



CHALMERS
UNIVERSITY OF TECHNOLOGY



From Competence to Competitive Advantage

Transferring Strategic Capabilities for Quality and Excellence in Nordic Manufacturing and Warranty Services

Master's thesis in Industrial Engineering and Management

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Cover: Alstom produced M33 Trams being taken into commission by Göteborgs Spårvägar.

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Abstract

Established research on capabilities and competitive advantages consists mainly in evaluating a capability in its current capacity, even when future predictions of a sustainable advantage are in focus. Connections to capability transfer are generally in the direction that effective knowledge transfer results in, or supports, a competitive advantage or a strategic knowledge resource. This thesis examined the reverse relationship of how competitiveness and availability of resources could influence the transfer process of an organization looking to move a strategic capability into warranty operations. This was done through four research objectives: (1) Assessing the competitive environment; (2) Identifying barriers to capability transfer; (3) Selection of a recipient site; and (4) Transfer process and training. Specifically the study aimed to fulfill these objectives within the scope of a multinational corporation (MNC) transferring a capability into warranty operations. The chosen method of accomplishing the objectives was through an qualitative, ethnographic case study of abductive nature, studying Alstom Rail, a rolling stock manufacturer with Nordics warranty operations. The study found that the warranty industry only regards quality up until a certain point after which additional performance is excessive but instead requires a broader profile of the capability to be transferred from serial production. Key barriers to the transfer included lack of motivation of the staff, financial incentives to resist warranty work, and lack of ownership and representation in the organization. The findings indicated that the capability transfer process should dynamically adjust itself so that the transferred capability fits the competitive scope of the warranty industry and align with available resources. Additionally, the study introduces the concept of resource-based barriers to capability transfer, which was specifically found related to facility conditions. The results of the study contributes to the scientific field of research on warranty industries by applying established theory in a new context and suggest new concepts or resource barriers in capability transfer processes. This highlights a need for future research to differentiate resource barriers from competitive misalignment, division of resource barriers and evaluating the organizational implications from actively managing the transfer process.

Keywords: Competitive Advantage, Resource-Based View, Knowledge-Based View, Capabilities, Strategy, Barriers, Resource Barrier, Multi-National Corporations, Warranty.

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Tobias Karlsson & Nils Mann,
Gothenburg, May 2025

List of Acronyms

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

EAB	European Adhesive Bonding
KBV	Knowledge-Based View
KB	Knowledge Barriers
KPI	Key performance indicator
MNC	Multi National Corporation
RBV	Resource-Based View
RO	Research Objectives

Contents

List of Acronyms	ix
List of Figures	xiii
List of Tables	xv
1 Introduction	1
1.1 Background	1
1.2 Purpose	2
1.2.1 Limitations	3
1.3 Alstom Rail	3
2 Theoretical Framework	7
2.1 Definition of Capabilities	7
2.1.1 Dynamic Capabilities	7
2.1.2 Competitive Advantage	8
2.2 Resource-Based View	9
2.2.1 VRIO Framework	10
2.2.2 RBV, Capabilities and Competitiveness	11
2.3 Knowledge-Based View	13
2.3.1 Definition of Knowledge	14
2.3.2 The Transfer and Sharing Perspective	14
2.3.3 Donor and Recipient Characteristics	15
2.3.4 Knowledge Characteristics	16
2.3.5 SECI Model	17
2.3.6 Bridging Ties	19
2.3.7 Transfer Barriers	20
2.3.8 Knowledge Transfer in Multinational Corporations	20
3 Research Objectives	23
3.1 Assess Competitive Environment	23
3.2 Identify Barriers	23
3.3 Recipient Site Selection	23
3.4 Transfer Process and Training	24
4 Method	25
4.1 Research Design and Strategy	25
4.2 Ethnographic Study	25
4.3 Research Process - Sprint Workflow	26
4.4 Data Collection	28
4.4.1 Interviews	29
4.4.2 Workshop	30

4.4.3	Participant-as-Observer	30
4.4.4	Company Documents	31
4.5	Data Analysis	31
4.5.1	Thematic Analysis	32
4.5.2	Gap Analysis	32
4.6	Sprint Review Meetings	32
4.7	Ethical Considerations	34
4.8	Research Trustworthiness	35
4.9	Use of Artificial Intelligence (AI)	35
5	Empirical Findings	37
5.1	Interviewees	37
5.2	Findings from Sprints	38
5.2.1	Sprint 1	38
5.2.2	Sprint 2	42
5.2.3	Sprint 3	45
5.2.4	Sprint 4	47
5.3	Remarks and Frequencies Across Interviews	48
5.4	Gap Analysis	49
5.5	Workshop	51
6	Implications	53
6.1	Competitive Assessment	53
6.1.1	Industry Based Competitiveness in Warranty Operations	53
6.1.2	Resource Based Competitiveness in Warranty Operations	54
6.2	Identify Barriers	55
6.2.1	Staff	55
6.2.2	Financial	56
6.2.3	Organizational	56
6.2.4	Facilities	57
6.3	Managerial Implications	57
6.3.1	Recipient Site Selection	58
6.3.2	Transfer Process and Training	59
7	Discussion	61
7.1	General Discussions	61
7.2	Future Research	62
8	Conclusion	63
	Bibliography	65
A	Interview Template	I

List of Figures

1.1	<i>A perspective showing how capabilities can potentially be transferred for a predetermined purpose in a strategic context.</i>	3
1.2	<i>The organizational structure of Alstom illustrating the link between project and site.</i>	4
2.1	<i>The SECI model, illustrating the different stages of knowledge creation. Adapted from Nonaka (1994) Authors' own copyright.</i>	18
4.1	<i>Working sprint methodology with a continuous feedback loop for effective alignment.</i>	27
4.2	<i>The structure of the bi-weekly sprint review meeting with stakeholders.</i>	33
5.1	<i>Barriers in collecting data between functions within the organization.</i>	44
5.2	<i>Process steps involved in adhesive bonding of window frames.</i>	46
5.3	<i>The resulting board after a completed aim workshop with technicians in Motala.</i>	51

List of Tables

2.1	<i>The categorization of resources in three broad types according to J. Barney (1991).</i>	10
2.2	<i>The categorization of resources in three broad types according to Grant (2021).</i>	10
4.1	<i>Relevant methods used in investigating the four research objectives with what type of data extracted.</i>	28
5.1	<i>Summary of the interviewees who agreed to an interview.</i>	37
5.2	<i>Overview of objectives across sprints with new findings.</i>	38
5.3	<i>Thematic remarks and frequencies across interviews.</i>	48
5.4	<i>Comparison of parameters for Motala service in Sweden highlighting the differences between the current state and a desired state.</i>	50

1

Introduction

This chapter provides the reader with a contextual foundation for the thesis by outlining the background and rationale behind the study. It starts with an introduction to the research background that led to identified gaps and a thesis purpose. The chapter then presents an overview of the case company, Alstom Rail, along with a description of its relevance to the phenomena to be studied.

1.1 Background

For certain firms, industries, or markets, it is common to attach warranty agreements to sales contracts as a way to instill confidence in the quality of a delivered product. Such agreements typically include maintenance or repairs at little to no cost to the customer, even potentially free of charge. Research is limited to how competitive requirements on resources or knowledge, as well as the transfer of capabilities, relate to the warranty industry. The gap in the research field becomes apparent when a warranty contract results in new capability requirements placed on the warranty operations. A company looking to offer a new warranty capability would therefore be forced to consider the required resources and knowledge to successfully transfer or acquire it.

Established research, such as J. Barney (1991) provides a comprehensive foundation to understand what constitutes a capability and how companies and organizations compete with each other from a resource-based perspective. One researcher, with the aim of focusing mainly on threats to the external market in the field of competitiveness, is Porter (2008) who introduced strategies such as *cost leadership*, *differentiation*, and *focus* as ways to achieve competitiveness. J. B. Barney (1995) presents the VRIO framework, which describes how a resource or capability must be *valuable*, *rare*, *inimitable* and *organizational* to provide a sustained competitive advantage. In addition to the Resource-Based View, there are some proponents of the Knowledge-Based View that expand organizational capabilities, arguing that knowledge embedded within an organization can be seen as a vital strategic resource (Grant, 1996). Some authors even argue that knowledge is one of the most important, if not the most important strategic resources for competitiveness (Bergh et al., 2025; Drucker, 1993; Liyanage et al., 2009). The concept of knowledge and associated definitions have been further discussed by Paulin and Suneson (2015), differentiating between knowledge as an object that can be contained and knowledge as a contextual construction interrelated to the individuals involved.

Opting for something more resembling the former definition, this paper draws inspiration from previous research on intra-organizational knowledge transfer such as Van Wijk et al. (2007)'s definition of knowledge transfer as an influencing process

of exposed actors as well as Easterby-Smith et al. (2008) dissecting both donor and recipient characteristics as well as aspects related to the knowledge itself that could enable knowledge transfer. Existing research highlights several aspects that would disrupt the transfer process. Knowledge stickiness (Szulanski, 1996), lack of knowledge explicitness (North & Kumta, 2018), transfer costs (Teece et al., 1997) and casual ambiguity (Szulanski et al., 2004) are some examples. However, discussions about the effectiveness of the transfer itself could be considered insufficient when evaluating a transfer process's appropriateness in a competitive setting, especially for an organization with a certain strategic ambition. Although recent efforts by Kengatharan (2019) determined that increasing social and human knowledge from transfer processes results in higher productivity and, in turn, contributes to a competitive advantage, the reverse effect of adapting a transfer process to fit a strategic competitive ambition could be of further interest to organizations operating in certain environments.

During actual transfer, barriers can influence the transfer process and hinder effective knowledge transfer or capability deployment. Barriers can be of different nature, where Riege (2005) categorize barriers at three different levels. Tanriverdi and Iacono (1999) introduces the concept of economic barriers where there is a failure to create a business model attractive to all stakeholders. Husain et al. (2017) connects barriers to RBV and transfer of technologies, which is an elaboration of the work of J. Barney (1991) and Porter (2008). One thing is evident, while barriers to knowledge transfer have been extensively discussed in different dimensions, such as technological (Riege, 2005) or cultural (De Long & Fahey, 2000), industry specificity is less studied with respect to how general barriers behave in a surrounding context.

