correlated with knowledge-sharing willingness and behaviour. In the meantime, the hygiene factors of external motivation only had significant correlation with sharing behaviour and not willingness to share.

By this, the authors of this paper can conclude that greater internal motivation and the creation of an altruistic mindset among employees will increase knowledge sharing willingness and behaviour. These aspects will also create a positive reputation about individuals who participate in the knowledge sharing and show the benefits of knowledge sharing willingness and behaviour. Moreover, hygiene factors such as rewards will draw individuals' attention to the behaviour of knowledge sharing and encourage such behaviour, but will not particularly contribute to creating willingness to share.

2.5.2 Willingness to share

Ajzen (1991) argues that predicting human behaviour is a complex task. However, one aspect that influences people's behaviour according to Wehn and Montalvo (2018) is people's intentions, goals, and plans. This is also supported by Deci and Ryan (1985), who state that individuals who have established a goal will engage in a behaviour that will lead to the goal. The reason for this is that most human behaviour is goal-directed, and therefore people's intentions, goals, and plans in a certain context can serve as a predictor of their behaviour (Wehn and Montalvo, 2018). With concern to that, Wehn and Montalvo present a modified version of the model *Theory of planned behavior* by Ajzen (1991), where they apply the model in a knowledge transfer setting, illustrated in Figure 2.5.

In the model, both the knowledge source's and the knowledge recipient's behaviour can be explained by the following factors: attitudes, social norms, and the control over the knowledge transfer process, which result in the accumulated willingness to transfer knowledge. These factors are described in the figure below. As can be seen, control over the knowledge transfer process can unlike the other factors directly result in the action of knowledge transfer. Ajzen (1991) states that the exact nature of the relations in his model Theory of planned behavior is still uncertain, even if the author also claims that his model is well supported by empirical evidence. Therefore, this uncertainty and empirical evidence is assumed to be valid also for Wehn and Montalvo's model. Furthermore, Wehn and Montalvo state that the model can be applied both in an inter-organisational setting as well as in an intra-organisational setting.

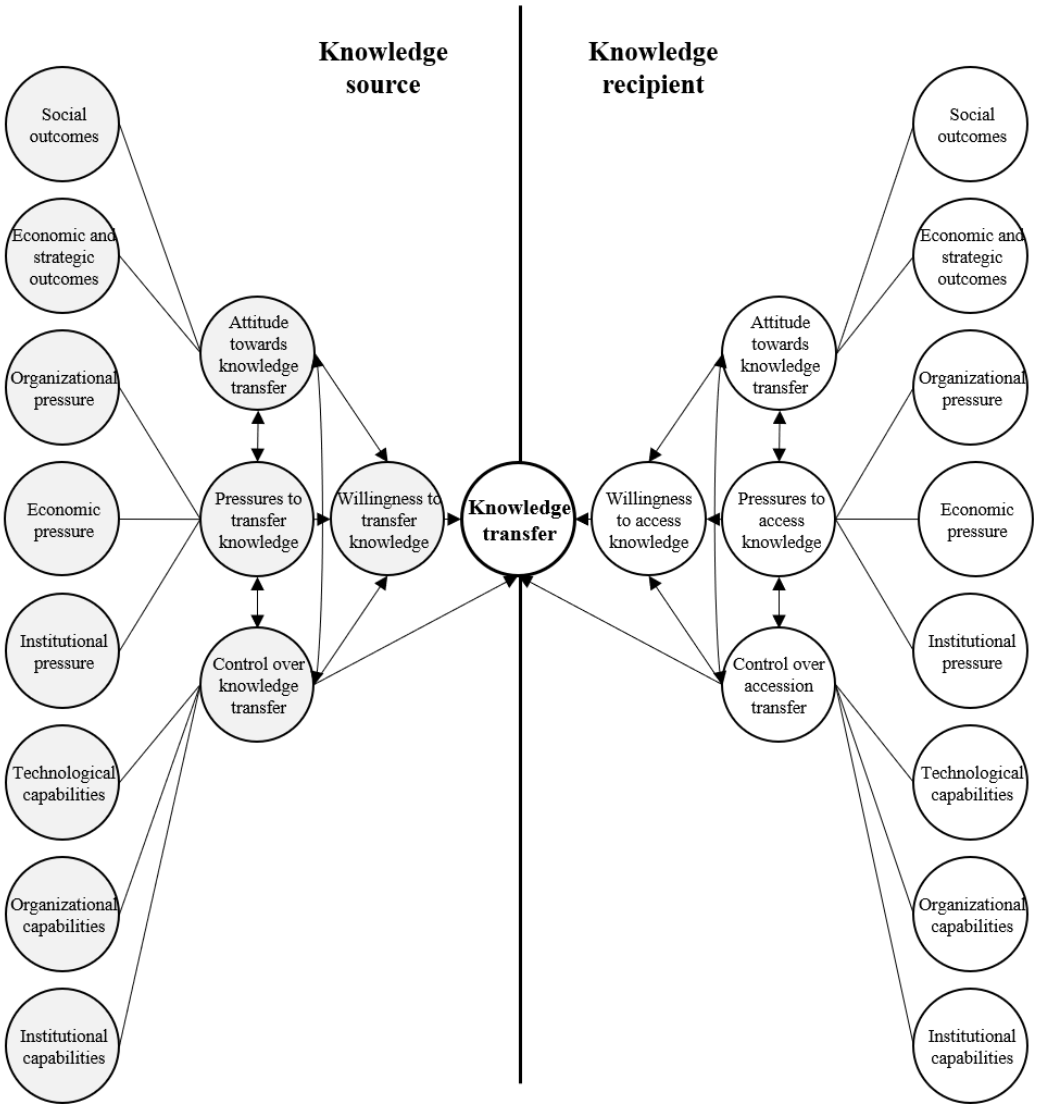

Figure 2.5: The dynamic knowledge transfer model (Wehn and Montalvo, 2018, p. 60). Authors' own copyright.

Wehn and Montalvo (2018, p. 59) define the first factor, *attitude*, as 'the degree to which people have a favourable or unfavourable evaluation or appraisal of a specific behaviour'. Therefore, an employee's degree of involvement in knowledge transfer activities is an index of whether they believe aspects arising from their involvement is favourable or unfavourable. The accumulated attitude towards knowledge transfer is the combined associations of the salient belief and relevant information regarding the topic that the transfer involves.

The perceived *social norm*, which is the second factor, to engage in knowledge transfer is constituted by the employee's accumulation of normative beliefs (Wehn and Montalvo, 2018), meaning how the employee perceives that people who are important to them believe the employee should or should not behave. In the knowledge transfer setting, this means whether or not they should participate in the knowledge transfer activity.

The third factor is *control* of the knowledge transfer process, which is defined as the perceived level of ease or difficulty of behaving according to a certain behaviour (Wehn and Montalvo, 2018). The belief regarding how easy or hard it is to achieve the planned outcome by knowledge transfer is based on, for instance, previous experience or second-hand information. An employee's perceived control over the knowledge transfer process is an index of whether required resources and opportunities to perform the transfer of knowledge is present or absent.

The model also presents different categories of general incentives (social outcome and economic and strategic outcome), pressures (organisational, economical, and institutional), and capabilities (technological, organisational, institutional) that affect the sources and recipients (Wehn and Montalvo, 2018). Which factor that influences each category varies depending on the context the source and recipient are operating in, and can go beyond the suggested incentives, pressures, and capabilities included in the model.

3
Method

This chapter starts by introducing the reader to the choice of research approach, strategy and design, followed by a description of the research process and its different phases. Next, the data collection methods are presented, accompanied by the chosen sampling technique and a description of the data analysis. Lastly, the quality of the research is described in terms of reliability and validity, followed by ethical considerations.

3.1 Research strategy and design

Bryman and Bell (2011) describe how research studies can be of qualitative or quantitative nature, or a combination of both. This research project utilised a qualitative research approach, since this type is common for studies seeking to develop new theories and 'tends to be concerned with words rather than numbers' (Bryman and Bell, 2011, p. 386). Indeed, knowledge transfer is a field which to a great extent concern the interaction and communication between individuals. Hence, and also due to the purpose of the thesis, it was reasonable to apply a qualitative research approach. According to Bryman and Bell (2011) and Hyde (2000), a research strategy is commonly either *inductive* or *deductive*. In this case, a deductive strategy was deployed, since the paper builds on existing research which is developed further.

Due to limited time, complexity of the research topic, and intended outcome, the research design considered most appropriate for this thesis was that of a single case study, complemented by theoretical research and external interviews. Noor (2008) explains that case studies are suitable when aiming to gain in-depth understanding of a particular issue. Similarly, Dubois and Gadde (2002, p. 555) underpin that 'Case studies provide unique means of developing theory by utilizing in-depth insights of empirical phenomena and their contexts'. Moreover, this research design is appropriate for intensive analysis and is commonly used in combination with a qualitative research strategy (Bryman and Bell, 2011). By conducting a single case study, the authors of this paper were able to perform an in-depth, detailed, and intense investigation of the specific topic at a representative case company. Additionally, the case study facilitated a deep understanding of presumably common issues related to knowledge transfer within manufacturing companies, and highly contributed to the development of recommendations aiming to overcome such issues.

3.2 Research process

Figure 3.1 below provides an overview of how this research project was conducted, followed by a description of what constituted each phase.

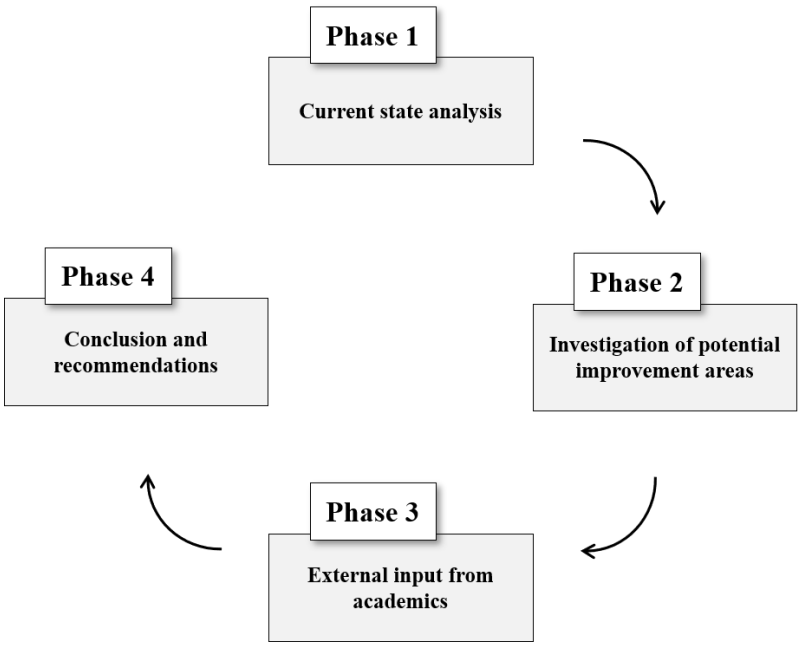

Figure 3.1: Illustration of research process

Phase 1: Current state analysis

The first phase involved performing a current state analysis at the case company and partly answering RQ 1. Several interviews were held with representatives from DA and PD to gain full understanding of how the current knowledge transfer process is designed, including all the different action-steps and stages, map which team and who is responsible for what, and gain insight into what factors they believe cause the process to result in an unsatisfactory outcome. Furthermore, the theoretical research in this phase involved gaining general knowledge about the knowledge management field and starting the in-depth study of knowledge transfer. This initial stage resulted in a good understanding of the perceived problem, what contributed to the insufficient process, and how the intended transfer process between DA and PD is designed. Moreover, the theoretical research provided substantial insight into the different areas of knowledge management and current views on knowledge transfer.

Phase 2: Investigation of potential improvement areas (of KT process at case company)

The second phase aimed to provide answers to RQ 1, 2, and 3, and mainly involved the following topics: knowledge transfer strategies, barriers and facilitators to effective knowledge transfer, and the impact of motivation and willingness to share on knowledge transfer. Several more interviews with representatives from DA and PD were held, including a representative from another technical division with ex-

perience of successful knowledge transfer between the departments. Although these interviews in part revolved around issues related to the existing knowledge transfer process again, emphasis was placed on how to improve the process. This phase provided valuable input regarding factors influencing the existing process, required resources, and what is needed to increase focus on knowledge transfer in general, as well as a solid literary base to proceed onto the next two phases.

Phase 3: External input from academics

The aim with the third phase was to gain further insights from the academia regarding factors that can influence the effectiveness of knowledge transfer between such departments as in this particular case study, which helped answering RQ 1, 2, and 3. Given the limited time frame of this project, it it unlikely that the conducted theoretical research has covered all aspects that can be of value to this thesis. Therefore, two interviews were conducted with academics from Chalmers University of Technology who possess experience within the field of knowledge management, with the aim to reveal new information on the topic. Since the answers obtained from the academics are based on extensive research within the field, they indirectly provide answers from a large number of other companies. These interviews did result in various other aspects that had not surfaced from the theoretical research or case study, but also confirmed a large part of the authors' previous interpretations. Findings here included for instance what the academics believe are vital factors and common barriers to effective knowledge transfer – insights highly relevant for the final phase.

Phase 4: Conclusion and recommendations

The last phase of the research process involved the development of recommendations, or "facilitators", that the authors after conducting the major part of the study concluded need to be in place within an organisation if to achieve effective knowledge transfer between departments or teams, such as PD and DA, and prevent recurring quality issues. The answers to the three research questions, including all relevant information and insights from the interviews at the case company as well as with academics combined with the theoretical research, were used to develop the final recommendations.

3.3 Data collection

The data for this thesis has mainly been collected through two qualitative methods, described in detail below. Semi-structured interviews have been conducted with representatives from Volvo Buses and Chalmers University of Technology combined with extensive theoretical research, to lay the foundation for the final recommendations. In addition to these methods, internal documents at Volvo Buses have undergone some analysis, to form an understanding of their current processes, routines, and ways of communication.

3.3.1 Interviews

Eleven interviews in total were held with ten employees at Volvo Buses in Gothenburg, which lasted for one to one and a half hours each. The system owner within EATS was interviewed twice, first to form an understanding of the current state, and secondly to identify potential improvements of their knowledge transfer process. Since knowledge transfer is a very broad topic and the knowledge regarding the existing transfer process at the company was initially scarce, it was slightly challenging to prepare certain questions in advance at the beginning of the research process. In line with recommendations of Bryman and Bell (2011) and Waller et al. (2015), it was therefore decided to perform semi-structured interviews. The very first interview was performed with an interview template consisting of relatively broad questions, and follow-up questions were formulated during the actual interview, depending on what the interviewee highlighted. This interview was also seen as an opportunity to "test" the questions. As more knowledge was gained from the interview, the template was altered before the next interview. The final template was developed iteratively in the same manner, until it was considered sufficient for the remaining interviews. Two slightly different versions of this template were developed, adjusted to fit whether the interviewee worked within DA or PD. Furthermore, two interviews were held with academics with insight into the field of knowledge management. This interview template was also semi-structured and based mainly on the research questions and information provided from the interviews at Volvo Buses, with the aim to gain external input on how to solve similar issues as they experience regarding the knowledge transfer.

The questions in the templates were formulated as neutral as possible by the interviewers to not inflict any bias upon the interviewee, thereby mitigating the risk of potentially influencing the interviewee's answers – since the aim was to obtain unique answers from each interviewee. Prior to each interview, the interviewees received a copy of the interview template, which also included a brief description of the thesis background, some of the knowledge gained so far, and the purpose of the interview. Performing the interviews in person let the interviewers interpret both the answer as well as the tone in the interviewee's voice and body language, which is supported by Waller et al. (2015). During each of the interviews, the interviewers took turns interviewing or taking notes. Unless negatively affecting the interviewee, interviews should preferably be audio recorded (Waller et al., 2015). Moreover, recording interviews is argued to prevent the risk of losing valuable information (Bryman and Bell, 2011), and provides the ability to check what was and was not said, which mitigates the risk of inflicting bias (Gill et al., 2008). Therefore, all interviewees were asked for permission to be recorded, whereof all said yes. After each interview, the interviewer taking notes listened to the whole interview once again and carefully summarised in detail what was said, although the interviews were not entirely transcribed. If something turned out to be unclear or hard to interpret after the interviews, clarification questions were asked over email, as suggested by Waller et al. (2015). The final interview templates can be found in Appendix A.

3.3.2 Formation of theoretical framework

Bryman and Bell (2011) underpin that the process of reviewing existing literature is essential to identify what is already known about a specific research area and if there exists any unexplored fields or unanswered questions related to it. Hence, conducting theoretical background research lays the groundwork on which another researcher can build new studies and form new theories.

Including extensive theoretical research served several purposes for this thesis. First, by analysing different views and definitions of knowledge and the areas within knowledge management, this thesis was able to take a certain direction from the start which formed a clear path for the upcoming theoretical sections. Second, looking into existing frameworks and views on knowledge transfer provided an understanding of what constitutes such a process, and what the final recommendations resulting from this research paper should incorporate to comply with theory. Third, investigating barriers, success factors, and the impact of motivational factors on the effectiveness of knowledge transfer served as valuable input when analysing the empirical data and constructing the recommendations.

Google Scholar and the digital library services of Chalmers University of Technology served as the main sources when searching for literature. According to Berg (2001), indexes suffer from terminological classification bias, even if they are cross-referenced. Hence, a wide variety of keywords were used when searching for relevant literature and research papers. This entailed a larger scope of literature, and subsequently more relevant information to be gathered, and the risk of terminological classification bias was mitigated. Moreover, since the topic of this thesis is very broad and several terms are sometimes hard to define, it was crucial to consistently keep in mind that relevant terms are classified differently by different researchers, and therefore the keywords also had to be altered to account for this. When the theoretical background research was initiated, keywords such as knowledge management, knowledge transfer, knowledge distribution, knowledge sharing, and knowledge transformation were used. Further into the research process, the keywords were narrowed down and included for instance barriers to knowledge transfer and knowledge transfer motivation. Eventually, the keywords could be made even more specific.

3.3.3 Sampling technique

There are various sampling techniques for qualitative research. For this thesis, it was deemed suitable to mainly utilise a combination of *purposive sampling* and *snowball sampling*, although only purposive sampling was deployed for the external interviews with academics. Since the study required participants with different roles within both DA and PD, where there are limited employees with the same role, purposive sampling seemed appropriate to start with. By applying this technique, the researcher chooses participants based on his or her judgement, and is also one of the most time-efficient sampling techniques (Dudovskiy, n.d.), which made it appropriate for this time-limited project. Deeper into the study, to identify other

potential interviewees, snowball sampling was instead utilised. With this technique, the selected participants from the initial sample suggest other individuals who they believe could contribute with valuable information to the study (Bryman and Bell, 2011).

3.4 Data analysis

For every interview, the knowledge and understanding regarding the existing knowledge transfer process, the reasons behind the insufficient outcome of the process, and the research topic in general increased significantly. Hence, the continuous analysis of the data obtained from the interviews was performed in accordance with the *hermenuetic circle*. This framework involves an iterative process where the researcher moves back and forth between parts and "a whole" in the process of developing an understanding (Boell and Cecez-Kecmanovi, 2010). Similarly, Paterson and Higgs (2005, p. 345) describe the hermeneutic circle as the process 'whereby the researcher attempts to understand the whole through grasping its parts, and comprehending the meaning of the parts divining the whole'. In this case, analysing the data according to the hermenuetic circle involved forming an initial understanding based on theoretical research, which was developed from subsequent interviews. The understanding was further deepened by the researchers' ability to better interpret new information, given the improved understanding from the previous interviews. Such an iterative and cyclical process with interviewees from different departments and other specialists facilitated a widened and unique understanding of the research topic by adding parts together to "a whole" (Paterson and Higgs, 2005).

3.5 Quality of research

According to Bryman and Bell (2011), one way to evaluate the quality of qualitative research is to assess the study based on two criteria: *reliability* and *validity*. The sections below describe the fundamentals of each criterion, and how it was accounted for in this study, followed by relevant ethical considerations. In accordance with Bryman and Bell, the criteria have been adapted to suit qualitative research.

3.5.1 Reliability

The term reliability concerns the "dependability" of qualitative research, and can be subdivided into *internal* and *external* reliability (Bryman and Bell, 2011). According to Bryman and Bell, external reliability concerns replication, and refers to 'the extent to which one's finding will be found again' (Merriam, 1995, p. 55). Bryman and Bell emphasise that it can be challenging to achieve high external reliability in qualitative studies, since it is extremely difficult to replicate the exact same social setting as in the original study. This is also underpinned by Merriam (1995) who explains that "human behaviour is never static", and highlights that some researchers instead look at the dependability and consistency of similar studies rather than external reliability. Next, internal reliability concerns the level of

consensus among the members in a research team, regarding their interpretations (Bryman and Bell, 2011). To maintain high internal reliability during the course of this research process, new information gained was continuously discussed and contradictory interpretations were scrutinised to arrive at a truthful understanding.

3.5.2 Validity

Similar to reliability, the validity of a qualitative study can also be evaluated from two perspectives. *Internal validity* corresponds to the "credibility" of a study, and concerns how well the researcher's interpretations are translated into theories (Bryman and Bell, 2011). The degree of internal validity therefore relates to 'How congruent are one's findings with reality?' (Merriam, 1995, p. 53). Internal validity in this study was ensured by repeatedly checking with the interviewees whether their answers had been correctly interpreted and if they agreed with the interviewers' perception of the problem and causes, and by taking some confidence in similar findings from the previous study by Almér et al. (2019). However, the risk of potential bias from this paper was also considered. By not taking the previous conclusions by Almér et al. for granted without confirming them in this study as well also increases the internal validity of this thesis.

External validity refers to the "transferability" of the research findings (Bryman and Bell, 2011), meaning to what extent the findings from one study can be generalised and applied to other situations and settings (Merriam, 1995). Based on the definition by Malterud (2001, p. 484), who states that external validity is 'The range and limitations for application of the study findings, beyond the context in which the study was done', this study is considered to be partly generalisable. It is likely that many manufacturing companies have two teams depending on the transfer of knowledge between them, which could benefit from the proposed recommendations. Thus, the thesis is believed to be externally valid with regards to such cases. However, if exceeding the scope to include entirely different social settings, the degree of external validity may be more limited.

3.5.3 Ethical considerations

Bryman and Bell (2011) emphasise four main ethical principles that should be considered when performing a research study:

- Harm to participants
- Lack of informed consent
- Invasion of privacy
- Deception

These factors and other potential ethical aspects associated with the selected data-collection methods were carefully considered and reflected upon throughout the research process. Although the risk of harm to participants (interviewees) was perceived to be low, confidentiality and anonymity has been handled with great care

and respect. In this report, the names of the interviewees are not included, and no potentially sensitive statements are linked to specific individuals. Moreover, prior to the interviews all participants were informed of the intention with the study, and that the finalised paper would be made public. Additionally, where and how long the information provided by the interviewees or the firm may be stored was discussed together with the supervisor at the company. Focus was also on ensuring that there was no risk of invading on the participants' privacy and that no sensitive information was revealed to other interviewees. Lastly, the risk of deception was minimised by the use of tools that enable as much truthfulness and verification to the data as possible. Moreover, all potentially sensitive information concerning the company and specifically EATS has been left out from the report.

Not to be neglected, research ethics should be reflected in all parts of a research paper, not only in the empirical data collection (Eriksson and Kovalainen, 2008). Therefore, the authors of this paper also placed a great deal of emphasis on honouring the responsibility towards each other and other researchers to act with integrity and respect of previous work in accordance with general ethical rules and principles established by Chalmers University of Technology (Chalmers Insidan, 2018).

4
Case description

This chapter provides a background regarding the departments, teams, and technical division investigated in the case study, followed by a description of the current working procedure of the teams. Thereafter, the initiation of a quality issue is described, accompanied by the knowledge transfer process used when solving a quality issue.

4.1 Background PD and DA

The two departments of focus in this case study are a product development department, named Platform Development (PD), and a quality department, named Delivery Assurance (DA), at Volvo Buses. Before the first of October 2018, the departments were one unit located in the same building and worked closely together. This organisational form caused a lot of stress, since the employees responsible for NPD were disconnected from their main tasks to work with quality issues. Moreover, the employees working with quality issues needed to, in periods, help out with product development, since this often had the highest priority. Consequently, the organisational structure made it hard for managers to prioritise between the tasks, which forced the employees to shift focus back and forth between product development and quality issues. This also resulted in quality issues stacking up, creating an increasing quality-issue backlog. Therefore, a reorganisation was made with the aim of starting to work in dedicated teams, to enable focus on one task at a time and give higher priority to solving quality issues.

When the employees were divided into the two new departments, they were also relocated to separate buildings. This new organisational structure made it necessary to implement a knowledge transfer process, since the informal day-to-day knowledge exchange between employees with different roles was lost. The process was developed by a few employees from DA, and has been piloted since the spring of 2019. The purpose of the process is to solve a quality issue, referred to as a *QJ*, and transfer this solution from DA to PD. Thereafter, PD is to implement this solution in new projects, thereby preventing the quality issue from reoccuring. The process of solving a QJ has long lead time, and hence no QJ has yet gone through the whole intended transfer process. The technical division EATS within PD has historically had many reoccurring QJs, why the knowledge transfer regarding EATS has been investigated.

4.1.1 EATS team

EATS is short for Exhaust-After-Treatment-System. As the name describes, the aim of the system is to clean the emission produced by the bus engine. The employees working with the development of EATS will hereafter be referred to as the *EATS team*. This team consists of a system owner responsible for the whole system, both current state and technical development within the coming ten years, and design engineers who design and develop the components within the system. EATS and the components attached to or surrounding the system consist both of in-house designed and purchased components. Some components need to be outsourced, since designing and producing them for such low volumes the company requires would result in very high costs.

All components designed by the EATS team are meant to have a corresponding Design Guideline (DG), describing for instance measurements that the component cannot exceed and Technical Regulations (TR), including requirements regarding driving distance among others. The EATS team work in product development projects that run over several years with hard deadlines that cannot be breached. Both the purchase and the production department expect the products by the deadline, and delays will therefore be costly for the company, especially if the delay has a negative impact on the customer. Until the end of last year, the team had regular meetings once every third week, but the number of team members was reduced and therefore the need for such meetings vanished. Now, the team mainly communicates orally, and the team members sit close enough to be able to just look up from the computer screen in order to exchange information.

4.1.2 QJ team

The DA department consists of four different quality teams, each with a team leader and a number of team members. Two of the quality teams are responsible for solving QJs that concern EATS and are hereafter referred to as the *QJ team*. They are responsible for making sure that the quality issue is solved, which is achieved by developing and getting a new product design in production. The QJ teams have short team meetings every morning where team members inform each other about the progress made in QJs. When working with QJs, new problems constantly arise, creating a need to continuously retrieve knowledge from others. Therefore, the QJ team often has to call meetings on short notice, which sometimes makes it difficult for EATS team members to participate. Occasionally, if the QJ is considered to be extensive, resources from PD are reallocated to the QJ team during the solving period of the QJ.

4.2 Knowledge transfer process

The knowledge transfer process at Volvo Buses reflects the process of solving a QJ and transferring the solution to the EATS team which implements the solution in new peojects. The QJ process starts by initiating the QJ, which is described in Section 4.2.1. Thereafter, the process of solving the QJ starts, which is done by performing a Lessons Learned (LL), further described in Section 4.2.2. The LL contains several elements of knowledge transfer and knowledge sharing, mainly through two meetings referred to as the *Check-Out* and *Check-In* meetings.