1.2 Purpose

Building on themes and concepts such as competitiveness, knowledge transfer, and capabilities from the introduction earlier, the purpose of this thesis is to explore how competitive strategies can influence the process of transferring capabilities, in the context of warranty and special processes, within a multinational corporation. Interestingly, how organizational conditions affect the transfer process with economic or knowledge barriers and the transfer mechanism that affect the final outcome of a transferred capability.

Therefore,

The purpose of this thesis is to evaluate the role of competitiveness in the capability transfer processes of multinational corporations operating in the warranty industry.

And

to evaluate how warranty-, and MNC-specific conditions affect the capability transfer process.

Figure 1.1 illustrates the situation of how a specific competitive environment, such as that in warranty operations, could affect how a capability would be transferred to that environment by showcasing specific competitive priorities.

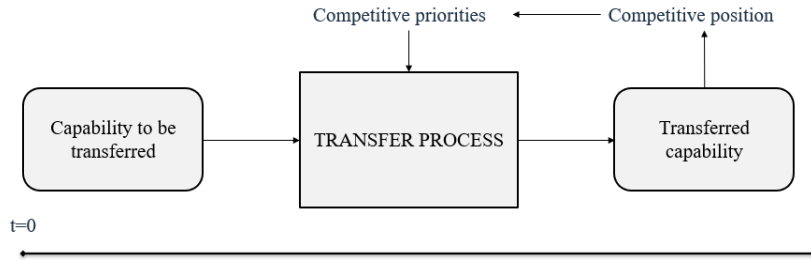


Figure 1.1: *A perspective showing how capabilities can potentially be transferred for a predetermined purpose in a strategic context.*

The findings of this thesis aim to contribute to an increased knowledge of how competitiveness can influence the international transfer of a capability into warranty operations.

1.2.1 Limitations

The thesis will be subject to limitations. This is to better focus on the task at hand agreed upon with Chalmers University of Technology and Alstom Rails. The limitation will act as a constraint to better frame the purpose and ensure a clear direction of the project throughout the semester. Considering the scope of the thesis and the time constraints, the current limitations include:

- The effects of time-related constraints, such as deadlines, project duration, and delays, will not be studied.

1.3 Alstom Rail

An organization that aims to transfer a capability is Alstom Rail, an international manufacturer of trains and trams with repair and maintenance operations in the Nordics. Due to different European and national standards for tram manufacturing, a mandatory technique called *Adhesive Bonding* for securing of windows panels and similar parts is accompanied by restrictions and requirements regarding staff competence and safety measures. Although Alstom employs bonding specialists in their European production sites, the Nordic organization does not house the capability, and instead outsources bonding work to an external company based in Germany. The decision to outsource bonding to an external company instead of utilizing an in-house resource from, e.g., Germany was based on a financial forecast conducted by Alstom. It indicated a small cost savings in selecting the external provider. Due to financial strain and strategic ambitions, as well as labor laws prohibiting prolonged temporary employment of technicians, the company decided to develop bonding capabilities within the Nordics. Alstom is therefore facing a strategic decision regarding the extent, location, and implementation of how the capability should

be transferred with respect to their competitive aspirations and business model.

Considering the situation at Alstom, it serves as a suitable case company throughout this thesis and acts as an example to better explore the idea of utilizing competence as a competitive advantage. Some of the benefits of this collaboration include access to relevant data, implementation of theory, and the ability to evaluate the findings in a realistic setting. As the case company currently does not employ any bonding capabilities in the Nordics, it offers a unique opportunity to examine capability deployment in a context with reduced bias from earlier attempts.

Alstom's organizational structure, illustrated in Figure 1.2 can be divided into two divisions: *projects* and *sites*. The projects are responsible for securing contracts (such as the Gothenburg M33 and M34 trams) and maintaining customer relationships; they are an immaterial actor that generates revenue without carrying out the operational tasks. Instead, material work is placed at the various Alstom sites, which in turn can be further divided into *production* or *service*. Production sites offer efficient serial production of new rolling stock additions, while service sites need to address maintenance and warranty demands from both internal projects and external customers.

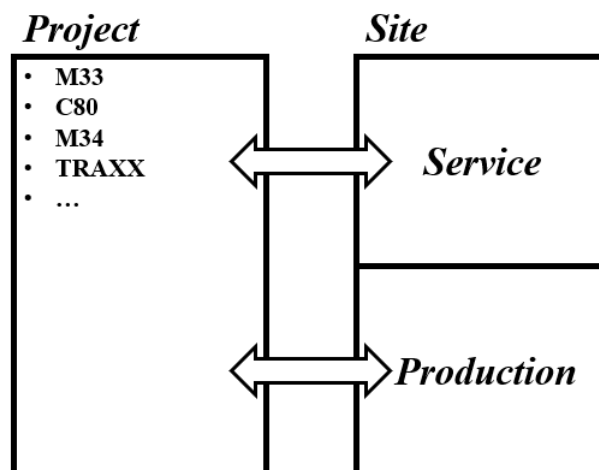


Figure 1.2: *The organizational structure of Alstom illustrating the link between project and site.*

Another distinguishing factor in the railway industry is that contracts often span large time frames, often including a substantial amount of service and warranty work before the final customer takes over. With a warranty period extending over multiple years and several thousands of kilometers in traffic, customer claims account for a substantial amount of a projects service operations. This means that while a vehicle could be manufactured abroad, a considerable service commitment is usually required on the deployed fleet in a Nordic country.

A contract-specific measure related to the warranty period is *Availability*, defined as

the percentage of vehicles that are operating as opposed to those that are taken out of commission to undergo maintenance or claim related repairs. Availability as a KPI (key performance indicator) is, therefore, central to many of the projects and, in turn, the service sites.

2

Theoretical Framework

This chapter presents the theoretical foundation upon which the result and analysis of the thesis will be based. It provides an understanding of Capabilities and Dynamic Capabilities, the Resource-Based View (RBV) with Resources and Competitiveness followed by an exploration of the Knowledge-Based View (KBV) with important concepts of knowledge such as Knowledge Transfer and Barriers.

The theoretical framework is structured to introduce both a foundational understanding and more specific insights. Many of the sections begin with thoroughly established concepts that provide the basic knowledge for the research, which is then followed by more extended and in-depth concepts within each respective field that aim to be applied and related to the findings. The reader is encouraged to view the theory as a layered approach to understand not only the basics but also how the scientific field has evolved. By presenting and selecting an appropriate definition of knowledge as well as distinctions of the knowledge sharing and -transfer concepts, the thesis establishes its position in the academic field among authors using other variations of the definitions. Doing so aims to help readers and gives a direction and place in literature overviews or other scenarios where it might be of central interest. However, in other cases such details regarding definitions are excessive, meaning that some readers could, for example, use the transfer and sharing concepts as synonymous and still utilize a majority of the content.

2.1 Definition of Capabilities

A capability refers to a firm's capacity to deploy and coordinate resources, often in combination, using organizational processes for a desired outcome (Amit & Schoemaker, 1993; Collis & Montgomery, 2008). Amit and Schoemaker (1993) further describe how capabilities are embedded within firm routines and often based on information, meaning tangible or intangible processes that develop over time due to complex interactions such as experience and learning. That a capability consisting not only of resources or knowledge alone, but through an interaction of both, has been supported by Eisenhardt and Martin (2000) using the RBV perspective and Nonaka et al. (2000) using the KBV perspective.

2.1.1 Dynamic Capabilities

The dynamic capabilities framework extends the RBV by exploring how firms maintain competitive advantage in changing environments. Dynamic capabilities focus on a firm's ability to adapt, renew, and reconfigure resources over time (Teece, 2007; Teece et al., 1997).

A dynamic capability can be defined as the firm's ability to integrate, build, and reconfigure internal and external competences to actively address changing environments. This definition is very relevant in industries affected by technological disruption, global competition, and innovation (Teece, 2007). Furthermore, dynamic capabilities are not functional routines themselves but rather competencies in how a firm modifies and adapts their existing resource base through incremental steps which can be divided into three core areas, evolving through a progression of activities. These activities create, apply, and protect knowledge and are known as *Combinative Capabilities* which drives value, *Integrative Capabilities*, which drives costs and finally, *Protective Capabilities* which concern return appropriation.

Combinative Capabilities refer to a firm's ability to synthesize and apply existing knowledge to develop new services and processes (Kogut & Zander, 1992). These capabilities explore how a company can coordinate diverse specializations and translate these into a certain result. The process involves identifying knowledge (e.g., a knowledge map) and making tacit knowledge accessible. The available knowledge is transferred through the SECI model as described by Nonaka and Takeuchi (1995). Finally, knowledge can be used for value creation.

Integrative Capabilities refer to a firm's ability to address cost-efficiency and coordination that ensure knowledge is applied within an organization where it is most needed. Grant (1996) describes two principles to consider when integrating knowledge, *aggregation* and *transferability*. Aggregation understands who has the knowledge, while transferability understands how difficult or costly it is to transfer and internalize.

Integration mechanisms include rules and directives (plans, scheduling, forecasts, etc.), sequencing (transformation steps in a timely manner), routines (patterns triggered by signals or choices), and finally group solving and decision making (more personal and communication intensive interaction) (Grant, 1996).

Protective Capabilities refers to the protection of knowledge that has been created and deployed to secure return on investments. Andersén (2012) describes how protective capabilities involve steps to effectively preserve knowledge and reduce the risks of imitation by competitors. This includes legal protection such as patents or non-disclosure agreements (NDAs). Mechanisms such as code of conduct and mobility restrictions to reduce the risk of information leakage.

2.1.2 Competitive Advantage

Competitive advantage refers to a firm's ability to create more value than its competitors. This is mainly through an offering of more superior services, products, or through operational efficiency that is sustainable over time. Often, competitive advantage allows for a firm to outperform their competitors, usually measured in profitability and market share (Porter, 2008). Porter further describes three basic approaches to competitive strategies:

1. **Cost Leadership:** A company provides goods and services at a lower cost than their rivals.
2. **Differentiation:** A company offers a unique value of significance to the customer that justifies a premium price for the distinctiveness.
3. **Focus:** A company focuses on a narrow competitive scope within an industry and tailors its strategy for this particular segment. Often, focus is combined with the two strategies mentioned above, creating variants.

Porter's framework mainly emphasized external market positioning, while the RBV, as introduced by J. Barney (1991), shifts the focus inward where competitive advantage is derived from resources and capabilities.

According to J. Barney (1991), a company achieves a competitive advantage when it implements a value-creating strategy, often measured through the VRIO framework. This value-creating strategy should not be implemented simultaneously by any current competitor, creating an advantage. If this advantage is maintained, it is also considered sustainable.