4.2.1 Initiating a QJ

There are different types of quality issues within the company, whereof the vast majority are warranty claims. Another type of quality issue involves complaints from customers about the product function, which is documented in market quality reports (MQR). Lastly, quality issues that can only be solved with the active involvement of PD constitutes a QJ. Although, an MQR can become a QJ at an evaluation meeting where a parameter referred to as the *C-value* is investigated. The C-value considers the business case of the quality issue, what the cost for solving the quality issue is compared to the claim costs. The analysis considers the intended production volume, the severeness of the issue regarding its implication for the customer, safety aspects, and error rate. The local error rate is also investigated, meaning that even if the error rate compared to all units is low, it might be classified as a QJ if the error rate within the certain region is high. If it is concluded that a business case exists when evaluating these factors, a QJ is initiated and registered in a tracking software programme, where the progress of the QJ can be followed.

4.2.2 Lessons Learned

A LL should be performed on all QJs, which serves to identify the root cause to the QJ and actions needed to take in order for the QJ not to reoccur. Performing a LL includes answering the following three questions:

1. What was the problem and root cause to problem?
2. Why was the problem created and why was it not detected?
3. What should we do to prevent the problem in the future?

The first question aims to clarify why the customer made the complaint and the technical reasons for why the problem occurred, which the QJ team is responsible to find an answer to. A Check-Out meeting, further described below in section 4.2.3, should have provided the QJ team with some initial knowledge regarding the issue and thereby how to further gain the knowledge needed. By discussing with the EATS team and other functions within or outside the company, a complete answer to the question should eventually be obtained. Also, a new product design replacing the design with the quality issue should be ready for production. Thereafter, it is time to "check in" the answer and other valuable knowledge back to the EATS team

and start producing the new quality-issue-free design. How the Check-In meeting is conducted is described in section 4.2.4 below.

The second question serves to identify how current or past ways of working created the problem, and why the problem was not detected before reaching the customer, which the EATS team is responsible to provide an answer to. However, when answering question one, the OJ team might find indications of the answer to this question. Sometimes the answer is no longer applicable, since the way of working have already been changed. Or, in some cases, a complete explanation to the second question is not possible because people knowing the answer do not longer work within the organisation.

The third question aims at finding a new recommended way of working in order to prevent this or similar problems from reoccurring, and to implement the solution to the previous quality issue in NPD designs. Also, the DG and TR are updated according to the changes. The EATS team is responsible for performing these steps. In Figure 4.1 below, an overview of the complete knowledge transfer process is illustrated.

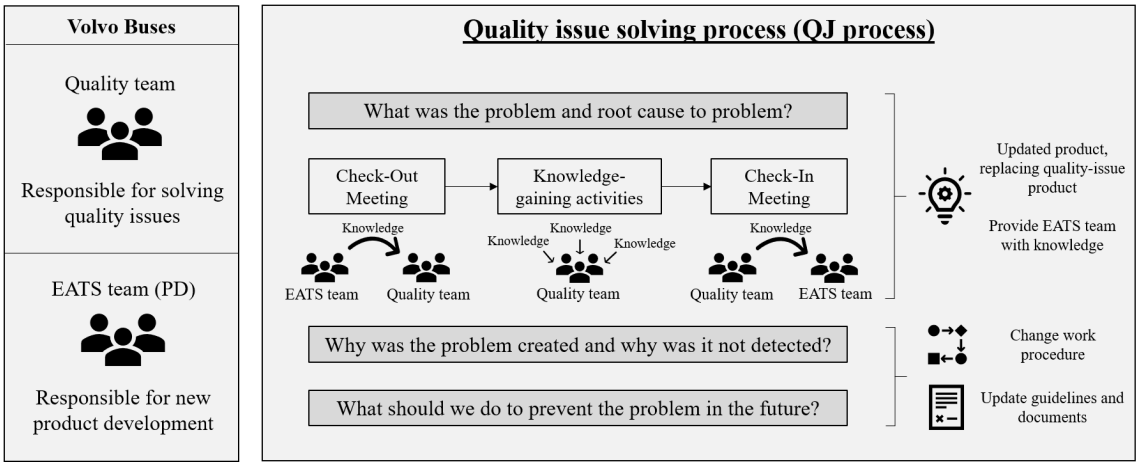

Figure 4.1: Knowledge transfer process during QJ. Authors' own copyright.

A detailed step by step guide regarding this process is available. The guide includes input of step, output of step, criteria for evaluation if a step is complete, if there is reference material describing the step, and competence needed to perform the step. Also, a detailed guide on what to write in the tracking software program is available, making sure every step is documented correctly. Whenever the status in the tracking software program is changed or other changes are made, all employees involved in that QJ will get an email informing them about the changes, thereby keeping everyone updated.

4.2.3 Check-Out meeting

In order for the QJ team to get started with LL question one, finding the root cause to the problem, a Check-Out meeting is held. This meeting is held shortly after

the QJ has been initiated and in this phase, the QJ team is responsible for the QJ. The QJ team invites relevant employees from the EATS team to participate in the Check-Out meeting, where the aim is to gain as much understanding as possible regarding the product or system that the QJ concerns – the QJ team "checks out" the knowledge possessed by the EATS team. An Excel file referred to as the *Check-Out/Check-In checklist* is used. This checklist contains two sheets, one for Check-Out and one for Check-In, both comprising nine actions which are followed to make sure that everything relevant is touched upon. One of the nine actions in the Check-Out sheet does not concern the component or system, instead it deals with how often the teams should meet during the QJ, since this initial Check-Out meeting is usually not enough in order to find the root cause of the problem. Therefore, this action decides, with regards to the QJ, how frequently the EATS team further needs to be involved when answering the first question.

4.2.4 Check-In meeting

When the OJ team has answered the first question in the LL, they are to hand over their findings and recommendations to the EATS team, which is done at a Check-In meeting. Also, a new design replacing the previous is sent to production. During this meeting, the knowledge gained will be checked back in to the EATS team. This team owns the component or system, and it is therefore their responsibility to answer question two and three in the LL, now that the root cause has been identified. The recommendations from the QJ team should already be quite well known, since the QJ and EATS team are meant to have had regular meetings during the process of answering the first LL question. The findings and the solution are commonly presented with a Power Point presentation, although no standard is set. The same Check-Out/Check-In checklist is used during the meeting, but now they go through the Check-In sheet with the nine different actions, and check in the knowledge back to the EATS team again. After the Check-In meeting, the EATS team take ownership of the QJ, and the QJ team is only further involved if the EATS team needs their input.

5
Empirical findings

This chapter presents the empirical findings gathered from the interviews at the case company and with the academics at Chalmers University of Technology. First, a list comprising all interviewees at Volvo Buses is presented, followed by a summary of the provided answers regarding six essential topics, sectioned by department. Thereafter, a summary of the findings from the interviews with academics is provided. All three sections are accompanied by key takeaways, summarised in bullet points.

Interviewees

Table 5.1 below describes which department each interviewee at Volvo Buses belongs to, and their role within the organisation.

Role of interviewee	Department
Group Manager	DA
Team Leader	DA
Lead Test Engineer	DA
Process Owner	DA
Team Leader	DA
Quality Leader	DA
System Owner (EATS)	PD
Design Engineer	PD
Group Manager	PD
System Owner (other department)	PD

Table 5.1: List of interviewees.

5.1 Representatives from DA

In total, six representatives from DA were interviewed. The data relevant for analysis from the interviews is presented below.

View on current knowledge transfer process

The interviewees having a direct connection to the knowledge transfer process knew the process well. This included two interviewees who are responsible for solving QJs and have partly followed the new process in current QJs, and two interviewees who have been part of developing the process. One of the interviewees, who is mainly responsible for solving the root cause in a QJ, had heard about the process but was not aware of what it incorporated. Another interviewee, who participates in the initiation of a QJ, is not further involved in the LL and was therefore not aware of the following steps in the process. However, the interviewee believed that it might be valuable to include its role in the process, to maintain the customer perspective regarding how severe the quality issue is.

When asked about whether or not DA should follow-up after they have handed over the QJ to PD, several interviewees explained that they were not aware of any current follow-up procedure. One interviewee argued that when the QJ is handed over to PD, it is their responsibility to implement the associated changes, and therefore it should not be DA's responsibility to check whether or not that has been performed. Another interviewee had experienced that it takes a long time for PD to implement the changes, and that the finished implementation has not been presented back to DA. The intention with the knowledge transfer process is that is should not be too burdensome to conduct, or otherwise no one will follow through, as explained by one of the interviewees. However, the process should, at the same time, be thorough enough so that value can be gained from it, and the same interviewee stated that it is a fine balance between the two. Moreover, another interviewee believed that both departments should have been part of developing the process to make sure everybody was on board.

What factors contribute to an insufficient process?

One interviewee was concerned that PD might not have enough resources to handle what DA hands over to them, and all other interviewees mentioned time or resources as factors they believe adversely affect the process. Taking time for brainstorming sessions where people have the opportunity to sit down in peace and discuss was believed to be necessary according to one of the interviewees. Another interviewee even believed that prioritising such activities will save time in the long run. Furthermore, one interviewee felt that urgent matters stops at PD, since they work in long term projects and do not have enough resources to handle a QJ, which require fast immediate action. Also, since PD does not have direct customer contact, their customer focus is lower, compared to that of DA, and therefore less sense of urgency arises. Several interviewees also pointed out employee turnover as a factor that adversely affect the process. Two interviewees developed this further by explaining that a lot of knowledge is lost when someone leaves the organisation. One of them explained that a new employee does not know the history of a component developed years ago, and can therefore not answer needed questions when solving a QJ. Then, if there is not proper documentation regarding the component, sufficient answers are hard to find.

Two interviewees believed that the reorganisation has created a need for a knowledge transfer process. One of them further elaborated that previously, when sitting in the same building, employees by default had contact with each other and one could overhear what was going on in other projects. Also, the other interviewee argued that when located in the same building, the outcome of the QJ was immediately implemented in new projects. However, both of them believed that having dedicated resources, which is a result of the reorganisation, is positive. Another interviewee, on the other hand, did not believe that the reorganisation created the need for a knowledge transfer process, the need was already present but the reorganisation fully disclosed it. Similarly, another interviewee argued that the social interactions had decreased due to the reorganisation, but that it should not influence the QJ solving process.

Lastly, one interviewee believed that all team managers should now be aware of the current process, but explained that it takes time for a process to become an actual working procedure. From their experience, several educational sessions are often needed in combination with the employees performing the task several times to fully implement a new working process.

Why recurring quality issues at EATS?

Many of the interviewees explained that EATS is a complex system, and therefore have more reoccurring quality issues compared to other systems. Moreover, one interviewee believed that there has been misplaced focus within the EATS team, regarding what should be the main focus area of the system. Another interviewee believed that time and resources contribute to the reoccurring quality issues, and it was also argued by another interviewee that the existing DG is not thorough enough in order for Volvo Buses's designers worldwide to know how to design the components in line with the latest guidelines. Moreover, three interviewees pointed out the lack of claim specifications called TR, and it was explained that only a few components possess such a specification and that they are not always updated. Furthermore, mixed opinions regarding the knowledge transfer process's influence on reoccurring quality issues were found. One of the interviewees argued that the knowledge transfer that is needed does not occur today, which leads to the knowledge gained by DA not being transferred back to PD, causing rework. On the contrary, another interviewee did not believe that the knowledge transfer is the root cause of the quality issues, and according to another interviewee it is too soon to say if the current knowledge process contributes to less reoccurring quality issues or not.

Motivation to transfer knowledge

One interviewee believed that colleagues overall are motivated to share their knowledge, and had not experienced that people keep knowledge to themselves. Rather, a culture of "providing knowledge and therefore expect to gain knowledge in return" is present. This was also emphasised by another interviewee, who gladly answers questions and participates in workshops when invited. Another interviewee believed that

since PD's main focus is NPD, solving issues concerning a bus that was launched many years ago might not be a top priority, and can therefore be less motivating than prioritising NPD.

How to improve the knowledge transfer process?

It was explained that a lot of documentation is generally performed, although some information is difficult to find since it is stored in different databases together with a lot of other information. One interviewee believed it would be valuable to define what type of information is important, where it should be stored, and how it should be shared and received. A workshop where they produce common templates used during QJs suitable for all parts involved was also suggested. Furthermore, one interviewee wished for an Excel file listing all system, where one could also find out who is system or component owner, if DG exists, and when it was last updated. This since updated and existing DGs have been very valuable for this person's role. One of the other interviewees was not aware that DGs existed until a few weeks ago, but believed they lack important technical data. Another interviewee explained that there are many places where information can be stored, but that the storing structure follows the organisational structure. Consequently, when the organisational structure changes, you are no longer able to find the information you need. Therefore, the interviewee believed that the storing structure should be independent of the organisational structure.

It was also argued that communication is important during a QJ, and that you have to involve the right people. One interviewee suggested having short Skype meetings to efficiently exchange knowledge, and having a scheduled meeting (e.g. 1h/week) that all employees involved keep available. The interviewee explained that it is not necessary to always have something to discuss, but that it is very valuable to have all employees available when having something to discuss. After DA have handed over the QJ to PD, one interviewee believed that DA should be further involved as a sounding board, since some knowledge is impossible to write down and hand over. Also, the QJ should not be closed until all stakeholders have received a presentation regarding the outcome.

One interviewee explained that, to fully understand the knowledge transfer process, the interviewee had needed multiple clarifications about the process from the Process Owner. Therefore, the interviewee believed that the process should be further specified. The same interviewee also believed that the actions in the Check-Out/Check-In checklist are not detailed enough. Similarly, another interviewee underpinned that the Check-Out/Check-In checklist is not self-explanatory, which makes different people interpret the meaning of the actions differently, leading to several possible actions or a situation where the intention cannot be understood, and therefore no actions can be suggested. Even the interviewee who had taken part in creating the actions has had some trouble interpreting the aim of some of them. It was stated that the purpose of each action was clear when formulating them, but as time passed it became difficult to understand their original intentions. Because of the ease of

forgetting what is meant after a while, one of the interviewees suggested having an explanatory text and examples included in the checklist. Furthermore, one interviewee argued that having selectable alternatives in the checklist might be confusing, because sometimes none of the alternatives are suitable.

Several interviewees talked about participating in other external meetings to gain and spread relevant knowledge. One interviewee emphasised the fact that DA work reactively with quality issues, but to be more proactive, DA should participate in a meeting called Design Review, where the design of a component is discussed. Before the final design, DA should share their input, since the knowledge they have gained during a QJ would be the best available input. One interviewee believed that PD should also be more involved before deciding on the final concept. Therefore, participating in PD's technical meetings is something one of the interviewees believed might be valuable, but mentioned that it might also be wasteful. Another interviewee developed this by explaining that it is not certain that the team members have time to go to technical meetings or group meetings, and if they do have time it is not sure that the agenda is relevant. A new type of meeting will be held by one interviewee where all current quality issues will be discussed and market information will be presented. The meeting will provide an opportunity to disseminate information regarding the progress of current QJs. PD will be invited, but the interviewee clarified that the meeting will not go into details, implying that the meeting might not always be fully relevant for PD.

How to increase the priority to transfer knowledge?

Two of the interviewees explained that management have stated that knowledge transfer is important and talked about the need to make time available for such activities, but have not always shown or illustrated the importance in practice. One interviewee believed that the wish to prioritise knowledge transfer has to come from the employees, but management has to facilitate the resources. Since the QJs have different status numbers, one interviewee intend to track the progress of the knowledge transfer. If the statuses have not changed in a couple of months, the interviewee intends to present the current state to management and ask whether or not this should be prioritised since, then, something is lacking to handle the matters as desired.

In one of the interviewee's development plan, it is stated that knowledge transfer should be more included in the working routines. The interviewee believed that management guidance also is necessary to fully ensure that employees who do not prioritise documentation and sharing of knowledge prioritise such activities. According to another interviewee, knowledge transfer activities are not included in the job description but believed that it should be, since it is one of the most important activities to perform. Moreover, it was emphasised that projects have always had higher priority than building knowledge, and believed that PD has been encouraged to prioritise projects but was not sure if that has been the case with regards to knowledge activities.

5.1.1 Key takeaways

Key takeaways from the DA interviewees are summarised in the bullet points below.

- Interviewees having a direct connection to the knowledge transfer process knew the process steps well, while the other interviewees did not know the steps well
- When designing the process, the aim was a knowledge transfer process that create value but yet not too burdensome to conduct
- Time constraints and lack of resources are believed to adversely affect the knowledge transfer process
- Employee turnover is believed to be a reason for not having a sufficient outcome of the process, since knowledge is lost when somebody leaves the organisation
- The physical distance between the departments, as a result of the reorganisation, is believed to negatively affect the knowledge transfer process according to some of the interviewees
- Since the process is new, it is not yet a fully implemented way of working
- EATS is a complex system and many components lack TR
- Mixed thoughts on whether or not the knowledge transfer process has a connection to the reoccurring quality issues
- Employees are willing to share their knowledge with others
- Existing and updated DGs are valuable
- During a QJ, it is important to have communication and meeting structures. Also, after a QJ some communication or meetings is valuable
- A more detailed and defined process is desired
- Meetings not included in the QJ process could be valuable to attend, since valuable knowledge might be gained
- In order for knowledge transfer to gain higher prioritisation, management need to show with proper actions that knowledge transfer is important
- Projects are given higher priority in relation to knowledge activities

5.2 Representatives from PD

In total, four representatives from PD were interviewed. The data relevant for analysis from the interviews is presented below.

View on current knowledge transfer process

All PD interviewees were aware that the knowledge transfer process exists and is under implementation since it is relatively new, but a majority expressed that they do not know where to find the documents describing the process. One of the interviewees on the other hand was more familiar with the process and the description, and believed it is clear who is responsible for what. The interviewee argued that the process looks well on paper, but that it presumes an endless amount of resources and time, and further explained that there is not enough time to sit down and get sufficiently involved in someone else's work to be able to provide support or input.

When asked about how the process has been communicated to the employees, the answers were somewhat inconsistent. One interviewee responded that the process description, that is the Check-Out/Check-In checklist, had been received through email, but that it had not been fully explained in person. The same interviewee had also provided feedback on the checklist when initially receiving it, but there had been no follow up on that feedback. Since the process is new, the interviewee had only been involved in one Check-In meeting, and not yet a Check-Out meeting. Another interviewee had only heard of the process, but did not know how it was designed or what actions it involved. The interviewee had not been part of any Check-Out or Check-In meeting yet, but also felt uncertain whether or not the person's role required involvement in those meetings or if relevant information from the meeting should be communicated from a senior colleague attending the meeting. Another interviewee responded that he had merely heard of the intended knowledge transfer process, but had not been introduced to the process description, informed about where to find the it, and had not been part of any Check-Out or Check-In meeting yet.

The interviewees who had not seen the process description before where shown the Check-Out/Check-In checklist with the nine actions during their interview. Regarding the interviewees' perceptions and opinions on the checklist, including spontaneous impressions, almost all agreed that the description overall was too general, while certain actions in it were too comprehensive. They did not consider the checklist to provide enough guidance, and very little details on what each action should involve in terms of for instance: required input and output, description regarding what should be discussed during the meetings, and what information that should be classified as important. One of the action-steps in the process description was very broad, and one interviewee believed that this step could in fact constitute a whole QJ. The actions were in some cases also perceived as unclear and not specific enough, which was argued to possibly result in different people interpreting the actions differently. Moreover, one interviewee highlighted that this could also lead to misinterpretations in the future. For instance, if the same employees revisit a Check-Out/Check-In checklist which they have worked with earlier, there is a risk of not interpreting the actions in the same way as they did the first time. On the contrary, one of the other interviewees did not believe that increasing the level of detail was necessary, but rather that focus should lie on ensuring that a Check-Out meeting actually takes place, in order for the involved participants to agree on how to proceed on working together.

What factors contribute to an insufficient process?

The main reasons behind the insufficient process and recurring quality issues highlighted by the representatives from PD were lack of time and resources, employee turnover, diminished communication between PD and DA, and some flaws in the current setup. Lack of prioritisation was also lifted as an important factor, but will be elaborated on further down.

First, all interviewees agreed on the fact that particularly time is a very limited resource within the department. Due to the reorganisation in 2018 combined with a gradual shift towards a more "Lean" organisation, many employees within PD have been transferred to DA and their responsibilities were divided onto the remaining employees. As a result, several interviewees explained that they experience a very heavy workload and have to prioritise their work in projects rather than work with knowledge transfer. The information delivered by DA after a QJ, which involves the solution and root-cause to the quality issue, consequently ends up in a backlog until time allows PD to manage the information and update the relevant DG and TR. In addition to the time constraints, one interviewee explained that it is generally difficult to gather all relevant people from PD to meetings. Since many employees have a very busy schedule, they have a hard time attending meetings on short notice.

Secondly, employee turnover was raised as a concerning problem to the knowledge transfer among all interviewees. Several employees have left EATS, and the knowledge they possessed disappeared with them. This has been problematic since important knowledge does not get documented and can thereby not be preserved by the organisation. Within EATS, there is only one employee on every position, which makes the division dependent on each employee, and a gap is created when someone leaves if there has not been a proper handover, which makes the team somewhat vulnerable to employee turnover. Also, one of the interviewees emphasised that it makes documentation even harder, since the new employee does not know the history or possess enough knowledge to understand the whole picture. A handover will be conducted if there is time, but sometimes people even leave before the new employee arrives. Moreover, one interviewee explained that new employees rarely possess the same knowledge and skills as the person they are to replace, which maintains the knowledge gap. Another interviewee underpinned that it is neither possible to collect all information another individual possesses nor to document exactly everything. This interviewee further stated that one commonly overestimates how much information is actually in a persons head, that cannot easily be passed on. Some leave behind extensive documents with information, but the other employees cannot always benefit from them due to for instance time constraints, knowledge gaps, or comprehensiveness of the documents. Instead, the interviewee believed that it is vital to only share the essential parts in a concise manner, to make the information useful.

Third, poor communication between the departments was also lifted as a factor that impede successful knowledge transfer. The reorganisation in 2018 resulted in PD and DA being located in different buildings, which in combination with employee turnover within both DA and PD has caused the previous natural social contacts to vanish and spontaneous meetings to decrease, according to one of the interviewees. This has led to PD being less actively involved during the actual QJ process but mainly at the beginning and end, that is at Check-Out and Check-In. One of the interviewees underpinned that what information you get during the actual process is highly dependent on your contacts within the departments, and explained that PD is not sufficiently involved during the course of the QJ. Furthermore, it happens

that DA solves issues that PD is not involved in. Hence, they can work on similar matters at the same time but not be aware of it. Moreover, several interviewees mentioned that there is a lacking sense of community. Poor communication, personal dependency, and low involvement hence lead to knowledge gaps, uncertainty regarding how the QJ is progressing, and varying knowledge about "what is going on".

Fourth, it was emphasised that there are some imperfections in the current setup. Highly related to communication, it was pinpointed that DA and PD have different ways of thinking about the EATS system. Several interviewees expressed the need for DA to expand their slightly narrow view during a QJ to not only investigate the area where the quality issue has surfaced, but to look at the whole system from a broader perspective to prevent new issues from occurring within other areas of the system – something that also require more communication. One interviewee explained that there have been situations where the solution to a quality issue has not been optimal from PD's perspective, which the interviewee mentioned could have been avoided if DA and PD would have had a better dialogue. Another interviewee also highlighted the importance of continuous communication and collaboration during QJs, since it is the system or component owner who knows whether or not a certain solution is even possible to implement. Moreover, one interviewee explained that another issue with the setup is that it decreases the sense of responsibility one gets when working with a quality issue. Since PD does not work directly with quality issues, the interviewee believed that an important part in the building of knowledge and the sense of responsibility, which presents itself when working on a quality issue, are removed and cannot be entirely reinstated with a knowledge transfer process.

Why recurring quality issues at EATS?

Several of the interviewees agreed that one of the main contributors to recurring quality issues related to EATS is the lack of a sufficient testing and verification method. Several interviewees explained how it is very difficult to develop a testing method that can fully replicate real-life circumstances, due to the highly complex nature of the system and varying external impact when in field. For instance, it was highlighted that a component can come out spotless from an extensive testing process, and still break after a couple of years in service. Moreover, since the buses run in varying external environments, from city centres to long-distance highways and everything in between, the component needs be appropriated to handle a wide range of external impacts.

Consequently, the component should ideally be tested in a way that corresponds to all such circumstances. During the interviews, the need and desire to develop such a testing method was emphasised. However, due to the severe complexity combined with resource and time constraints, they have not been able to prioritise this. Furthermore, financial resources was also explained to impede knowledge transfer work. One interviewee explained that since it is very costly to develop new products, they usually apply "carry over" solutions used in the existing production. Moreover, since

it is very expensive to appropriate all components for buses exclusively, due to low production volumes, PD cannot put too high demand on the components.

Motivation to transfer knowledge

When asked if the interviewees feel motivated or experience encouragement to focus on knowledge transfer, several stated that they are on some level expected to work actively with knowledge transfer, since it has been stated by management that it should be prioritised. However, it was explained by one interviewee that there is little focus on knowledge management in general. Moreover, it was mentioned that although knowledge transfer is highly emphasised by management in a broader context, management does not see to sufficiently integrate this in the daily routines. Knowledge transfer is expressed as something very important, but is not encouraged enough to the extent that it is a natural part of the working routines. Due to limited time and resources, high costs, and strict deadlines, PD is encouraged by management to prioritise new development projects. As such, knowledge transfer is not given enough attention.

The overall impression from the interviews is that PD is not provided with the required resources to be able to prioritise knowledge transfer, and do not feel that the request to do so is given sufficient attention from management. One interviewee underpinned that it is considered to be of high importance, but that time constraints and financial aspects form severe obstacles. As a consequence, the motivation among employees in general to work with knowledge transfer is relatively low, and perceived as something to focus on when there is time available. However, the interviewee outside EATS expressed high internal motivation to work with knowledge transfer since the interviewee personally finds it very important, and therefore makes time to work with documentation and other tasks related to knowledge transfer. However, the possibility to find time to work with knowledge was mentioned to highly depend on what role one has within the organisation. Although everyone likely believes that it is important and should be prioritised, some employees cannot afford to miss a project deadline due to documentation, while it can be easier for others to set aside time for such work.

How to improve the knowledge transfer process?

More frequent and consistent communication and exchange of information between DA and PD was highlighted as a key improvement area. One interviewee raised the need of having more meetings during the QJ process in addition to the Check-Out and Check-In meetings, in order to get continuous updates and a better sense of how the QJ is progressing. This would enable PD to be more involved in the problem-solving process and the development of the solution. According to the interviewee, the current constellation is perceived to involve one team who is responsible for finding solutions to a problem, but the team creating the problem are not aware of it or how the problem is solved – why the interviewee believed more frequent meetings is key. The same interviewee believed that the overall communication would

be improved if the two departments were relocated to the same building again, as this would enhance the natural social connections between the teams, and hence decrease the dependency on one's personal contacts. It was also suggested that introducing more spontaneous places where the employees can meet and talk would have a positive impact on communication. Furthermore, another interviewee believed that even if having dedicated resources is effective, the setup could have been constructed within PD instead, who are the ones responsible for the product. This since documenting something someone else has done cannot compare to actually participating in the work yourself.

More resources and time to enable work with knowledge transfer and update DGs was also lifted. The interviewees suggested for instance to increase the number of team members, thereby removing some parts from the existing employees' responsibilities, which would facilitate more time for documentation and other knowledge transfer related tasks, and look into the possibility of shifting some responsibilities to DA to free more time. Related to this is also the allocation of resources, which will be elaborated on in the next section. Furthermore, it was emphasised by one interviewee how keeping people and their knowledge within the organisation is extremely valuable, and highlighted that it is essential for management to provide proper incentives for people to stay, in order to decrease employee turnover. Suggestions on how to achieve this were through a different salary system – where wages are more influenced by experience rather than career path – and more encouragement, trust, flexibility, and acknowledgement for one's work and efforts. A final suggestion on how to improve the process was to further develop the existing Check-Out/Check-In checklist to incorporate a much more detailed structure and guidance with no risk of misinterpretation, and where it is clear who is responsible for what.