Grant (1991) elaborated on this and emphasized how competitive advantage should also consider coordination and integration, that is, how well the firm deploys and aligns in accordance to strategic goals.

2.2 Resource-Based View

The Resource-Based View of the Firm is a theoretical framework in strategic management that explores what differentiates firms and how they can achieve a sustained competitive advantage (Hooley et al., 1998). The theory emerged as a response to earlier strategic theories such as the work published by Michael Porter, particularly his organizational view, focusing mainly on the external market forces. The RBV focuses mainly on competitive advantage within the firm and how a firm can leverage its resources and capabilities (J. Barney, 1991; Wernerfelt, 1984).

While a capability can be seen as the "how", a resource, on the other hand, can be seen as the "what". Resources in the strategic management literature are defined as assets (tangible or intangible), knowledge, processes, and technologies within an organization that can be used to implement and support strategies (J. Barney, 1991). Barney further describes that resources can be categorized into three types, as seen in Table 2.1.

Table 2.1: *The categorization of resources in three broad types according to J. Barney (1991).*

Physical	Human	Organizational
Facilities	Training	Firm Structure
Machines	Experience	Culture
Geographical Location	Employee Skills	Routines
Raw Material	Intelligence	Information Control and Coordination Systems

For a resource to be considered a source for competitive advantage, it must fulfill the VRIO criteria which will be expanded on in Section 2.2.1.

Grant (2021) expanded this definition of resources with a more operational and integrated perspective. His categorization consists of the following three types as seen in Table 2.2.

Table 2.2: *The categorization of resources in three broad types according to Grant (2021).*

Tangible	Intangible	Human
Capital	Patents	Skill, "Know-How"
Securities	Copyright	Motivation
Buildings	Reputation	Abilities
Equipment	Culture	

Although tangible resources can be observed more easily, intangible resources are often those that drive value and contribute to a sustained competitive advantage. For that reason, in this thesis, Grants' view is very relevant considering the intangible nature of a special process. The distinction between tangible and intangible assets aligns well with the focus of deploying capabilities and knowledge across geographical locations.

2.2.1 VRIO Framework

To evaluate whether a firm's resources and capabilities can create a sustained competitive advantage, J. B. Barney (1995) introduced the *VRIO framework*, which stands for Valuable, Rare, Inimitable, and Organized. This framework serves as a tool to assess the internal resources of the firm. Barney further describes the four components as follows:

Valuable A resource is valuable if it exploits business opportunities and neutralizes external threats. The resource provides value to the customer and allows the firm to perform activities more efficiently than competitors.

Rare A resource is rare if it is not widely possessed by competitors. Resources such as technology, talent, or a powerful brand can lead to uniqueness. An important

consideration is that it is important that the resource also contributes meaningfully to strategic differentiation; otherwise it simply offers competitive parity with competitors.

Inimitability A resource currently possessed by a firm must be costly or difficult for a competitor to imitate or copy. Inimitability can be hindered by various aspects such as *casual ambiguity*, *unique historical conditions* or *social complexity*.

Organized Finally, an organization must fulfill this criterion to effectively capture value from its resources and capabilities. This includes having an appropriate structure with processes in place to leverage their resources to create value. Without it, no matter how valuable the resources are, they will fail to deliver a competitive advantage.

An important factor to recognize is that resources are dynamic, that is, they change over time. Their value can erode over time considering that they are affected by firm decisions, trends, and technological advancements. Therefore, it is important to regularly reassess and analyze the available resources in an organization and invest in new resources over time (J. Barney, 1991; Collis & Montgomery, 2008).

2.2.2 RBV, Capabilities and Competitiveness

Herrmann (2008) compares the view of a market and its national institutions as a competitive alignment with the Resource-Based View on competitiveness and found that a majority of pharmaceutical firms aligned their competitive strategies with resources rather than nationalities. This is further evolved by Andersén (2010) suggesting that the RBV as presented by J. Barney (1991) leads to a number of managerial implications. Among resource diversification, customer relations, and human resource management, he points out the necessity of acquiring the appropriate resources when imitating the capability of a competitor. Using the same principle for a transfer rather than a capability, this aspect could be relevant for a company that is carrying out a kind of internal imitation process.

Collis (1994) examines the view of capabilities as sources of sustainable competitive advantages in a more skeptical light and proposes a number of possible fallbacks for organizational capabilities. First, a capability could lose its competitive properties through several reasons, such as erosion following the fact that firms are likely to adopt new competitive strategies or experience changing market environments, for example, the capability becoming less rare. Similarly, a capability could be both replaced or surpassed by another one. Second, according to Collis (1994) the competitive threat in the realm of capabilities is greater than when simply comparing resources, which would generally be easier to define, predict, and limit within an industry. However, a new capability could include ambiguity that makes it difficult to understand its value and copy its characteristics. Although such aspects might appear to be correspondingly advantageous to the competing firm as a competitor, it is important to note that their culminating effects negatively impact the ability to enjoy a sustained competitive advantage (Collis, 1994).

A similar factor behind what Collis (1994) calls "the infinite regress" of sustainable competitive advantages from capabilities is the fact that competitors that recognize the inimitability in a capability will be inclined to challenge it with another, accepting the strength in its position. Two proposals are made to counteract the regressing advantages, one being a constant evaluation of the surrounding context. This means that the capabilities that are likely to provide a sustained competitive advantage differ between industries and points in time, and instead of desperately trying to define and evaluate such capabilities, organizations should aim to position themselves to simultaneously build new ones while acknowledging the large uncertainty (Collis, 1994). Another approach to build competitive advantages through capabilities is to gradually compete on one level within the capability at the time. This would generally mean adopting the so-called *best practices* before moving on to subsequent levels. However, since no connection between level positioning and competitive environments is made, the approach cannot guarantee more success than the broader perspective on competitiveness.

Lafuente et al. (2016) builds on the RBV and VRIO framework (J. B. Barney, 1995) with an important distinction. Instead of evaluating each resource in isolation, they argue that a systemic approach is necessary that includes the resources and their interactions together to assess competitiveness. Arguments include the fact that some resources could provide obstacles to fully utilizing others, such as a deficient digital system that obstructs skilled workers from reaching their full capacity.

A practical competitive index consisting of several pillars of competitiveness aims to capture the full competitive strength of resources. Some of the pillars more relevant to manufacturing firms are human capital, networks, decision making, competitive strategy, and internationalization.

1. **Human capital:** refers to employees and factors such as education, the share of employees participating in training programs or the uniqueness of human capital.
2. **Networks:** refers to the reliance on external assistance in the development of the business or the uniqueness of the networking relationships.
3. **Decision making:** refers to the application of different sources of information, the sharing of this information, or the knowledge transfer of administrative operations.
4. **Competitive strategy:** refers to the direction of the strategy, if it is defensive or proactive, or uniqueness of a firm's strategy.
5. **Internationalization:** refers to the uniqueness of location.

Lafuente et al. (2016) refers to the concept of *configuration* as the degree of strategic alignment according to a theme across the resources. For an organization with a single pillar showing large differences in its configuration compared to the other pillars,

its suggested to target the bottleneck area with specific investments. However, an organization with more aligned pillars should instead employ a *harmonization* strategy that aims to improve the general alignment of the pillars collectively (Lafuente et al., 2016). Furthermore, the larger firms in the study saw an increased competitive performance from enhancing the configuration by its strongest alignments, while the smaller firms would ideally aim to correct weaknesses in its configuration of pillars.

Beamish and Chakravarty (2021) explains how the RBV was developed for single countries, product-centric organizations, and in the realm of MNCs generally only applied to non-diversified organizations. Similarly to Lafuente et al. (2016), they argue that the competitive assessment of a resource or capability should take into account the surrounding resources and conditions, such as the spatial, economic, and institutional barriers that MNC's face. Although an MNC can leverage ownership advantages, such as product knowledge, capabilities, and management processes, these aspects may not be easily transferred across geographical boundaries. A consequence is that an MNC should consider location-specific constraints that can hinder effective transfer of a capability and complement the existing understanding with other studies to understand competitiveness in MNCs. Specifically, evaluating the value, rarity and transferability (inimitability) of a capability or resource must be done according to local conditions, and not on a firm level, particularity in diversified organizations (Beamish & Chakravarty, 2021).

2.3 Knowledge-Based View

The Knowledge-Based View of the firm is an extension of the Resource-Based View of the firm. The idea is that knowledge can be seen as a strategic resource that an organization possesses (Curado & Bontis, 2006; Grant, 1996; Grant & Baden-Fuller, 1995). The KBV highlights organizational knowledge, which can be seen as explicit, tacit, and difficult to imitate as a primary source to achieving a sustained competitive advantage compared to traditional models that emphasize physical and financial resources.

Kengatharan (2019) describes how KBV emerged as a response to the increasing importance of intellectual capital, innovation, and learning in shaping performance such as efficiency and customer value. Authors such as Kogut and Zander (1992) and (Spender, 1996) have elaborated on the KBV and explored how knowledge is created, shared, and applied in organizations. They further describe how knowledge can be seen as more than simply an input and an output. It can serve as a dynamic force that contributes to the integration and coordination between and within teams.

KBV at the core describes knowledge as something that resides within an individual but also within an organization's routines and systems. This type of knowledge can be explicit, meaning knowledge that can be communicated, or tacit, meaning knowledge that is embedded within experiences and is difficult to transfer. Explicit and tacit knowledge will be elaborated on in more detail later in this chapter. Due

to the nature of knowledge and how it behaves, the KBV is concerned with how knowledge can be transferred and integrated within or between a firm.

2.3.1 Definition of Knowledge

To be able to study knowledge, it is important to define it in order to transfer and manage it effectively. Knowledge may seem intuitive, but there are multiple definitions and interpretations in the literature. Knowledge at a foundational level is often described as "justified true belief", a philosophical view (Artemov, 2018; Hay, 2008; Nonaka, 1994). Nonaka (1994) further described how "justification" is the process of screening to achieve truthfulness, which determines the quality of the created knowledge. In a context of organizational and strategic management, knowledge is viewed more as a strategic resource that allows for adaptation and innovation (Grant, 1996; Nonaka, 2007).

Furthermore, King and Zeithaml (2003) argue that knowledge is more than just an asset, it is context dependent, more specifically within an organizational context, and is tied to its social construct. Knowledge differs between industries, divisions, and roles and cannot be treated universally. They further describe how managing knowledge requires language to effectively distinguish what is relevant from what should be ignored. Milton (2007) suggested that knowledge can be observed in a more practical setting. Knowledge can be acquired and then structured through processing such as interviews or workshops. These methods are important in converting tacit knowledge to more explicit knowledge in an actionable form.

Knowledge can be defined by four aspects known as the "DIKW hierarchy" which consists of data, information, knowledge, and wisdom (Ackoff, 1989; Zins, 2007). *Data*, meaning the basic building blocks that serve as input. *Information*, meaning data that have been processed and structured in patterns such as models. *Knowledge*, meaning the ability to act on information and enable decision making. Finally, *Wisdom*, meaning the types of accumulated content of the human mind. This hierarchy, also known as the "Knowledge hierarchy" has also been subject to criticism. Frické (2009) described the hierarchy as unsound and methodologically undesirable.

An adopted definition of knowledge most suitable for the thesis according to the authors of this study is:

A resource and context-dependent, strategically valuable, justified true belief that enables decision-making within a capability.

Despite the different interpretations, one thing that many authors agree on is that knowledge is a critical organizational resource (Grant, 1996; Nickerson & Zenger, 2004; Nonaka & Takeuchi, 1995).

2.3.2 The Transfer and Sharing Perspective

The ability of an organization to develop and deploy capabilities in an efficient manner depends on its ability to manage knowledge mechanisms, such as knowledge

sharing or knowledge transfer. Knowledge sharing refers to an organization's systematic way of collecting and sharing knowledge to facilitate organizational learning (Hoe, 2006; Nonaka & Takeuchi, 1995). It plays an important role in ensuring learning in individuals and teams, enabling firms to respond to changes, contribute to innovation, and maintain strategic alignment (Teece, 2007). However, knowledge sharing is often hindered by people, behavioral, and operational challenges that make the transfer of know-how and expertise difficult (Argote & Ingram, 2000). These challenges are relevant to understand when developing capabilities, where organizations need to ensure that competencies are transferred and embedded efficiently between locations and the team and overcome knowledge-related barriers.

Knowledge transfer "refers to the process through which actors, teams, units, and organizations receive, exchange, and are influenced by the experience and knowledge of others" (Van Wijk et al., 2007). It also contributes to improved financial performance through the development of imitable capabilities (Szulanski, 1996).

One foundation of theory on knowledge transfer has been presented by Easterby-Smith et al. (2008) where both the characteristics of the donor and the recipient, as well as the knowledge itself, are taken into account. While the study mainly concerns inter-organizational transfer, similarities with intra-organization transfer such as the presence of cultural barriers motivate the appropriateness of utilizing the framework as a base for diving deeper into the theory around knowledge transfers.

2.3.3 Donor and Recipient Characteristics

Absorptive Capacity

Important to consider is that the effectiveness of the process depends on the organization's ability to absorb capacity. That is, its ability to recognize, assimilate and use new knowledge (Cohen & Levinthal, 1990). If an organization lacks the necessary infrastructure, the risk of knowledge loss increases due to inefficiencies and inconsistencies in capability development. Furthermore, a larger number of knowledge sources has a negative effect on the absorptive capacity of acquiring companies, while a larger size of the organization itself enhances the absorptive capacity of a firm due to more accessible and diverse resources (Van Wijk et al., 2007).

Intra-Organizational Transfer Capability and Stickiness

To effectively transfer knowledge within an organization, it is important to ensure that capabilities are not isolated with certain teams but adapted and spread across different levels and locations. Szulanski (1996) describes the challenges an organization faces when transferring knowledge, which is known as "knowledge stickiness". This concept describes how information is difficult to extract and apply in new settings, which is very relevant for an organization operating across different regions and cultures.

Another aspect of intra-organizational knowledge transfer is the casual ambiguity related to the knowledge itself and how the negative consequences of it are less prevalent within organizations than between (Van Wijk et al., 2007). Although increasing organizational size also tends to facilitate knowledge transfer through more

diverse resources (Cohen & Levinthal, 1990), indications of a reverse relationship with firm maturity and centralization showed that older organizations with more self-supporting units experience greater difficulties (Van Wijk et al., 2007).

Motivation

Easterby-Smith et al. (2008) makes the case for understanding the motivation to teach and learn in the donor and recipient respectively, as both aspects not only influence the success of knowledge transfer operations but also influence one another.

Intrinsic motivation comes from satisfaction with the employee's self-defined goals or with the content of the activity itself (Ko et al., 2005). This motivation is crucial for the transfer of tacit knowledge, as it is difficult to codify. Furthermore, Ko et al. (2005) suggests that an organization should deliberately select intrinsically motivated individuals, rather than challenge the level of intrinsic motivation with an extrinsic aspect that was found to be far less impactful. However, *Extrinsic motivation* like salary, can instead be a trigger to initiate knowledge transfer and ensure early efforts in a knowledge transfer process.

2.3.4 Knowledge Characteristics

Easterby-Smith et al. (2008) structures the influential characteristics of knowledge itself in the three dimensions of tacitness, ambiguity, and complexity. Unlike the knowledge-sharing approach which regards knowledge as the interplay between actors, this coincides with the knowledge-transfer definition by Ko et al. (2005) utilizing a donor and recipient model, with knowledge as an objective resource that can be communicated, learned and applied. At the same time, Van Wijk et al. (2007) offers the perspective that increasing complexity and degree of tacitness contribute to knowledge ambiguity, which in turn has a direct impact on knowledge transfer.

Explicit and Tacit Knowledge

Within the Knowledge-Based View, there are two types of knowledge that are distinct, *tacit* and *explicit* knowledge. These two primary forms were introduced by Polanyi (1966), which explains the nature of knowledge and what is required to manage it. Polanyi famously stated "We can know more than we can tell", which indicated that tacit knowledge is often deeply embedded and subconscious within an individual or organization, based on experience and difficult to articulate. Explicit knowledge, on the other hand, can be seen as formal, structured and eventually transferred and codified more easily (North & Kumta, 2018).

Tacit knowledge includes wisdom, know-how, intuition, and insights which an individual has gained through personal reflection, experience, and practice. Lam (2000) even argues that one of the most effective ways in acquiring tacit knowledge is through experience, where sharing each other's thinking process is otherwise very challenging. Tacit knowledge becomes deeply embedded within an individual's action, which makes it difficult to communicate directly due to it being context-specific and often part of an individual's unconsciousness. Explicit knowledge refers to information and knowledge that can be documented and communicated through formal

training, manuals, etc. (Grant, 1996).

Grant (1996) further describes that the primary role of a firm is to manage and integrate tacit knowledge within the individual, considering that explicit knowledge is already more easily communicated and transferred. Moreover, the organization serves as a way of coordinating and applying individual knowledge towards a certain goal.

Ambiguity

Understanding and correctly extracting information from the donor is time consuming both within and between organizations, with ambiguity placing additional strain on the transfer process (Van Wijk et al., 2007). Although the mentioned benefit of ambiguity protecting knowledge from leaking or being stolen could be less prevalent when transferring knowledge within the organization, the appropriate degree of knowledge ambiguity appears to be a critical determinant of organizational knowledge transfer. Szulanski et al. (2004) identifies a crucial aspect of casual ambiguity in that it separates explicit formal knowledge from the actual complete routine practices that the organization wishes to transfer. Consequently, with high-performing processes requiring understanding in order to be transferred a limitation is placed upon the successful extent of the transfer operations. The destructive effect of ambiguity is further enhanced by a high degree of trust between the donor and recipient, especially present in intra-organizational relationship, where it will remain unchallenged and allow pervasive assumptions dictate the content of knowledge instead. On the topic of transforming and developing capabilities, Collis (1994) goes so far as to say that casual ambiguity is a complete deterrent by definition. This follows the assumption that the holistic understanding of the capability cannot be attributed to a certain actor but rather is tacitly distributed across the organization, meaning that the causes and condition of how it contributes to a competitive advantage remain unidentified. Any attempts of transferring, replicating, or developing such capabilities are therefore not predictable (Collis & Montgomery, 2008).

2.3.5 SECI Model

The SECI model, as described by Nonaka (1994) describes how knowledge can be transmitted in four different stages, *Socialization*, *Externalization*, *Combination* and *Internalization*. It describes a continuous and dynamic process through which an organization creates and transmits knowledge by converting between tacit and explicit knowledge for learning, as highlighted in Figure 2.1. Nonaka and Takeuchi (1995) later expanded on the model and describes the SECI model as a "spiral of knowledge", a sequential evolution of knowledge, where knowledge is created between the stages. The SECI model focuses on a holistic view, where the process creates new knowledge. Unlike a linear model in knowledge management, the SECI model describes the interaction between explicit and tacit knowledge as a source of innovation and learning. According to Nonaka and von Krogh (2009), the interaction is not a simple process, there is a discussion whether or not new knowledge created can be observed as different poles or as a continuum, where the contradiction between tacit and explicit knowledge exists.

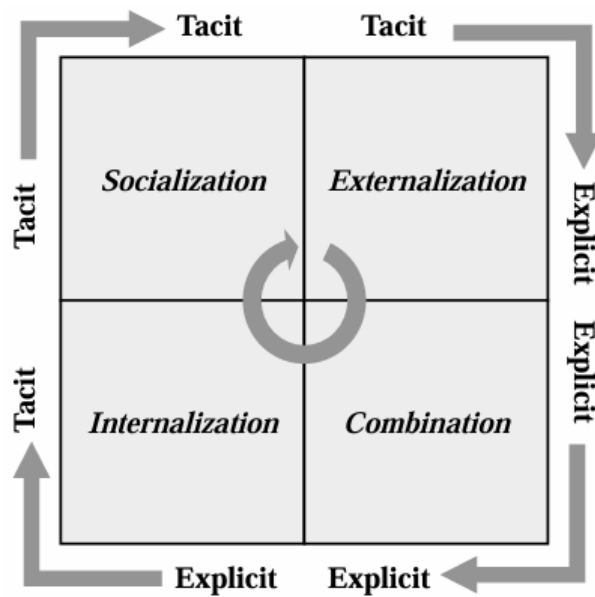


Figure 2.1: *The SECI model, illustrating the different stages of knowledge creation. Adapted from Nonaka (1994) Authors' own copyright.*

The four stages as described by Nonaka (1994) can be defined as follows:

Socialization refers to the conversion of tacit knowledge to tacit knowledge between individuals and involves experience-sharing, observations, and imitation. The setting is often informal, for example, mentoring a new employee, completing an apprenticeship, or learning by doing on the job. Usually, the individual acquires skills without written documentation, with shared experience being the primary goal. Nonaka (1994) further described how socialization enables the transmission of deeply embedded knowledge within an organization.