How to increase priority & motivation to transfer knowledge?

Several of the interviewees believed that increased support, encouragement, and clear directions from management would contribute to knowledge transfer receiving higher priority. It was highlighted that management need to show both with words and action that they consider it important, for instance by enabling the required resources, such as finances and more team members, and time to focus on knowledge transfer related tasks. By giving higher priority to such work, it will be viewed as more important. One interviewee also explained that having a follow-up on tasks related to knowledge transfer would possibly increase the associated work. Moreover, it was suggested that measuring could have a positive impact on prioritising knowledge transfer, since things that are measurable are generally viewed as more important. To increase motivation to work with knowledge transfer, it was emphasised that management need to show that such work is truly valued and acknowledged. One interviewee believed that it does not necessarily have to be acknowledged in monetary terms, but that it can be even more encouraging for people to feel appreciated and hear that their work has been beneficial. Nevertheless, another interviewee highlighted that when it comes to quality, related tasks should be a natural and mandatory part of the working routine. It was also argued that

employees who make time for knowledge transfer work see the need to do it, and it should be discussed more frequently to increase the understanding that it is not performed for one's personal gain, but that there is an actual need for it.

5.2.1 Key takeaways

- The interviewees from PD were aware of the intended knowledge transfer process, but a majority did not know all the actions in the Check-Out/Check-In checklist or where to find the related documentation
- There were inconsistent responses to how the process had been communicated
- Many interviewees perceived the Check-Out/Check-In checklist as too broad, where some actions were to comprehensive while others were unclear, which brings the risk of misinterpretation
- The main factors raised that undermine the process were lack of time and resources, employee turnover, diminished communication between the departments, and imperfections in the current setup
- After the reorganisation, many of the natural social connections between DA and PD have disappeared
- The employees within PD are not actively involved in the QJ process, and what information is transferred back to them is highly dependent on personal contacts
- The main contributor to recurring quality issues related to EATS is the lack of a sufficient testing and verification method
- The interviewees do not feel enough motivation to work with knowledge transfer since they are more encouraged to prioritise NPD
- Knowledge transfer is expressed as highly important by management, but is not stressed to be a part of the daily working routines
- The interviewee outside EATS experiences high internal motivation to work with knowledge transfer, and therefore makes time for it
- Mainly four areas that could contribute to improving the knowledge transfer process were emphasised: increased communication between the departments, more resources and time, decreased employee turnover, and a more detailed process description
- In order to increase the priority to transfer knowledge, several of the interviewees agreed that management need to show both with words and action that such work is important

5.3 External input from academics

Two external interviews with academics from Chalmers University of Technology were conducted. The data relevant for analysis from the interviews is presented below.

What are success factors to effective knowledge transfer?

One of the academics mainly underpinned communication as the main success factor to effective knowledge transfer. He argued that the ability to overhear what is going on in different projects is also of great importance, since if people are to learn form each other, they need to be able to hear how the projects progress and be given the chance to ask questions. Moreover, the academic explained the importance of transferring knowledge from key employees to other team members, to avoid losing valuable knowledge when people leave the organisation. The other academic believed that it is essential to have a good understanding of who the recipient of the knowledge is. This since the most suitable way to transfer knowledge depends on this and the recipient's knowledge base. Moreover, the academic argued that forming a sense of community is vital to achieve effective knowledge transfer, but highlighted that this is something which is commonly missed.

The terms *ease of access* and *ease of use*, with regards to documentation, were also lifted by one academic, who explained that ease of access is often established at the cost of ease of use. That is, information availability is commonly highly emphasised within organisations, but the information might not always really be available in practice, since the documentation might not make sense to everyone and can therefore not be used – resulting in diminished ease of use. Moreover, the academic explained that employees are commonly asked to use standardised templates and upload them in a shared database. However, these might not always be applicable, and in many cases it does not provide either ease of access or ease of use. This results in poorly documented knowledge, which is only available for employees who are aware of what to search for. Therefore, just encouraging employees to make documents available by adding them to a database, where they are uniformly presented in a standardised template, will not make the knowledge more accessible or more easy to use for other employees. As such, it was argued that the ease of access and use is key to consider when looking to facilitate effective knowledge transfer, which was also supported by the other academic.

What are common barriers to effective knowledge transfer?

Both academics agreed that the more teams are differentiated, the harder it becomes to integrate them. This since they inevitably develop different cultures and subsequently different agendas, priorities, and views on what is perceived as important. Establishing a physical distance between them was argued to constitute an integration barrier, and one academic believed that it is important to question what the benefits are of separating teams if interaction between them is required. Moreover, proper incentives was lifted as a barrier in this specific context. If two teams have different views on what is important, they naturally have more incentives to carry out the tasks they find more important, which forms a barrier between the two. Another factor that was highlighted which can form obstacles to effective knowledge transfer was that of excessive documentation. One academic explained that organisations are commonly worried that knowledge will disappear when employees leave and therefore almost force people to upload documents, and also depersonalise

documents to a great extent. The academic pinpointed that organisations generally put too much trust in such documents, and further argued that just because information or knowledge has been documented, it does not naturally mean that other people can understand or utilise this information in that particular format. Rather, one need to discuss with the person who originally conducted the documentation to really understand it and be able to reuse the knowledge.

How to increase communication between departments?

One suggestion on how to increase the communication between departments was to create an integration role. That is, an employee who is responsible for ensuring a high level of communication and that valuable knowledge gets transferred between teams or employees. Moreover, both academics believed that there are generally too many meetings and too much focus on documentation, which was explained as a common mistake when trying to increase communication. One academic believed that too much focus on coordination can consequently become more costly than performing the actual tasks. Therefore, instead of merely creating more and more opportunities to communicate, it was argued that focus should lie on increasing the efficiency of the ways people communicate, for instance by changing the form of the meetings. The academic further explained that having shorter and more frequent meetings where only discussing what is important at the time can be more efficient compared to long and comprehensive meetings. In line with this reasoning, the other academic highlighted that more efficient communication in general can reduce the number of change orders, implying that it also contributes to reduced scrap and rework. With regards to how to increase the efficiency of communication, the importance of establishing a common goal was emphasised. Thus, even if the teams are performing different tasks, they need to work towards achieving the same goal.

How to increase motivation to transfer knowledge?

The essence of leadership was emphasised by one academic when asked about how to increase motivation among employees to participate in the knowledge transfer. He explained that leaders need to show what the mutual goal and vision is, and highly stress the need of conducting the work required to achieve it. Moreover, the academic believed that management and leaders within an organisation need to show appreciation towards work performed in line with the stated goal, in order to create motivation among employees to work in that direction. Similarly, the other academic explained that management is the mechanism that to a great extent controls the facilitation of knowledge transfer. The academic further underpinned the need to create a sense of urgency in order to increase motivation, and suggested visualisation as a supportive tool to achieve this. For instance, if visualising the consequences of a quality issue, it was argued that people will emotionally relate to it more extensively, compared to when reading a customer complaint or similar. As a result, a sense of urgency is created, as well as an increased feeling of responsibility towards solving the issue. The academic further argued that it does not matter whether or not an organisation has developed a good knowledge transfer process

if there is no connection to the issue that motivates people to participate in the knowledge transfer. An additional suggestion on how to increase motivation to transfer knowledge was to ensure that, during meetings, people commit to the tasks they plan to conduct or finalise until the next meeting, and then follow up on their commitment. However, in order not to reduce the effect of this, one of the academics emphasised that the follow-up meeting should not be a "blame game" if someone has not been able to fulfil their commitment, since this might be due to reasons the person cannot control. In cases where one person's commitment cannot be fulfilled due to another person's late delivery, it is important to have clear communication and understanding that the employees depend on each other and can have a meaningful role in other people's ability to deliver on time.

How to increase sense of community between departments?

According to one of the academics, breaking down the "we and them" thinking is vital in order to create a sense of community between different teams. Work rotation was suggested as a way to achieve this, since it is supports the building of relationships. Moreover, the importance of developing an understanding of "each other's worlds" and how different teams and individuals interpret information was emphasised. Different teams need to understand other team's limitations and resource constraints in order to build a mutual understanding of what each team's capabilities are. Similarly to what was suggested on how to increase communication between teams or departments, it was emphasised that working towards the same goal also increases the sense of community.

5.3.1 Key takeaways

- Communication was highlighted as key to achieve effective knowledge transfer
- Transfer of knowledge from key employees to other team members, a sense of community, and balanced information availability were also considered as success factors in this context
- The greater the extent to which teams are differentiated, the more difficult it is to integrate them
- Physical distance constitutes an integration barrier to knowledge transfer. Moreover, not having proper incentives in place and performing excessive documentation were also lifted as barriers
- Creating an integration role, where one employee is responsible for ensuring knowledge exchange, was believed to increase communication
- Instead of focusing only on increasing communication, emphasis should be put on increasing the efficiency of communication
- It is important to create a common goal, since although teams could be working on different tasks, their work would be aligned towards achieving the same goal
- Leadership is of key importance to increase employees' motivation to transfer knowledge, as well as creating a sense of urgency and committing to tasks
- In order to create a sense of community, it is crucial to establish a "we and we" thinking and build an understanding of each other's worlds

6
Analysis and discussion

This chapter presents an analysis and discussion of the empirical findings from the case study, and how these findings relate to the theoretical research and information provided from the external interviews with the academics. The chapter is categorised into three sections, where each of the research questions presented in Section 1.3 is answered.

6.1 Factors preventing effective transfer

Knowledge articulability and embeddedness

It was revealed from the interviews that a majority of the knowledge within the departments is deeply embedded in the people within DA and PD, knowledge which is both tacit and explicit in nature. If and to what extent something is documented varies depending on how important the individual considers it. Since it is not (sufficiently) demanded or checked whether DGs and TRs gets updated, the insufficient documentation is believed to largely contribute to the knowledge gap between the departments and the recurring quality issues. As explained by Bresman et al. (1999) among others, documented knowledge is explicit, easier to articulate, and hence easier to transfer compared to tacit. By properly and continuously documenting explicit knowledge, in a TR for instance, the technical requirements of the components would be made more easily accessible to DA who can take them into consideration when finding a solution to the quality issue.

However, it was also mentioned among several interviewees that they experience "information overload". Consequently, embedding knowledge more deeply in tools such as databases could at the same time potentially lead to people not knowing where to find the required information, which is important to also take into account. Since they believe there is too much information stored in databases, one can question if knowledge is currently too deeply embedded in tools as well. To some extent yes, since it is difficult to both find and sort which information is relevant in each specific case. As mentioned in Chapter 5, it was emphasised by one interviewee that it would be valuable to define what constitutes important information, where it should be stored, and how it should be shared and received. This relates to ease of access, as explained by one of the academics – who on the other hand underpinned

that ease of access is commonly facilitated at the cost of ease of use. Hence, it is vital to have a somewhat standardised way of documenting knowledge, in order to ensure that when information is accesses, it is also easy to understand. However, the most important knowledge needed during QJs is believed to currently be embedded in the employees, including explicit knowledge about technical requirements, which brings significant dependability on each individual when solving a QJ. Hence, the departments would likely benefit from codifying more knowledge, thus increasing the sharing of combined knowledge.

Furthermore, a significant portion of the knowledge deeply embedded in employees is believed by the authors to constitute tacit knowledge. Consistent with literature, this type of knowledge was expressed as harder to articulate and thus more difficult to transfer, since it is not possible to write absolutely everything down. Hence, such knowledge should preferably be transferred during meetings with participants from DA and PD, to ensure a common understanding and facilitate the ability to verify that all tacit knowledge have been transferred from PD and absorbed by DA at Check-Out, and likewise when the solution is checked back in to PD from DA. That is, in order to share tacit knowledge, the individual possessing the knowledge also needs to be transferred (i.e. attend the meetings in person), which is supported by Cummings and Teng (2003). In the current scenario, the transfer and absorption of tacit knowledge, socialisation, is deemed to be insufficient to achieve successful knowledge transfer. Moreover, Droege and Hoobler (2003) lifted the issue of losing valuable tacit knowledge when employees leave the organisation. This also appeared evident in the case study, where one of the most emphasised factors to insufficient knowledge transfer was in fact employee turnover and the lack of handovers before the employees leave, which will be elaborated on below.

Lastly, it is perceived by the authors that knowledge is also quite deeply embedded on organisational processes and routines. The departments are not currently involved in each other's work and the tacit knowledge they possess is hence deeply embedded in the way they work together in the separate teams. It is reasonable to assume that if the departments were to increase the integration between them and become more involved in each other's working routines, the transfer of knowledge between them would likely be enhanced. This since being aware of the other department's processes, which involves both priorities and limitations, would possibly increase the understanding between the teams – which was lifted as insufficient today – and awareness of who knows what, which would subsequently contribute to improved knowledge transfer and outcome of the knowledge transfer. This is supported by Moreland (1999), who explains that group performance is likely to increase when people are aware of where knowledge resides. In this case, group performance can be viewed as the combined performance which DA and PD achieve together, for instance when successfully managing to prevent a quality issue from reoccurring in new projects. As such, if the people involved within DA and PD are consistently aware of whom from the other team to ask for certain information, the exchange of knowledge would likely increase, and DA would be able to account for essential information possessed by PD when developing the solution.

Organisational distance

As explained by Cummings and Teng (2003), the strength of social ties and free flow of communication can significantly increase the efficiency of knowledge transfer. Consistent with literature, these were identified as factors that currently impede the transfer of knowledge at the case company. It was revealed from several interviewees that natural social connections and spontaneous communication that previously existed between DA and PD have decreased as a result of the reorganisation and employee turnover, which have led to a low level of integration between the departments. As one of the academics explained, integration barriers arise naturally when departments or teams are separated, since they form their separate cultures and are assessed in different ways.