Externalization refers to the conversion from tacit knowledge to explicit knowledge through insights or ideas into a formal concept. Usually, this step occurs through dialogue and reflection and is essential for capturing an individual's expertise so it can be shared and reused by others within the organization. This process can be an enabler for collective understanding and create new ideas or models of learning.

Combination refers to the conversion of explicit knowledge into a more complex form of explicit knowledge, involving reconfiguration by sorting and re-categorizing knowledge. This includes integrating data from different sources, such as documents or meetings, and using these to create new forms, such as guidelines or formal procedures. This stage is important in larger corporations where knowledge requires effective collection and organization to support decision-making and standardization.

Internalization refers to the process of converting explicit knowledge back into tacit knowledge. This is done through learning by doing or repeated actions. In this stage, the process of "trial-and-error" is common, where employees internalize knowledge until it becomes intuitive. Acting on explicit knowledge, reflecting, and

then internalizing it.

Together, these four stages form a knowledge spiral, where explicit and tacit knowledge interact and allows for continuous learning (Nonaka & Takeuchi, 1995).

Although Nonaka's work is rich in theory and provides a conceptual foundation for understanding knowledge, recent research has tried to operationalize the findings into a practical setting in organizations. Farnese et al. (2019) argue that each stage can be supported by specific tools or mechanisms that contribute to a better understanding of the SECI model that is more actionable. For example, Farnese et al. describes how *Socialization* can be nurtured by more experienced colleagues providing less experienced colleagues with constructive feedback through direct interaction. Furthermore, *Externalization* may involve structured reflection, which means examining mistakes made in order to prevent the same mistake from reoccurring. Moreover, *Combination* relies on organizational communication with formal practices and digital tools, for example, communication tools and internal databases, so that an employee can be kept informed. Finally, *Internalization* is supported by hands-on training and exercises in real work scenarios.

2.3.6 Bridging Ties

Apart from relationship constellations that exist within a geographic location, other network links to distant divisions or external actors are usually present in large international organizations. McEvily and Zaheer (1999) examined the connection between a firm's ability to identify and utilize competitive capabilities and the heterogeneity of its external network connections through a number of *bridging ties*. Here, bridging ties were defined as a way through which the organization can exploit information opportunities (*structural holes*) in its network, embodied by the amount of redundancy in the network, the infrequency of interactions, and the geographic dispersion. The presence of bridging ties is therefore largely dependent on the organizational structure and consequentially its network connections, with high non-redundancy, infrequency, and dispersion leading to increasing ties, spanning over more structural holes.

Networks that present a large amount of bridging ties, and diversity in its knowledge sources enjoys a more responsive process to develop competitive advantages (McEvily & Zaheer, 1999). The authors specifically identify ties to regional institutions such as universities as advantageous relationships that can provide access to knowledge in areas that otherwise would be unavailable to the organization. It also seemed like the mere existence of bridging ties indicated a proactive development of competitive capabilities independently of the institution itself.

The strength of the links did not appear to be of any significance in their study, which would contradict elements of the theory of structural holes in networks as presented by Burt (1992) while acknowledging that the infrequency of the connection points is not necessarily the best measure of relative strength (Granovetter, 1973).

2.3.7 Transfer Barriers

While knowledge can be seen as critical for competitive advantage, the actual application within an organization can often be hindered by barriers. Paulin and Suneson (2015) describes how knowledge barriers (KB) have been applied from different points of view. For example, KB has been described as having not enough knowledge due to education in a particular area or topic. That the perceptual system in a human or group has an insufficient number of contact points to convert information to knowledge.

Similarly, Szulanski (1996) have studied knowledge transfer and identified barriers such as *casual ambiguity*, knowledge that lacks clarity in how or why it works. *Lack of retentive capacity*, when the receiver lacks prior knowledge and the ability to absorb and the new knowledge. *Arduous relationship*, when interpersonal friction and hardship hinder the willingness to share knowledge between the source and recipient.

Riege (2005) expand this understanding and categorize KB into three levels:

1. **Individual Barriers:** This refers to an individual's lack of trust, fear of sharing due to the belief that it will jeopardize their job security, or differences in educational levels.
2. **Organizational Barriers:** This refers to internal competitiveness within different business units, poor communication, or a physical work environment that restricts effective knowledge sharing.
3. **Technological Barriers:** This refers to the lack of integration of IT systems, the lack of compatibility between IT systems and processes, or the lack of training in regard to new systems and processes.

Another barrier to knowledge transfer, as suggested by Tanriverdi and Iacono (1999) is *economic barriers*, defined as the failure to create a business model that is attractive to all stakeholders. In addition, the impact of new markets from the adopter's perspective is said to be a major concern. This barrier could be reduced by attaching reimbursements or compensations to the business model in question.

Husain et al. (2017) elaborates on Porter (2008), J. Barney (1991) and Riege (2005) to connect the RBV with barriers to the transfer of technologies. Some of the suggested barriers are related to knowledge transfer barriers, such as the topic of motivation from *lack of awareness*, *limited forecast and planning*, and *lack of clear demand*. Other barriers relating to the resources of the recipient are *lack of human resources*, *lack of infrastructure*, and *excessive government intervention and regulation*. Lastly, Husain et al. (2017) targets the larger organization with barriers from *lack of communication and inadequate information* and *technology systems*.

2.3.8 Knowledge Transfer in Multinational Corporations

Gooderham (2007) presents a framework that interlinks knowledge transfer in MNC's with dynamic capabilities by determining a number of variation sources in knowledge transfer. The paper highlights that dynamic capabilities are a necessity in

successfully transferring knowledge across the external spatial, social and technical distances as suggested by Ghemawat (2001) by providing internal coordination and consistent links between units. The perspective of MNC as a knowledge network and the view on knowledge itself is a resemblance of the previously discussed (King & Zeithaml, 2003) definition, with structural-, relational- and cognitive social capital being paramount to knowledge transfer (Gooderham, 2007). Structural social capital in this context refers to the relationships within the network itself, which could facilitate both the development of dynamic capabilities similar to the narrative of (McEvily & Zaheer, 1999) and facilitate the remaining two types of social capital through social interaction points. The relational dimension concerns the nature of the ties, where one of Gooderham (2007)'s main propositions is that a higher degree of relational social capital, or trust, will result in a higher degree of knowledge transfer. This is contradicted by a more nuanced addition of McEvily and Zaheer (1999) which emphasizes that large amounts of trust could obstruct knowledge transfer as it deters clarification. Lastly, cognitive social capital refers to the shared understanding of a given context, including terminology and systems. In doing so, cognitive social capital was also found to support the building of trust in MNC relationships (Gooderham, 2007).

Although some aspects of MNC knowledge transfer models concern the definition of knowledge and its characteristics, the sourcing of knowledge should also be taken into account. MNC's are naturally diverse and can therefore obtain knowledge not only *internally* from other units within the organization but also *externally* for instance from local education institutions, or a combination of both. Asmussen et al. (2013) suggest utilizing a combination of the knowledge sharing perspective and a resource-based view as it rules out what called "the bathtub perspective" on knowledge stock that is sometimes overflowing and instead advocates for a contextually changing knowledge resource. Furthermore, maintaining and transferring knowledge is associated with financial costs, which is increased by heterogeneity in its source (Asmussen & Goerzen, 2013). Another aspect that Asmussen and Goerzen (2013) highlights as affected by heterogeneous sourcing is the unwanted *accommodation* effect, where a unit alters their existing beliefs or knowledge as local information takes residence in the organization. This could lead to loss of knowledge that is valuable to the rest of the organization, as the knowledge is not only cumulative in a bathtub but context dependent and therefore exposed.

When it comes to deliberately developing capabilities and enabling intra-MNC knowledge transfer Gooderham (2007) suggests three managerial practices, namely motivational mechanisms, transmission channels, and socialization mechanisms. Motivational mechanisms are a recurring theme in knowledge transfers in MNC's, and draw inspiration from the motivational aspect in the framework presented by Gupta and Govindarajan (2000) where diffusion of knowledge from one division in the organization is opposed by actors that enjoy a information monopoly. Similar tendencies in the recipient are mentioned as potential barriers emanating from ego-defense mechanisms and power struggles. Here, knowledge is defined more as a stock item in the organization that can be transferred in one direction, which is more consistent

with Grant (1991) although the study did not go more into effects of the nature of knowledge itself, such as the degree of tacitness.

Transmission channels influence the degree of structural social capital as managers can use formal proximity, that is, grouping divisions and units together, and the design of intranet systems to create social pathways where interaction can occur (Gooderham, 2007). The third practice aims to create socialization mechanisms that can internalize organizational goals and create mutual understanding. Addressing cultural diversity is suggested as a key point in generating cognitive social capital while at the same time addressing motivational barriers.

Chen and Lovvorn (2011) extends on the previous MNC model with the division of social capital into structural, relational, and cognitive dimensions. Similarly to Gooderham (2007), both formal and informal integration mechanisms are mentioned to increase structural social capital, but in addition to trust and reciprocity, the study suggest that *commitment* and *identity* play a crucial role in increasing relational social capital. Although the definition of knowledge here is again more that of a resource, with certain costs associated with the creation, handling, and distribution of it, it is worth mentioning that the success of knowledge transfer in this study is measured by speed.

3

Research Objectives

This chapter present key objectives. The objectives aims to bridge the gap between the theoretical framework and practical applications observed within the case company. The chapter presents four objectives, each with an individual area that will be the main guideline and observed simultaneously in sprints to systematically explore organizational capabilities and how they can be deployed.

This thesis is based on objectives rather than research questions. This is because the research process consists of an agile method using sprints where the objectives are explored simultaneously in each sprint. Two of the objectives, which are *assess competitive environment* and *identify barriers* mainly focus on descriptive exploration of the underlying contextual conditions. The other two, which is *recipient site selection* and *transfer process and training*, focus more explicitly on the transfer process and its content.

These objectives will iteratively and collectively collect empirical findings that will be used to understand the implications.

3.1 Assess Competitive Environment

The first objective is to understand how a competitive environment affects the capability transfer process, the initial step could identify the competitive priorities in question. Determining specific aspects of the warranty operations that would affect how a capability is evaluated as a competitive advantage provides a foundation for examining the effects on the transfer process itself.

3.2 Identify Barriers

With an established strategically appropriate target, an organization would turn its attention to the actual transfer of the capability in question. To better understand how this process is affected by being situated in a multinational corporation and the warranty operations, the objective is to identify barriers and other aspects that could hinder a successful capability distribution. Such aspects could be related to individual, organizational, or economic barriers that might serve as a barrier to effective transfer.

3.3 Recipient Site Selection

After assessing and understanding the initial conditions, the objective is to propose how an organization can effectively initiate a program related to the deployment of

capabilities at a site. The proposal will consider multiple aspects, for example, staff and facilities. Initiating at a specific site allows for a better understanding of how well the organization manages deployment. Later, this site can serve as a reference point or a benchmark for other service sites in different geographical locations to better navigate the challenges of implementation.

3.4 Transfer Process and Training

After determining the appropriate location, the objective is to establish a process through which the capability should be transferred. Considerations include the distribution and characteristics of training resources, conditions, and a suitable time frame to distribute the capability. Taking into account the interactions and necessary relations of these factors, a complete approach can be developed with standardized elements.

4

Method

This chapter introduces the reader to the methodological approach. First, the research design and strategy followed by a description of the research process, then the data collection and data analysis methods. It introduces the agile sprint-based workflow that organizes data collection in an iterative manner. Finally, ethical consideration and research trustworthiness, which ensure that the research has been conducted responsibly.

4.1 Research Design and Strategy

This thesis adopted a case study design, combining different methods and incorporating a qualitative research approach to analyze the transfer of capabilities within an organization. According to Bell et al. (2019), a case study involves a detailed analysis of a particular case over a period of time to understand complex phenomena within their context and works well with a qualitative approach. A qualitative research approach can be described as "a research strategy that usually emphasizes words rather than numbers" (Bell et al., 2019). This approach enabled a deeper understanding of how a special capability and the knowledge required to manage it were transferred. Moreover, to understand how challenges are perceived by people engaged in the work in the company with their insights regarding the situation.

Bell et al. (2019) further describes how a research strategy is commonly classified as *inductive* or *deductive*. An inductive strategy means that empirical observations of the case company form the basis for the insights, while in a deductive setting, the testing is more strict of pre-existing hypotheses (Bell et al., 2019). However, given the iterative nature of the study, where empirical insights and theoretical frameworks were refined in parallel, the research adopts an *abductive* approach as described by Dubois and Gadde (2002). An abductive strategy is suitable for a case study when the goal is to develop theoretical understanding through the matching of theory and empirical observations. This approach of using a combination aligned well with the structure with ongoing interpretations and refinement of perspectives.

4.2 Ethnographic Study

The thesis partially adopted an ethnographic study format that was carried out in the case company. However, the researchers are aware that the study is not strictly an ethnographical study due to certain factors. None of the authors has been completely immersed within all of the company divisions but have spent enough time to be able to draw insights. Bell et al. (2019) describes an ethnographic approach as "intense researcher involvement in the day-to-day running of an organization, so that the researchers can understand it from an insider's point of view". The ethnographic tendencies of the study were supported by one of the authors being employed in the

company prior to and during this thesis. Additionally, since the transfer process itself was being prepared largely within the activities of the thesis, it was not a day-to-day operation that required constant company presence. An example of this is the sprint review meetings, elaborated further in this chapter. It was valuable that only one of the authors had prior experience within the organization, as this created an interesting exchange of perspectives with the one who did not.

One consequence of such data collection layout where many data points are collected by being present in the company is that the empirical findings at many times become unstructured. Any data without clear origins can be assumed to come from various situations that occurred in the company during study periods, such as coffee talks, jokes, or comments attached to other topics.

The study allowed for a better understanding of the *company culture* and *workplace behaviors*, with current issues related to special processes. These two aspects are described by Bell et al. (2019) as common focus areas during the conduct of an ethnographic study. In addition, Bell et al. (2019) describe how it is important to remember that conducting a full-scale ethnographic study requires the researcher to spend a considerable amount of time over a long period. Considering the scope of this project, the study could be considered to be a *micro-ethnography*, which involves focusing on a particular aspect due to time constraints (Bell et al., 2019).

4.3 Research Process - Sprint Workflow

The research process in this thesis adopted an Agile-inspired workflow utilizing sprints. The *agile methodology* was originally developed in a software development context (Beck et al., 2001), and has since been applied in other contexts due to its ability to promote flexibility, stakeholder engagement and responsiveness to change (Conforto et al., 2014).

The thesis was conducted with regular stakeholder meetings that ensured efficiency and continuous alignment both academically and also with the case company. The activities were divided into a weekly meeting with a representative from Chalmers University of Technology, while a 14-day sprint cycle engaged key stakeholders in the case company. This allowed for feedback loops and continuous alignment due to emerging insights.

To ensure accountability and create a sense of urgency, a *scrum board* with a designated team with a product and a sprint backlog contributed to a structured method with clear objectives and ensured that the information flow was effective. This aligns well with agile practices of using collaborative planning and visual workflows (Rigby et al., 2016).

The sprint-inspired methodology was suitable for this thesis due to its dynamic nature. The case company had already initiated an internal project aimed at developing the competence and capabilities within their organization in the Nordic region.

In this way, the project was able to continuously align with the case company and ensured relevance and facilitated the exchange of ideas. There were also multiple stakeholders involved, especially Alstom, which created uncertainty regarding objectives and milestones. Regular, structured interval meetings helped mitigate these challenges.

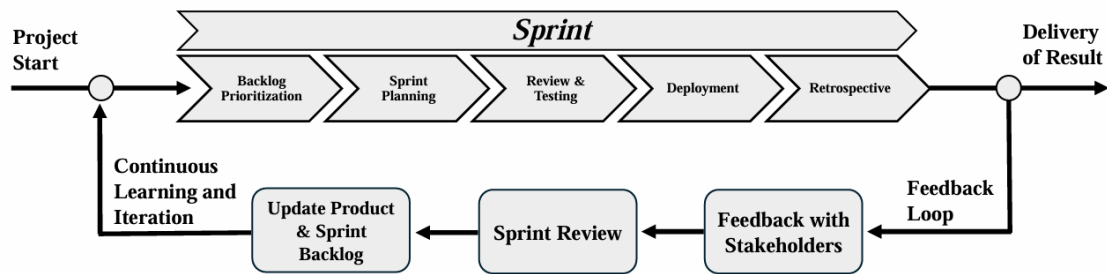


Figure 4.1: Working sprint methodology with a continuous feedback loop for effective alignment.

Throughout the thesis, in each sprint, the objectives were explored simultaneously across sprints, rather than isolating each aspect to a certain phase. Observing each aspect at the same time allowed the project to remain adaptable to new developments and ensuring continuous alignment with the case company. If the project focused all its attention on one aspect, there was a risk of major changes if an obstacle or unanticipated event occurred. For example, the third objective considers the choice of a first site that could have been decided in one of the first sprints. However, if constraints related to language, training, or resources are only addressed in the fourth sprint, a sequential process might contradict earlier recommendations. Observing each question, the project could integrate findings in a later stage without risking proposed solutions already in place.

The project consisted of a total of four sprints. This was in part due to time constraints, where the thesis had set aside time corresponding to five sprints, and a result of enough findings collected at the point of completion. In the beginning, time was needed to initiate the study and also to finish the project towards the end. The four sprints were conducted in between and were considered enough to explore the four research objectives.

Each method required to investigate the research objectives is listed in Table 4.1 with the type of data the method extracts. It summarizes which research objectives are relevant for which method. Although most of the methods investigated all four research objectives, *workshop* and *company documents* were more relevant in understanding knowledge specifically due to the format of the workshop and the nature of the documents.

Table 4.1: *Relevant methods used in investigating the four research objectives with what type of data extracted.*

Method	Type of Data	Relevant Research Objectives (RO)
<i>Data Collection Methods</i>		
<i>Interviews</i>	Qualitative insights into current issues with capabilities and knowledge transfer	RO1, RO2, RO3 & RO4
<i>Workshop</i>	Shared perceptions, challenges and potential solutions	RO2 & RO4
<i>Participant-as-Observer</i>	Contextual data on capabilities and knowledge	RO1, RO2, RO3 & RO4
<i>Company Documents</i>	Documented procedures, formal structures, past efforts	RO2, RO3 & RO4
<i>Data Analysis Methods</i>		
<i>Thematic Analysis</i>	Synthesized themes from qualitative data	RO1, RO2, RO3 & RO4
<i>Gap Analysis</i>	Identification of discrepancies between existing and ideal state	RO2, RO3 & RO4
<i>Mixed Method</i>		
<i>Sprint Review Meetings</i>	Observation and team feedback	RO1, RO2, RO3 & RO4

4.4 Data Collection

The main data collection method in this thesis has been interviews. However, to achieve a more credible result, the concept of *triangulation* has been applied. Bell et al. (2019) describes triangulation as the use of more than one method or data source in the study and works well in a qualitative research strategy. To achieve this, the thesis facilitated a workshop on site, as well as studied internal documents along with observations at the company. Each method has a motivation for how they contribute to the research objectives and is compiled in Table 4.1 for quick

reference.

4.4.1 Interviews

The main data collection component during the sprints consisted of narrative interviews. This method provided valuable information on each research objective. Although most of the interviewees were able to provide plenty of information, certain stakeholders had perspectives more relevant for the four research objectives. The more senior employees provided valuable insights regarding *Research Objective 1 and 2* in particular. Employees engaged with the training program could provide information regarding *Research Objectives 3 and 4*.

The interviews were conducted digitally in cases where participants were located outside of Sweden, e.g., Germany or Greece. The sampling technique consisted of *purposive sampling* and *snowball sampling*. Bell et al. (2019) describes purposive sampling as how participants are chosen strategically, which means that respondents were deliberately selected to collectively represent multiple functions and organizational divisions, while the topics and prepared questions were similar. Moreover, with snowball sampling, interviewees recommend other relevant interviewees (Bell et al., 2019), which in turn is time-efficient and invites the people who are probably the most relevant for this study. By observing multiple perspectives on common topics, the combination of respondents aimed to provide not only role specific or contextually dependent insights, but also show potential conflicts of opinions or lack of communication.