Some of the findings also imply that the organisational distance has developed to the degree that the departments now view each other as two separate teams that are not involved in each other's work, and with little natural collaboration between them. Although one interviewee believed that decreased social connections should not impact the QJ process, other interviewees explained that when located in the same building, they were able to overhear what was going on in different projects, and it was much easier to have continuous communication and more frequent updates. The importance of overhearing was also pinpointed by one of the academics. This and other aspects such as differences in opinion regarding which departments should be responsible for documentation and the different views on the EATS system have also contributed to the diminished sense of community and the departments growing further apart. Hence, the organisational distance between the departments is evidently a severe obstacle to the current knowledge transfer process.

Physical distance

In accordance with Athanassiou and Nigh (2000), many interviewees agreed that face-to-face communication is generally preferable when it comes to exchanging information, and that "nothing happens if they do not meet". The reorganisation has directly created a physical distance between DA and PD. Since the teams are now located in different buildings, they do not naturally pass ways or interact on a daily basis, which has resulted in less face-to-face communication, and instead an increased proportion of the communication takes place over email or Skype. The need for more frequent communication between the departments in order for PD to become more involved during the actual QJ, and not just in the Check-Out/Check-In meetings, was highlighted. Previous research has shown that teams need to be closely located if intense communication should be facilitated, and it was believed by one interviewee that the communication between DA and PD would increase if the teams were relocated to the same building again. Hence, the physical distance is perceived to directly hinder frequent communication between the departments, and it is reasonable to assume that it indirectly also affects the organisational distance and contributes to decreasing the sense of community between the departments.

Knowledge distance

Based on the empirical findings, it is apparent that there exists a knowledge distance between the employees within DA and PD. The amount of information and how it is transferred between them highly depends on the individuals' own personal contacts within the other team, which leads to some people receiving valuable information that it is not always passed on or shared with everyone involved. Moreover, the lack of communication between the involved parties from the different teams during the QJ process leads to suboptimal solutions to quality issues. Hence, the knowledge distance becomes particularly evident at the end of the knowledge transfer process at Check-In, when the information is transferred back to PD who are faced with a solution that might be very complex, due to circumstances that DA are not aware of and therefore did not take into account when solving the quality issue. This combined with PD not always being able to prioritise reviewing the information from DA or participate in quality-meetings on short notice consequently leads to recurring quality issues, and solutions to QJs that are not always possible to implement in new projects. Additionally, the barrier also reveals itself when new employees join PD. Since documentation is not performed on a regular basis and employees occasionally leave the organisation before the new arrive, the new employees start with an insufficient knowledge base, which takes a long time to build up.

Norm distance

The interviews revealed that DA and PD have different focuses, which clearly guides and highly influences their work. Client focus is highly emphasised within DA, and hence quality issues are of top priority. Meanwhile, PD needs to highly prioritise NPD, and the employees therefore have to set aside work with knowledge transfer. As such, the work performed by the departments is not completely aligned towards achieving the same goal, and is carried out with different purposes. Even though the organisations share some fundamental values, there is a noticeable norm distance between them. Similarly to what one academic mentioned regarding organisational distance, the consequences of integration barriers that arise when separating teams are also evident here. Given the discrepancies of what is perceived as most important, difference in focus, and separate cultures, there is a lack of a common understanding and low relational embeddedness, as defined by Dhanaraj et al. (2004). In line with the reasoning by Tushman (1977) and Cummings and Teng (2003), it is arguably evident in this case that not enough shared values and the degree of relational embeddedneess have created a norm distance, which likely contributes to the insufficient knowledge transfer.

Organisational culture and prioritisation

There is great resemblance between what was found from the theoretical research and the case study regarding the very close connection between organisation culture and prioritisation. According to Cummings and Teng (2003), having a learning culture set in place accompanied by appropriate routines and sufficient capacity increases the chance for knowledge transfer success. Even though knowledge trans-

fer and the related tasks have been emphasised as something vital that should be prioritised within the case company and employees are overall happy to exchange knowledge, neither of the departments are perceived to have a sufficient learning culture. Moreover, the current structure does not provide enough capacity for PD to prioritise work with knowledge transfer, which is a contributing factor to why NPD is prioritised over knowledge transfer. As such, it is possible that the organisational culture forms the employees within PD to not perceive knowledge transfer as an integrated or natural part of the daily work, but rather viewed as less important compared to new projects, which results in less attention to such work. Hence, the organisational culture is believed by the authors to contribute to reluctance within PD to work with knowledge transfer, and instead prioritise NPD. Therefore, the current organisational culture is considered to have a negative influence on how knowledge transfer is perceived in general, since culture to a great extent forms what employees chose to include and prioritise in their daily routines, as implied by Lai and Lee (2007).

Leadership and management

Consistent with literature, many interviewees agreed that management plays a vital role when it comes to communicating the essence of knowledge transfer to really make it a top priority among all employees and make it an integrated part of the daily work. All three facilitators highlighted by Davenport et al. (1998) (see Section 2.4.4) were included in the factors the interviewees consider critical to succeed with the knowledge transfer process. As implied in the empirical findings, a major barrier to knowledge transfer today was explained to partly be due to the decisions and actions taken by management not being completely aligned with the stated importance of knowledge transfer. Bell DeTienne et al. (2004) argue that management need to stress how vital knowledge management is if employees are to take it seriously, which was also highly emphasised among the interviewees. Many explained how knowledge transfer is expressed as important by management but not always shown in practice. In line with Warrick (2017), insufficient leadership towards more well-functioning knowledge transfer is also reflected in the organisational culture, which in the case of Volvo Buses encourages the prioritisation of other tasks within PD, and clearly hinders successful transfer of knowledge. By setting a different tone and ensuring that the importance of knowledge management in general is brought up more frequently could arguably enhance the knowledge transfer between departments like DA and PD, which is supported by the academics' reasoning.

Transfer activities

Increasing the number of meetings and opportunities to communicate was raised in order to improve the current knowledge transfer process between DA and PD. The interviews revealed that particularly informal opportunities to share and transfer knowledge are scarce, and it was implied that this contributes to decreased overall communication between the departments. Since the teams are currently located in different buildings and have experienced decreased social connections, it is reason-

able to assume that more frequent communication and more transfer activities could contribute to enhanced knowledge transfer, which is supported by Cummings and Teng (2003). One of the academics although explained that the traditional solution to insufficient communication, that is increasing the number of meetings and other formal transfer activities, can result in the exact opposite effect than what was intended, since the mechanisms set in place to coordinate tasks can be more costly than performing the actual tasks. Hence, instead of focusing only on increasing the number of transfer activities, the academic suggested that it can be more beneficial to increase the efficiency of the activities and provide more informal opportunities to share knowledge. Given the time constraints within PD, they would likely benefit from having shorter and more efficient formal meetings with a more narrow focus, and increased informal opportunities to share knowledge. As described in Section 2.4.5, there are three different types of knowledge transfer activities, which require equal focus due to their interdependence. The Check-Out/Check-In checklist is deemed to cover all of these activities, and was developed to include the construction of a flexible activity plan for each individual QJ, which can be adapted depending on the number of required transfer activities. Therefore, the issue is instead believed to concern even making the activities happen, which is affected by several of the other barriers discussed in this chapter.

Case specific barriers

A few specific factors that hinder sufficient knowledge transfer between the departments at the case company were revealed during the study. These are deemed by the authors to be applicable on a wide range of companies with similar departments, and will therefore be analysed and discussed in this separate section.

Resource misallocation and time constraints

From a majority of the interviews, both with representatives from DA and PD, it was highlighted that PD is not provided with the sufficient resources, in the form of people and time, to be able to conduct the tasks related to the knowledge transfer process. This clearly forms a significant obstacle to the intended knowledge transfer process. Although not related to the process itself, appropriate resources need to be in place to merely facilitate the opportunity to transfer knowledge. Highly linked to culture and prioritisation, when moving resources from PD to DA the organisations are pushed in a direction where solving quality issues should be perceived as top priority, which results in less attention being given to the implementation of the solution. Moreover, this is believed by the authors to further strengthen the norm distance between the departments. Time constraints forces PD to prioritise NPD rather than knowledge transfer, and is of top priority for them. In the meantime, DA view quality issues as the top priority, and stresses how customer focus is of main importance. These different views and focuses, as mentioned earlier, likely contributes to widening the norm distance between the departments.

Employee turnover

The consequences of employee turnover, especially in the cases without a sufficient handover, was raised from all interviewees at the case company, and it is believed by the authors that mitigating from risks associated with this factor is fundamental for companies aiming to achieve successful knowledge transfer. When employees leave the organisation without transferring their knowledge to the new employee or the remaining colleagues, a knowledge gap is instantly created, resulting in both explicit and tacit knowledge disappearing from the organisation. According to Droege and Hoobler (2003), companies do not risk losing codified knowledge when employees leave. However, this is only valid under the assumption that such knowledge has been properly documented. Additionally, even if such knowledge is transferred in the form of documents, the ease of access and use, as explained by one of the academics, becomes essential and can be problematic if the company does not have the required infrastructure in place.

Nonetheless, the risk of losing tacit knowledge when employees leave is arguably more problematic in this context, since the success of the knowledge transfer is dependant on individual knowledge. Therefore, as suggested by the interviewees at the case company, it is believed that a proper handover where mainly socialisation is deployed is likely to significantly enhance the retention of tacit knowledge within the organisation – which highly benefits the knowledge transfer. Moreover, employee turnover also decreases the awareness of who knows what within the departments, since it takes time to establish a connection with new employees and learn about their capabilities and skill-set. This is believed to further hinder effective knowledge transfer between departments who are dependent on each other, and where the exchange of information should preferably involve the individuals possessing the appropriate knowledge base.

Unclear process description

The existing description of the knowledge transfer process was perceived by several interviewees as too unspecific, who expressed the need for more details and thorough descriptions of what each action-step should involve, among others. This could possibly cause inconsistencies in the outcome of the Check-Out and Check-In meetings, since different people likely believe different actions should be included in the checklist. Therefore, too little required information or information in the wrong format could be generated from the meetings. As such, several interviewees emphasised how the process description would benefit from more details and specificity, since they believed that this would increase the quality of the knowledge to be transferred as well as the quality of the meetings. However, one of the academics underpinned that the most common reason to why employees express the need for more detailed instructions is to refrain from responsibility. The academic further explained that people usually feel restrained by highly detailed processes, but yet feedback on processes descriptions that are not completely satisfactory commonly involves the request of more details. Even though this aspect is something that could be looked further into, it is believed by the authors, based on what has been learned

from the case study, that a more detailed process description would in fact benefit the knowledge transfer in such a way that the Check-Out and Check-In meetings would always ensure sufficient knowledge exchange and a plan forward that is accepted and understood by everyone.

Missing verification method

Lastly, an interesting finding to why there are recurring quality issues within EATS in particular is partly due to the fact that there is currently no sufficient verification or testing method put in place to evaluate if the solutions developed by DA prevents the same quality issue from reoccurring. Despite the severe complexity of the system, some interviewees believed that it could be possible to develop such a testing method if sufficient attention, resources, and dedication were put in place to do so. In order for knowledge transfer to be effective, there needs to exists a method to provide feedback and verify if the correct solution to a certain quality issue has been developed, which can at the same time verify whether the knowledge transfer has been successful or not.

6.2 Effect of motivation and willingness towards knowledge sharing and transfer

External and internal motivators

Overall, employees at Volvo Buses seem to be motivated to share knowledge. The described culture of providing knowledge and therefore expecting knowledge in return could be viewed as a sign of the hygiene factor ***interpersonal relations*** being present, or that one or several motivators are present. In the first case, the interpersonal relations needed to be motivated to perform knowledge sharing or transfer are present, and therefore enables the sharing behaviour. In the other case, mainly motivators that Hendriks (1999) suggested, ***responsibility***, ***recognition***, ***promotional opportunities***, or ***appreciation*** for their knowledge work might be the factors influencing the sharing behaviour, but they also share because they expect or hope for ***reciprocity***. The fact that employees do not keep knowledge to themselves indicate that high motivation for sharing is present, and that no dominant external factors that influence people to withhold knowledge exist. The reason behind this sharing behaviour could possibly be related to the organisational culture, and the associated motivators influencing this behaviour need to be retained. Especially internal motivators should be retained and further implemented, since they according to Hau et al. (2013) have a positive impact on knowledge sharing, while there is mixed evidence regarding the impact of external motivators on knowledge sharing.

One interviewee believed that an ***increase in salary*** is not what is needed to motivate people. This argument is in line with Hendriks's (1999) argument about hygiene factors, that is, an increase in a hygiene factor will not motivate behaviour. The interviewee further believed that ***recognition*** and ***encouragement*** for the

work done both from colleagues and management would increase motivation. This is supported by the literature which state that the characteristics of internal motivators are that they increase motivation. Furthermore, one interviewee felt, due to the person's work position, ***responsibility*** towards documenting and also think it is important, therefore required time to document knowledge is found. The interviewee from another technical area believed that taking ***pride in work performed*** and getting some ***status*** for achieving high quality products contributes to knowledge transfer success. Moreover, the fact that the team members were always ***challenged at work***, since most employees working within the team had been working there for several years and challenge colleagues' thinking, was also believed to contribute to the success. Thereby, both the hygiene factor ***status*** and the motivators ***achievement*** and ***challenge of work*** are present.

Having to handle a component with quality issues that needs to be solved was believed to not be motivating for the component designers at PD. This is reasonable to believe since employees might feel that it is not their ***responsibility***, since the quality issue might steam from a component designed by someone else years ago. Also, an unexpected quality issue that quickly needs to be solved leads to less ***operational autonomy*** for the employee. Furthermore, since NPD have higher priority, the designer is more likely to gain a feeling of ***achievement*** and ***responsibility***, and receive ***recognition*** for such work. One way to increase the internal motivation to solve quality issues is to make the component designers view them as a ***challenging work task*** that no one has ever solved before. By implementing other mechanisms such as regularly ***complementing other's work*** and provide employees with ***work autonomy***, is also believed to increase the feeling of internal motivation.