The interview topics were shared with the respondents 4-5 days before to offer some degree of preparation; however, the line of questioning and particular details were kept undisclosed in an effort to discourage respondents from communicating and aligning on answers, which would discredit findings related to the communication issue.

The interviews were recorded and automatically transcribed using AI tools, which is recommended by (Bell et al., 2019). They further describe how recording serves as an important tool in not only remembering *what* people say but *how* they say it. Both researchers took individual notes, which were compiled into key takeaways immediately after each interview. The takeaways were then compared and summarized before being sent to the respondent for confirmation. The process aimed to minimize the risk of missing important takeaways and to refine the subjective judgment of relevance and significance. The most important takeaways from the interview were then compiled and summarized. Similarities or agreement between remarks were identified, as well as any contradictions. Remarks were sorted according to the thesis objective they most closely concerned with as a way to keep track of how balanced the sprint turned out to be and the holistic progress of it.

The interviews were conducted until thematic exhaustion was reached, that is, until the interviews no longer contributed significantly to new insights. Towards interviews 7 and 8, overlapping patterns and recurring themes started to emerge, which

shifted the focus to other aspects of the report such as analyzing insights or exploring potential implications.

4.4.2 Workshop

The workshop, or "focus group", conducted in this thesis focused on exploring a specific topic to gather insights from a group of participants at a greater depth. Conducting a workshop was important to collect valuable information on *Research Objective 2 and 4*, as these insights contributed to the understanding of barriers and the willingness to absorb knowledge. Bell et al. (2019) describes how a focus group is characterized by "an emphasis in the questioning on a particular fairly tightly defined topic". This allowed for a discussion and collection of insights from different perspectives.

The focus of the workshop in this thesis was to verify the information previously gathered from interviews and to also understand the perspective of the technicians on site who are directly affected by a special process, e.g., bonding. Some of the interviews had previously discussed the training program that a technician is required to complete to be allowed to perform the Bonding procedure. Of four or five technicians, only one was able to pass it and, for that reason, the focus of the workshop explored the training program.

The method used, as described by Alänge (2009) was an *Affinity Interrelationship Mapping (AIM)* session, exploring the barriers to knowledge absorption and training participation. The method consists of 10 steps and allowed an open and structured environment in which participants generated ideas around a guiding question and then organized these ideas to find the root causes. The guiding question were as follows:

Why would someone not want to participate in a bonding training program?

Participants were chosen according to *convenience sampling*, meaning those who were available at the time to participate (Bell et al., 2019). Three technicians participated with varying levels of experience and different ages, which gave different perspectives and insights on the topic.

The workshop was held in the third sprint, with preparations made in the first and second sprints. In the final sprint, the insights uncovered were used in the implications.

4.4.3 Participant-as-Observers

As part of the data collection, a study visit was made to one of the company's service depots in Sweden. In this depot, the adhesive bonding process is performed on the trams. The visit allowed the researcher to directly engage in the context where knowledge would transfer, offering insights into interactions, tacit knowledge, and context-dependent learning processes which contributed to *Research Objective 3 and*

4. In addition, the interaction with technicians allowed a better understanding of how capabilities can be adapted or reconfigured in a different setting, for example, introducing an aspect of competitiveness, which contributed to *Research Objectives 1 and 2*.

The observation followed the *participant-as-observer* role, described by Bell et al. (2019), in which the observer is identifiable as a researcher, is present, and actively participates in the setting to better understand. The technicians had been informed of our presence and proceeded with a demonstration of the process at each step of the procedure. They further explained the methods and answered questions about the chemicals used, the protocols to follow, and the skills required.

4.4.4 Company Documents

The thesis incorporated a range of internal documents provided by the case company. The material includes formal training material, standard requirements, and criteria for special processes. The purpose of analyzing these documents was to gain a deeper understanding of the formal structure of special processes and to validate the claims from the interviews to increase credibility. The documents offer a useful contrast to the more dynamic and subjective insights gained from observations and interviews with its more formalized representation of practices and policies, which contributes to *Research Objectives 2, 3 and 4*.

Bell et al. (2019) describes how documents, especially in *case study* research, can provide valuable background information about the company and its history. Moreover, they further describe how documents can serve as a good way to build up a "timeline" perspective due to the previous managerial decisions made and documented.

To assess the trustworthiness of the documents, Bell et al. (2019) highlights four criteria:

1. **Authenticity:** is the documents of genuine origin?
2. **Credibility:** is the content free of errors?
3. **Representativeness:** is the document typical of its kind?
4. **Meaning:** is the content clear and comprehensible?

All material was provided by the case company by authorized personnel. The documents were free of errors, and had they been subject to such, the appropriate employee at the company would have been notified. The technical terminology and formatting were comprehensible, although advanced.

4.5 Data Analysis

After the initial data collection, the data gathered were compiled and analyzed. The main method was thematic analysis, which Bell et al. (2019) describes as the most

widely used strategy for qualitative data analysis. In addition, a gap analysis was performed to understand the current state in comparison to the desired state of the service depot.

4.5.1 Thematic Analysis

Following the transcriptions and the cleaning of the data, a thematic analysis was performed. According to Bell et al. (2019), *thematic analysis* can be described as a method that involves the search for themes and patterns in data sets. This is suitable when research aims to understand how participants interpret environments. The analysis allowed for a systematic identification of recurring patterns, remarks, and frequencies across interviews, providing a structured approach to uncovering insights relevant to *Research Objective 1, 2, 3* and *4*, such as how knowledge is transferred and competitive priorities. It is important to mention that the thematic analysis did not place weight on the different remarks and frequencies. Instead, it allowed for an understanding of whether multiple roles and different divisions had the same view or were all affected by a particular insight. Displaying similarities or contradictions in this way aimed not to give a conclusive importance metric in the thesis scope, but to show what different stakeholders viewed as important and if others shared that opinion.

4.5.2 Gap Analysis

A gap analysis was performed that compared the current conditions of a service site with the desired future state. Kim and Ji (2018) describes the gap analysis as a tool to identify where gaps are and the difference between the current situation and "what ought to be". The analysis can contribute to a better understanding of the critical areas where managers should take action (Kim & Ji, 2018). The idea was to highlight potential barriers and understand what was missing to ensure that bonding could be performed long-term at the site. The analysis allowed for identifying shortcomings, as well as revealing inconsistencies contributing to both *Research Objective 2, 3* and *4*.

The gap analysis was made possible after visiting the depot, observing, and interviewing the technicians. The analysis identified critical defections, such as unclear process ownership, the state of the facility, and safety procedures. The method was iterative across multiple sprints, using findings from interviews, observations, and documents.

4.6 Sprint Review Meetings

After each sprint, stakeholders were invited to a *sprint review meeting* that presented the findings of that particular sprint. This allowed for continuous alignment and feedback on the findings. The structure of the presentation can be seen in Figure 4.2. The sprint summary summarized the activities that had taken place, followed by the finding of these activities. The implications highlighted similarities and contradictions in relation to the theory explored in the thesis. The final step consisted

of planning the next sprint with an update to the sprint backlog. After the presentation, the meeting was open for suggestions and discussion of additional topics and comments related to the findings. The meeting opened up for discussions regarding the research objectives and how the process can better align to keep investigating in an efficient way, subsequently contributing to *Research Objective 1, 2, 3 and 4*.

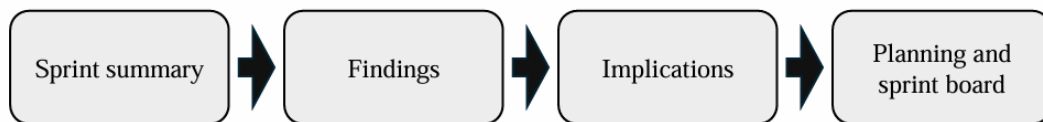


Figure 4.2: *The structure of the bi-weekly sprint review meeting with stakeholders.*

The sprint review meeting functioned as both a data collection method and an analytic forum. The empirical findings from the sprints were presented to stakeholders, and the discussion offered a valuable opportunity to observe how the participants interpreted, processed, and challenged those findings.

Sprint Review 1

The first sprint review meeting was held with 13 participants representing services, technical training, production operations and product introduction support, as well as different managerial functions. The meeting focused on presenting the initial scope of the thesis and the research objectives the study would explore. The main findings from the first sprint were presented, which were mainly from the first 7 interviews conducted. The meeting then turned into a discussion regarding the next steps.

Sprint Review 2

The second sprint review meeting presented an attempt to conduct a financial analysis, forecast demand, and gap analysis. Most of these had been difficult to complete because of unavailable data. For that reason, the meeting focused on discussing the availability of data and the lack of communication channels, highlighting the barriers identified between functions and the need for representation and ownership.

Sprint Review 3

The third sprint review meeting presented the study visit to the service depot where an interview and workshop was held. The AIM-workshop was presented with the findings which was very valuable because it allowed the white collar workers to understand the priorities of the blue collar workers. Moreover, a process map was presented that highlighted where explicit and tacit knowledge was the most prominent in the chain of events. Finally, the previously started gap analysis was finalized and presented, highlighting the current state compared to a desired state.

Sprint Review 4

The final sprint review meeting focused on summarizing the work so far. It presented

the activities that had been made with similarities and contradictions between the different data collection methods. The findings so far in relation to competitiveness, knowledge transfer with barriers and ownership and representation was presented.

4.7 Ethical Considerations

Ethical considerations are important in maintaining trustworthiness and rigor of qualitative research, considering that most of the data collected in this thesis is from structured interviews. According Bell et al. (2019), ethical research ensures that the study is conducted in a respectful manner with respect to participants and the data. There are four main criteria for the evaluation:

1. **Credibility:** Ensure findings and insights accurately reflect the participants experience.
2. **Transferability:** Understanding and creating "thick descriptions" to enable application in other environments.
3. **Dependability:** Adopting an "auditing" approach where records are kept to maintain consistency and transparency.
4. **Confirmability:** Ensure the research is conducted in good faith without personal values influencing the result.

Ethical considerations have been part of each step in the process throughout this thesis, particularly during interviews when interacting with employees. Moreover, Bell et al. (2019) highlights four ethical principles that should be considered when conducting business research:

Harm to Participants In this thesis, the risk of harm to the participants was close to zero. Each interview was conducted online due to the fact that participants involved were located in various geographical locations such as Sweden, Germany, Greece etc. The information shared during the interviews was treated confidentially. Participants were not subjected to risks such as emotional or professional. The use of insights was treated in a way that avoided misrepresentation and would not jeopardize their professional standing. To ensure this, at the end of an interview, key takeaways were sent to the participant for confirmation.