Since PD does not directly work with the quality issues, one interviewee believed that they have a lower feeling of ***responsibility*** towards the quality issues, which is problematic. By increasing their involvement, the motivation to participate will likely also increase. One interviewee believed that PD did not have enough sense of urgency regarding quality issues, since they are not in direct contact with customers. By having closer customer contact, PD would likely gain a higher hygiene motivation from the customers. DA probably gains a higher sense of ***achievement***, ***recognition***, and ***challenge of work*** regarding QJs. This since they are the ones ***responsible*** for solving a challenging problem, while PD's main responsibility is to implement the solution to the complex problem according to DA's recommendations. Also, this is their main work task, which they cannot compromise with. Since the knowledge transfer is such an essential part to perform their work, they have internal motivation to participate in the process. Existing and updated documents provide DA with some of the knowledge they need and, according to one of the academics, some people prefer to be able to do some research themselves before getting in touch with another employee where they can gain further knowledge. Access to relevant and updated documents would therefore provide ***operational autonomy*** to the employees.

Attitude towards knowledge transfer

The fact that PD experiences significant time constraints and resources may result in PD not finding it favourable for them to participate in the knowledge transfer process during QJs, since participation takes time from activities with higher priority, such as NPD. Therefore, it is reasonable to assume that the lack of time and resources influence their attitude towards knowledge transfer negatively. Furthermore, since knowledge management overall is not highly prioritised, the attitude towards participating in such activities is lower.

Many interviewees wished for a more defined process. By having a clear understanding of the process and all details within it, employees can get a clear picture of what they as individuals will gain by participating in the knowledge transfer process. However, a more detailed process description might show unfavourable factors from participating in the process. Therefore, it does not help to only have a more detailed description of the process, it is also important that employees see the process as favourable to participate in. Otherwise, employees will gain a negative attitude towards participation. Therefore, favourable attributes need to exist, and be highlighted to enhance the attitude among employees towards the knowledge transfer process.

Participating in the knowledge transfer is essential for DA, in order for them to perform their work. Therefore, it is reasonable to believe that DA sees it as favourable to participate in the process. Meanwhile, employees within PD sometimes think that the solution to the QJ is too narrow and that the solution, consequently, can create new problems or lead to increased complexity in form of more component variety. If the output from the process is viewed as insufficient or problematic, it will negatively influence PD's attitude towards the knowledge transfer process. Therefore, it is believed that the departments' different views on the output from the QJs provide them with different attitudes towards participating in the knowledge transfer.

Pressures to transfer knowledge

Management has stated that knowledge transfer is important and do expect employees to work with knowledge transfer to some extent. However, the importance of knowledge transfer should be further illustrated in practice. One of the academics explained that management needs to show with actions what a desirable behaviour is. Then others will be influenced by the social pressure which will subsequently create a norm towards participating in knowledge transfer. Shared norms, as stated by Cummings and Teng (2006), prevent communication barriers. Therefore, initiation of a shared norm will generate a positive loop of less communication barriers, and maintain the social norm and a behaviour towards participating in knowledge transfer. This could for example be done by having guidance in the knowledge transfer process which would increase the social pressure to participate in the knowledge transfer process as well as making it easier to participate in the transfer. Encouragement was also suggested as an enhancer of the social pressure.

Management also need to facilitate knowledge transfer. For example, important facilitators such as lack of time and resources are believed to influence the social pressure. If fewer employees have time to participate in the knowledge transfer process, fewer employees will consequently take part in creating social pressure towards participating. Furthermore, the fact that NPD receives higher priority also creates a lower social pressure to participate in knowledge transfer activities, since the social pressure is rather focused on NPD. Lastly, since the teams are located in different buildings, the social interactions have decreased. This is likely to have lowered the social pressure and therefore facilitators such as other forums for communication need to be implemented.

Control over knowledge transfer

Lack of time and resources are believed to influence the perceived control over the knowledge transfer process. If believing a sufficient amount of time is not available to participate successfully in the knowledge transfer process, the control over the process will be perceived as lower. Also, if not a sufficient number or not the most appropriate employees participate, the perceived success of the transfer will also be low. One interviewee had a role which did not involve being pushed by NPD deadlines the same way as other engineers. Therefore, it was easier for this employee to successfully participate in the knowledge transfer activities.

The knowledge transfer process is new, why it can be assumed that employees think or believe that it is difficult to perform, or at least more difficult to perform than a more established process. Therefore, it can be assumed that the control over the process will increase with time even if the intended process description remains unchanged. The intention to not make the knowledge transfer process too burdensome to conduct increases the employees' control over the process and is therefore a favourable attribute. Since only DA took part in designing the current process, it might be designed in a way that is less suitable for PD, and therefore they can feel less in control over the process. For instance, since meetings are called to on short notice, PD sometimes have difficulty participating in them. Increasing concern of PD's work situation is believed to make them feel more in control over the process.

Having a more detailed description of the process, where it is clearly stated what is expected to be done, by whom, and where to find relevant information might increase control. If a more detailed description of the process makes it easier to perform the knowledge transfer process successfully, the control will increase. However, if the clarification only reveals how complicated the process is to perform, the employees will feel even less in control. According to one of the academics, employees usually ask for a more detailed description regarding a process because then the responsibility to obtain a successful outcome does not lie on them, since they are just following predefined instructions. On the other hand, the academic further argued that if a process is too detailed, employees commonly feel controlled and experience lack of freedom and ability to be creative. In both cases, employees can find a reason to why the knowledge transfer was not successful. Either because the

instructions were not detailed enough leading to not knowing exactly what to do, or because the instructions were too detailed causing low flexibility or few possibilities to be creative. Asking for a more detailed process could, of course, be valid and not inflicted by merely having an excuse for the outcome, but it is an interesting point worth evaluating.

6.3 Success factors to effective knowledge transfer

Community and a common goal

Both academics explained that there will always be barriers between two separate teams because they develop their own culture, have different agendas, different time constraints, and view different tasks as important. The barriers thus create a need for integration mechanisms, in order for the teams to work together in the desired way. One of the academics argued that setting a common goal creates a feeling of community between the teams. Having a goal will, as described by Deci and Ryan (1985), influence people to engage in a behaviour that makes them reach the goal. Therefore, it is believed that setting a common goal for the teams will both lower the barriers between them by increasing the feeling of working as one team, and make them engage in a behaviour that is in line with the stated goal – thereby enhancing the desired outcome.

Furthermore, one of the academics explained that it is important to gain an understanding of "the other team's world" and build a mutual understanding of each other. Teams need to understand other teams' limitations and have reasonable expectations based on available resources. Suggestions that were lifted on how to reach such an understanding included for instance round table discussions and work rotations. The suggestions will provide employees with the possibility of internalisation which, according to Chirico and Salvato (2016), lower the risk of different interpretations and disconnection of teams from their thought worlds. This is believed to open up a possibility to instead gain an understanding of "the other team's world". There is some work rotation present within the case company, as resources from PD are temporarily reallocated to DA, which contributes to a developed understanding of DA's world. However, there is no reallocation from DA to PD. This is believed to be even more important, since PD is the department which in fact experience the most pressure due to resource and time constraints. In line with the academic's reasoning, the knowledge transfer would arguably benefit from a greater sense of community and mutual understanding. Lastly, one of the academics explained that employees need to feel a connection to the issue or the knowledge transfer will not succeed – no matter how sufficient the process is. Therefore, having a sense of community and a common goal is believed to be a vital part of making employees connected to the issue.

Efficient and frequent communication

Both according to Cummings and Teng (2003) and one of the academics, physical distance is a factor influencing the communication. However, as the other academic stated, sitting close does not necessarily make people communicate with each other. Meetings and how they are structured is important. Shorter and more frequent meetings were suggested both by an academic and an interviewee. This is suitable both in this case and likely for many companies, since time and resources can be assumed to generally be scarce. Also, since new knowledge might be needed quickly when solving a QJ, more frequent meetings might reduce the total lead time and make sure important knowledge is transferred before critical decisions are made. Meetings where the employees make commitments about what they are going to do during the week and when they will do it was suggested by one of the academics. Besides making a commitment to others and thereby increasing the social pressure to behave accordingly, information and updates about progress is exchanged among the employees. The academic highlighted that follow-up meetings should not be a blame game if someone have not solved there task due to complexity or time. Making people feel bad will reduce their motivation and pointing out individuals' performance might affect the team spirit negatively. Furthermore, as also mentioned by the academic, the reason for not delivering might be because someone else has not delivered their input, and therefore one cannot continue with the task. Therefore, making people aware of how their output affects others is important, since knowing how one's output affects others will increase the feeling of responsibility. Also, delivering to someone else will provide an opportunity to feel achievement and gain recognition for the work performed.

Having more communication and meetings or better communication might save time in the long run. One of the academics stated that more efficient communication can impact the level of scrap and rework, thus leading to less consumed time, and reduced rework will increase customer satisfaction and improve financial performance. Frequent meetings was also believed by one of the academics to work as an integrator, as discussed in the previous section, and such meetings will provide an opportunity of internalisation and externalisation among employees. Furthermore, as stated by Tiwana and Mclean (2005), the interaction between employees will enhance creativity which is believed to provide a suitable solution to the quality issue faster, thereby mitigating the risk of negatively affecting customer relations and consequently the financial outcome. Synergies arising from the suggested activities can be viewed as especially attractive to obtain, since these can increase efficiency. Lastly, one suggestion from one of the academics was to have an employee responsible for team communication and making sure key employees exchange knowledge with each other. This suggestion is believed to improve the communication and transfer of knowledge between teams. However, if this should be reasonable to realise, other teams within the organisation should be in the need of such a role as well, otherwise it will likely be too costly.

Sense of urgency and connection to problem

One of the academics underpinned the importance of making people connect to and be engaged in a problem to be sufficiently motivated to solve it. Moreover, the academic believed that if no connection to the problem existed, having a knowledge transfer process would not make any difference. A suggestion on how to achieve this was to visualise the problem and how the solving process is progressing, thus making the issue easier to relate to and creating a sense of urgency. In the case specific context, even if PD is the owner of the system and have the utmost responsibility for EATS, it is perceived that they might not feel the same responsibility for QJs concerning EATS as DA, since mainly DA is involved in solving the quality issue. Therefore, it is believed that increasing the connection and responsibility PD feels towards QJ issues will favour the knowledge transfer and the application of their process. Furthermore, by visualising the QJ and how far the solving-process has come will increase priority and create a sense of urgency.

Transfer of knowledge to colleagues and the organisation

The academics also underpinned the importance of transferring knowledge to colleagues and to store knowledge within the organisation, for instance in databases. This in order to not lose valuable knowledge and avoid knowledge gaps when employees leave the organisation, but also to ensure that not only one employee possesses knowledge that can be utilised by others. Since there is commonly only one employee for each position at PD, they are highly dependent on each individual on a daily basis, and knowledge gaps are often created when employees leave the department. One of the academics emphasised how it would be beneficial to spread more knowledge throughout the organisation, for instance by pairing employees with key competencies with other less experienced workers. Based on this reasoning and putting it into the context of the case study, spreading knowledge to others within the organisation is believed to increase the effectiveness of the knowledge transfer as well as improving the outcome of the process.

7
Recommendations

Based on the answers to the three research questions, the following recommendations constitute factors which the authors of this paper argue need to be in place within an organisation in order to enable effective knowledge transfer between two departments. By implementing these recommendations, it is believed that the chance of knowledge transfer success between a quality assurance department and a development department will be increased, and recurring quality issues prevented.

An organisational culture favouring knowledge transfer

Based on the findings from the study, the need for organisations to establish a culture that supports the transfer of knowledge can arguably be considered as a vital factor to have in place in order to facilitate effective and successful knowledge transfer. Forming such a culture is believed to actively motivate people to prioritise knowledge transfer and transform their attitudes towards it, since working routines and decision making would be shaped in a way that would favour such activities. Moreover, it would enhance the effectiveness and outcome of the knowledge transfer process. How to achieve this type of culture is argued by the authors to mainly be a matter of leadership, since leaders highly influence the organisational culture. By consistently communicating and showing that knowledge transfer is of key importance to achieve high-quality products, it will become a more and more integrated part of the working routines, and eventually a natural part performed regularly.

High internal motivation to transfer knowledge

An organisational culture favouring knowledge transfer is believed to also contribute to increased internal motivation to transfer knowledge. Consistent with literature, the case study findings implied that the effect of internal motivation exceeds that of external motivation. Therefore, it is believed that managerial focus on creating and maintaining high internal motivation among employees to participate in knowledge transfer is key in order to facilitate an effective process. Working within a culture where knowledge is encouraged and where employees receive recognition for such work from both management and colleagues is believed to significantly increase the internal motivation to perform tasks related to knowledge transfer, which is also viewed as an important facilitator to effective knowledge transfer.

Aligned resources and knowledge transfer goals

In order to enable effective transfer of knowledge, it is further argued by the authors that the provided resources need to be aligned with the stated goals related to knowledge transfer. Evidently, time and resource constraints, such as staff-shortage and insufficient testing procedures to verify solutions to quality issues, can form a significant obstacle in a knowledge transfer process. Hence, appropriate resources need to be in place to enable sufficient participation in knowledge transfer activities. Moreover, if provided with more time for knowledge transfer, employees are likely to experience a feeling of being more in control over the process, which will increase the willingness to transfer knowledge. It is also reasonable to expect an increase in social pressure to transfer knowledge, when providing sufficient resources and creating more time for knowledge transfer activities. Mainly the leaders and management within organisations have the power to implement this recommendation. By not only stating that knowledge transfer is important, but also facilitating it, is believed to highly increase the social pressure and overall willingness to participate in the transfer. Aligning resources with the intended outcome of the knowledge transfer process will thereby contribute to facilitate effective transfer.

Frequent communication combined with efficiency

Although expressed as a need at the case company, having more formal meetings does not necessarily increase the chance of knowledge transfer success, unless the communication and knowledge exchange during the meetings is also performed in an efficient manner. Efficiency here could for instance involve only discussing the "right things", that is, what is relevant at the time, or create an integration role with responsibility for coordinating the knowledge exchange. It is arguably vital to find a balance between communication frequency and efficiency, so that the total effectiveness of the knowledge transfer is enhanced. This in turn is believed to also save time in the long run, since increasing the number of shorter and more efficient meetings is believed to outperform that of fewer and longer meetings. Additionally, with regards to documentation, there needs to be a sustainable balance between ease of access and ease of use if to achieve effective knowledge transfer.

This recommendation is believed by the authors to decrease the knowledge distance between the parties in the knowledge transfer, since it would increase the involvement of more employees who are required in the process, as well as improve the access and usage of knowledge and information. Moreover, it would increase the degree of socialisation and combination, and ensure that all involved have been provided with the relevant information. Furthermore, a higher degree of involvement from both parties would plausibly also improve employees' attitude towards knowledge transfer, and increase the social pressure to participate. This would likely enhance the willingness to contribute to successful knowledge transfer, and is therefore believed to be a fundamental part in facilitating effective knowledge transfer.

Minimised physical distance

It is also believed that minimising the physical distance between the departments will highly contribute to more effective knowledge transfer, as a result of increased and more frequent informal knowledge sharing. Also, it would provide the ability for people to overhear how different projects are progressing and enable more informal opportunities to easily provide input and receive regular updates. Minimising the physical distance is furthermore believed to contribute to decreased organisational distance. If the departments are located close to each other, the feeling of "being in the same team" is likely to develop among the employees. This also contributes to an enhanced sense of community, which is elaborated on below in the next recommendation.

Mutual goals, a common purpose & a sense of community

To decrease the norm and organisational distance between the departments participating in the knowledge transfer, this study has evidently revealed that a sense of community, shared goals, and aligned purpose is essential. If the departments are to achieve effective knowledge transfer, they need to work in the same direction towards fulfilling the same goals and feel that they have a mutual purpose. This is believed to increase the "understanding of each other's worlds", as emphasised by one of the academics, including values and prioritisation as well as awareness of what constraints and possibilities that exists within the respective departments. This will enable more effective knowledge transfer, since the departments will adjust the transfer process to be as smooth and beneficial as possible for all involved. It is also reasonable to expect that a higher sense of community will result in increased social pressure to work more actively with knowledge transfer activities, since the employees will likely gain a better understanding of the departments' interdependence and feel more responsibility towards each other's work.

Connection to the issue

In order to increase the prioritisation revolving knowledge transfer activities, establishing a connection to the quality issue is key, subsequently creating a sense of urgency. Also in this case, the major responsibility to develop a connection to the issue among employees belongs to the leaders and management of the organisation. For instance, visualising the consequences resulting from quality issues is believed to form an emotional connection to the problem, which will increase the feeling of responsibility amongst the involved to solve the issue in the best possible way to prevent it from reocurring. Moreover, such a sense of urgency will change the attitude among employees and increase the pressure to participate in the knowledge transfer, as well as to optimise the outcome of the process.

Preservation of knowledge within organisation

To mitigate from risks associated with employee turnover, it is crucial to constantly focus on preserving both tacit and explicit knowledge within the organisation. It

must be made clear that the employees are expected to share the knowledge they possess with the other colleagues before leaving. Knowledge that can be codified should preferably be documented, while tacit knowledge should be shared and transferred to other individuals through socialisation. Therefore, the authors of this paper argue that knowledge transfer in this context should be conducted utilising a codification strategy which is supported by personalisation. However, in addition to continuous transfer of knowledge to other individuals within the organisation, it is also of great importance that knowledge is regularly stored and embedded in tools such as databases. Evidently, not all knowledge can be documented, but vital technical specifications, such as DGs and TRs, should be updated on a regular basis, to both ensure that new employees can learn from these documents and that remaining employees can continue to benefit from the (otherwise lost) knowledge. The benefits of this recommendation will likely become particularly apparent in cases where there is only one employee for each position, since the dependency on specific individuals will decrease. As such, increased focus on preserving knowledge is believed to facilitate effective knowledge transfer.

A clear process description

Lastly, by having a clear process description in place which the involved employees have agreed on and fully understand, the effectiveness of the knowledge transfer is expected to be significantly enhanced. A clear description with an appropriate level of detail will arguably make the knowledge transfer easier to plan, structure, and conduct. Moreover, it will mitigate the potential risk of misinterpretation or missing a certain action-step that should have been in place to achieve successful knowledge transfer. Reaching consensus on what should be included in the process description, when originally developing it, will likely increase the employees' feeling of control over the transfer process. This will thereby impact their behaviour in favour of the knowledge transfer and enable a more efficient process.

8

Conclusion

This chapter summarises the key parts of the study. First, the purpose of the thesis and answers to the research questions are presented, followed by the final recommendations. Lastly, the chapter closes with a brief discussion on the recommendations, sustainability aspects, and suggestions for future research.

8.1 Research findings

The purpose of this thesis has been to identify factors, or "facilitators", that need to be in place within an organisation in order to enable effective knowledge transfer between two departments. In the context of this paper, one of these departments is responsible for solving quality issues, while the other department is responsible for implementing the solution in new projects. In order to arrive at a set of recommendations which involve these facilitators, three research questions have been investigated and answered.

8.1.1 Research question 1

What factors prevent an effective knowledge transfer process?

Several of the factors that can form potential barriers which were found during the theoretical research were also identified from the empirical research at the case company, namely (1) knowledge articulability and embeddeddness, (2) organisational, physical, knowledge, and norm distance, (3) leadership and management, and (4) transfer activities. Moreover, four additional barriers to effective knowledge transfer appeared from the case study, which were (5) resource misallocation and time constraints, (6) employee turnover, (7) missing verification method, and (8) unclear process description.

8.1.2 Research question 2

How does motivation & willingness affect knowledge sharing & transfer?

It was found that both motivation and willingness have a great effect on the sharing and transfer of knowledge. Employees' motivation towards knowledge transfer and

the sharing and transfer behaviour is mainly affected by internal motivators such as responsibility, achievement, operational autonomy, and challenge of work. The willingness is affected by (1) the attitude towards the knowledge transfer, (2) the present social pressure to participate in the knowledge transfer, and (3) the perceived control over conducting the knowledge transfer successfully.

8.1.3 Research question 3

What are success factors to effective knowledge transfer?

Based on the empirical research, and to a great extent on the answers provided from the external interviews with academics, several success factors to effective knowledge transfer were identified. These were (1) community and a common goal, (2) effective and frequent communication, (3) sense of urgency and connection to problem, and (4) transfer of knowledge to other individuals and the organisation.

8.2 Final recommendations

From the empirical findings and the theoretical research, the authors have identified nine factors that are believed to facilitate effective knowledge transfer between a quality assurance department and a product development department. These factors are expressed as recommended facilitators that need to be in place within an organisation to enable effective knowledge transfer within the specific context of this paper. These recommended facilitators are as follows:

- An organisational culture favouring knowledge transfer
  - High internal motivation to transfer knowledge
- Aligned resources and knowledge transfer goals
- Frequent communication combined with efficiency
  - Minimised physical distance
- Mutual goals, a common purpose, and a sense of community
- Connection to the issue
- Preservation of knowledge within organisation
- A clear process description

8.3 Discussion

Although this study confirms a large part of existing theory, the case specific findings have served as a valuable contribution to the research area of knowledge management, and provided a new perspective and deeper understanding of the topic knowledge transfer. As the stated facilitators, the recommendations, are highly interrelated to one another, and the identified case specific barriers are believed to have a further negative influence on the barriers obtained from the theoretical research, this paper contributes with useful insights and new pieces to the solve the complex puzzle of successful knowledge transfer. The recommendations are believed

to be essential to have in place within manufacturing companies in order to facilitate effective knowledge transfer. Even if an organisation possesses a sophisticated process description, the authors of this paper argue that without paving the wave to carry out the process effectively, it will not result in knowledge transfer success. Consequently, similar quality issues will reoccur, since the required knowledge have not been transferred properly to the recipient, that is, the development team. Having the stated facilitators in place is therefore believed to enable the utilisation of a knowledge transfer process and effective transfer of knowledge between a quality assurance department and a development department. As a result, the facilitators are believed to significantly increase the chance of preventing recurring quality issues. Furthermore, the recommendations are believed to be externally valid to similar contexts. That is, the facilitators can likely enable effective knowledge transfer between a variety of other teams and departments and contribute to achieving their stated goals.

Connecting back to the sustainability aspects as discussed in Section 1.1.1, product design was emphasised by Hoopes and Postrel (1999) to be particularly sensitive to knowledge gaps. Insufficient knowledge transfer between a quality assurance department and a development department could therefore compromise on financial and environmental sustainability due to more scrap, increased material consumption, higher costs, and declining revenue. As such, effective knowledge transfer between departments within manufacturing companies is believed to positively contribute to sustainability in various ways. Moreover, from a greater perspective, preventing reocurring quality issues could improve social sustainability. For instance, in the case of Volvo Buses, maintaining high-quality components in vehicles in development countries could contribute to improved social sustainability in terms of the effectiveness of the public transportation system.

8.4 Future research

Even though the proposed recommendations laid forward in this thesis are believed to be applicable on a great number of manufacturing companies, the external validity would be even further increased if similar findings were obtained from multiple case studies. There is no "one size fits all" solution to establish a successful knowledge transfer process amongst all companies. However, expanding the scope would possibly result in the identification of additional key facilitators that need to be in place to enable effective knowledge transfer. Eventually, the list of recommendations could potentially result in a flexible framework that can be utilised within a wide range of different organisations aiming to achieve effective and successful knowledge transfer. As such, similar research which involves multiple case studies across multiple industries would be of interest for further investigation.

Furthermore, research revolving the implementation of the stated recommendations and specifically how to fulfil them is also of particular interest. For instance, identifying effective tools that are suitable to utilise in order to achieve increased motivation among employees and create a sense of urgency is only one aspect that needs to be

accounted for if to establish an organisational culture favouring knowledge transfer. Additionally, with regards to preservation of knowledge within organisations, strategies on how to accomplish this could expand to include for instance corporate or HR policies, or development of new standards and routines to apply when employees leave the organisation.

9

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A

Appendix 1

A.1 Interview template: DA & PD

Introduction

- What is your current role within the firm?
- How long have you worked within Volvo Buses?
- Could you tell us a little about your previous experiences?

Knowledge transfer

- What is your perception of the intended knowledge transfer process and its design?
- Has the intended knowledge transfer process been communicated to you?
  - (Yes) How?
  - What is your role in this process, and how are you working with knowledge transfer?
- Is the process description clear and easy to understand?
  - Is it clear who is responsible for what?
  - If you do not know how to perform a certain step in the process, what do you do?
- How do you perceive the knowledge transfer process and its effectiveness?
  - Are everyone working in line with the provided process description?
    - (No) Why do you think that is?
  - What works well in the current process?
  - What works less well in the current process, and how could it be improved?
- How would you have wanted the knowledge transfer process to be designed?
  - Is there anything missing in the current process description?
- Do you experience that employees are expected to work with knowledge transfer?
  - Are you motivated to work with knowledge transfer?
  - Are employees expected to prioritise such work?
    - (Yes) By whom?
    - (No) Should it be prioritised?
- Is knowledge sharing and transfer valued within the organisation?
  - (Yes) How is it valued?
  - (Yes) Who values it?

  - (No) How should it be valued?
  - (No) Who should value it?
- What motivators, incentives, and other factors do you think are required in order for employees to work actively with knowledge transfer?
- How to make knowledge sharing and transfer perceived as something important?

Work with knowledge in general

- How do you currently share information or knowledge in general?
  - Why specifically like this?
  - What works well and less well with these ways?
- How do you currently receive information or knowledge in general?
  - What works well and less well with these ways?

Follow-up on process (last three questions only asked to PD)

- After the Check-In meeting, what happens when the information is received by PD?
  - Is there any follow-up procedure after Check-In?
  - How are potential changes shared within PD?
- Does PD have sufficient resources to proceed with the information handed over by DA at Check-In?
  - (No) What resources are required?
  - Does it occur that the information handed over by DA gets low priority?

EATS

- Why do you think that such a large number of quality issues reoccur within EATS in particular?
  - What contributes to this?
  - How could it be improved?

A.2 Interview template: Academics

Introduction

- What is your current role and research area?
- Can you tell us a little about your experiences within knowledge management and transfer?

Effective knowledge transfer

- What would you say are common "success factors" to a well-functioning knowledge transfer?
- What are common barriers and other factors that prevent effective knowledge transfer between teams?
  - At individual level? At organisational level?
- What do you believe should be included in a description of a knowledge transfer process?
- How to achieve increased communication between teams?
- How to increase the exchange of information and knowledge between teams?
  - How to achieve the above without increasing time constraints?
- How to increase the understanding between teams regarding e.g. different prioritisations?
- What are good ways to easily share or visualise progress and updates within a project to all involved?
- How to ensure that important knowledge remains within an organisation?
- How could knowledge gaps resulting from employee turnover be prevented?
  - How to ensure that the employee's core knowledge remains within the organisation?
- What is management's role with regards to knowledge transfer?
- What demands associated with knowledge transfer are reasonable for management to make?
- It was mentioned by several interviews at the company that the extent of documentation performed varies depending on how important it is perceived to be. How should managers handle this and the way tasks are divided?

Motivation

- How to increase the motivation among employees to work more actively with knowledge transfer?
- What tools can be utilised to increase motivation?
- How to ensure that work related to knowledge transfer is prioritised?
- Do you believe that a sense of community between teams can increase the motivation to transfer knowledge?
  - How to increase the sense of community between teams?
- Would you say that visualisation or sharing increases the motivation to work with and prioritise what is being visualised or shared?