Informed Consent Participants was informed of the purpose of the research and how their participation and the provided data will be used. When interviews were recorded, the participant was informed of this and provided the opportunity to accept or decline participation under these conditions.

Invasion of Privacy To protect the privacy of participants, the names of the participants were kept anonymous in the report. Sensitive data from internal documents or from the interviewee was treated with discretion. Considering that this work was performed at Alstom, it was important to ensure that Alstom understood and could affect how their data and privacy were handled to safeguard sensitive information.

Alstom had the right to participate and to oversee how their data were used and to control company details.

Deception This study and the reporting were conducted without deception. Communication and reporting reflect the true intent of the research and the data is transparent. The integrity of the participants was respected and their insight was presented in a way that reflects their true meaning. The integrity of the research was conducted without bias and objectively to ensure proper citation of previous work with a fair and correct image of the work already recognized.

4.8 Research Trustworthiness

This study has been designed to ensure trustworthiness in its different phases. Multiple methods were used to validate the results of interviews and workshop with, for example, observations, which adds to credibility, with findings based on more than one perspective (Bell et al., 2019). Various methods contributed to the principle of triangulation as described by Bell et al. (2019). The anonymity of the interviewees should be kept to avoid negatively affecting any participant, both emotionally and professionally, according to good research ethics (Bell et al., 2019), a principle that was honored in this thesis.

To ensure dependability as described by Bell et al. (2019), the interview transcripts were kept if consent was given to record them on the company hard drive. Multiple different stakeholder were invited to the interviews. This ensured that the study considered many different perspectives which is recommended by Bell et al. (2019). Sensitive documents have been securely stored on the organization's internal systems, which ensures data integrity and confidentiality.

The theoretical framework was designed with academic sources published in peer-reviewed scientific journals. The articles were reviewed to ensure that one does not "reinvent the wheel" as described by Bell et al. (2019). The research process has been clearly documented and systematically followed with motivation if deviations have occurred.

To strengthen the claims and complement the qualitative insights, quantitative data would have strengthened the overall trustworthiness of the recommendations in this thesis. Due to factors such as insufficient data, it has been difficult to adopt quantitative methods.

4.9 Use of Artificial Intelligence (AI)

AI models were used to better understand certain topics and their relevance to this thesis. It was used to get an overview of sources that could be relevant to the thesis and how research has developed over time. AI was also used to transcribe interviews and correct latex code.

5

Empirical Findings

This chapter presents the empirical findings of each sprint conducted throughout the project. The findings aim to address the objectives mentioned in the previous chapter. The chapter begins with the interviewees and is followed by the findings of the individual sprints.

5.1 Interviewees

Table 5.1 includes the sprints and shows the interviewees who agreed to an interview.

Table 5.1: *Summary of the interviewees who agreed to an interview.*

Interview	Department	Functional Role
<i>Interviews Conducted in Sprint 1</i>		
Nr. 1	Engineering	Technical Training Manager Nordics
Nr. 2	Project	Project Manager
Nr. 3	Engineering	Industrialization Manager
Nr. 4	Management	Nordic Product Manager
Nr. 5	Engineering	Process Engineer
Nr. 6	Engineering	Industrialization Manager
Nr. 7	Management	Nordics Operations Manager
<i>Interviews Conducted in Sprint 2</i>		
Nr. 8	Management	Nordic Product Manager
Nr. 9	Management	Industrialization Manager
<i>Interviews Conducted in Sprint 3</i>		
Nr. 10	Site	Site Manager
Nr. 11	Site	Technician

5.2 Findings from Sprints

Each sprint involved objectives. These objectives involved assessing the competitive environment, identifying barriers, selecting a recipient site, and finally a proposed transfer process and training. All objectives were investigated in each sprint to ensure continuous alignment with the case company and the development of the project. However, due to time constraints or other aspects such as the interviewee having limited insights, it was not always possible to gather data on each objective in each sprint. In Table 5.2 the objectives that gained new insights during a sprint are highlighted.

As mentioned above, the method consisted of four sprints in total. However, as shown in Table 5.2, in the third sprint the focus changed from collecting new data to formulating answers to research objectives. This transition occurred because a substantial amount of data had already been collected and new interviews and observations began to yield repetitive insights.

Table 5.2: *Overview of objectives across sprints with new findings.*

Sprint / Objectives	<i>Obj. 1: Context & Strategy</i>	<i>Obj. 2: Identify Barriers</i>	<i>Obj. 3: Site Selection</i>	<i>Obj. 4: Training & Transfer</i>
<i>Sprint 1</i>	✓	✓	✓	✓
<i>Sprint 2</i>	✓	✓	-	✓
<i>Sprint 3</i>	✓	✓	✓	✓
<i>Sprint 4</i>	-	-	-	-

5.2.1 Sprint 1

Activities in the first sprint consisted of seven interviews highlighted in Table 5.1 as a starting point to collect data related to the four objectives from as many perspectives as possible.

Objective 1: Assess Competitive Environment

An interviewee expressed how there is an increased need for bonding in the Nordics. When there is a contract with a customer, special processes, such as bonding, could be part of the agreement, thus creating the need. For that reason, the company needs to ensure that bonding can be performed, so there is a certain availability according to the warranty period. This was confirmed by several different roles in the organization, placing an emphasis on trust in upper management to guide future needs. However, a conflicting perspective of a decreasing bonding demand was also given. Other mentioned that the current situation was a short-term fix, with outsourcing risks such as high costs and termination due to labor laws.

Trust and information through word of mouth was the main communication mechanics, as the organization did not employ a forecasting method that covered the

need for the bonding process displayed in the project pipeline. Three sources stated that such information should be available, as both the production process and the adherence to the standards are specified in the project contracts, but there was no structure in place to capitalize on the potential forecasting insights stemming from this information. One interviewee had heard that a discussion about forecasting process demand was being held, but no concrete decisions could yet be shown.

When asked about aligning bonding with a competitive strategy, there is no strategic alignment today with an emphasis on being cost-efficient. A project usually consumed more capital than originally thought due to learning and inefficiencies. Quality and a speedy delivery are two aspects that are further described as important, with a balance between these two aspects and cost. The interviewee proceeded by stating that it will be difficult to motivate blue collar workers to ensure high quality and speed when there are no other incentives than a fixed salary, and this is an aspect that should not be changed. Providing bonuses to do the job can send the wrong message and lead to quality issues.

The competitive nature of bonding was said to be associated with a larger offering, stemming from several competitive ambitions. Firstly, on a global scale, the organization aimed to both increase their market share as well as the amount of internal sourcing. This means that priorities of bonding capabilities were decided to focus mainly on speed and flexibility, supporting and enabling other competitive aspects of the project to show. Furthermore, two interviews stated that the nature of warranty operations brings a unique set of conditions to the ideal capability expression. Specifically, offering higher quality than required will not yield additional revenue or advantages, as warranty orders are based on customer claims after the project has already been sold. This results in a situation where quality is the most important aspect up to a satisfactory level, where it no longer needs the slightest improvement.

In addition to supporting new project sales by ensuring adequate bonding support in the warranty segment, due to the mixed organization roles of the service sites, simply offering a bonding service could also increase sales in the non-warranty segment of aftermarket services. This was another target for the company amid growing servitization focus stemming from a broader corporate strategy.

After fulfilling the required quality level and doing it in a way that is quick and responsive to keep the availability of customer rolling stock satisfactory, the next priority of the capability would be reducing costs. This was said to be important, while not the main focus at this stage. One interviewee mentioned lean production as a generally suitable target vision, while another placed more emphasis on the previously mentioned rolling stock availability measure, a specific KPI that measures the number of vehicles out of commission and is connected to financial terms in the project contract. As a result, responsiveness and speed through overcapacity would be strategically consistent.

Another important finding regarding the target behavior of a bonding capability in

warranty operations is that the standards requirements on a service site are generally substantially lower than those of a production site. Several interviews stated that customers neither demand nor expect the same level of performance from a warranty claim action compared to a newly produced vehicle.

Lastly, the nature of the capability also has to be vastly different as competence need to be broad rather than deep. Comparison of the manufacturing of hundreds of identical vehicles in a serial production site with the various demands of leakages, crash repairs, or other damages that would be encountered in a service site. Each bonding task would bring various amounts of uniqueness, which demands extensive process knowledge and robustness from the technicians to tackle new situations dynamically.

Objective 2: Identify Barriers

Some barriers displayed where embedded in the structure of the organization, with multiple respondents highlighting the existence of organizational silos, keeping incentives, strategies and information from flowing effectively. Communication channels are informal or non-standardized between divisions and regions. Specifically, service sites could not take part of a broader picture containing an aggregated bonding demand and instead only were informed on needs from each project as they appeared. Furthermore, enjoying better margins from external service assignments, sites were reluctant to bear investment costs for capabilities that were said to cater organizational needs rather than those of the individual sites.

Lack of communication existed also between different sites in the organization, and not just between other divisions such as a project. When asked about the sharing of knowledge between sites, one interviewee responded "very little".

Other barriers were connected to specific resources or, or lack thereof, in the recipient site itself. Firstly, finding appropriate staff to train proved difficult, with historically unsuccessful training efforts showing a number of difficulties. Language barriers, theoretical emphasis and an lack of motivation were all mentioned as reasons as to why only one out of seven technicians that underwent training managed to complete it. The high reliability on individuals was mentioned by several interviewees also in the fact that after successfully certifying and training a technician, that knowledge is considered locked within that individual and therefore neither spread to other parts of the sites nor retained in the company if that individual were to leave their employment. This means that after considerable efforts has been put into finding the suitable member to undergo training, all investments could be lost in an instance. This was the case with the previously successfully trained individual who left the organization shortly after.

Lastly, one specific barrier to implementing bonding capability as is, comes from the testing specifications. While standards stipulate that bonding work must be accompanied by a junction test using the same materials as the real junction, this is impossible in warranty operations as no identical material to that on the specific vehicle exists. Tests are therefore carried out using material of similar but not ex-

actly identical condition.

Potential synergies that could aid the transfer process were also discussed in the interviews. Most examples included utilizing learning from the existing special processes support organization residing in Paris, or through the system wide ERP-systems that could provide communication flows.

Objective 3: Recipient Site Selection

Discussing an appropriate first site showcased many difficulties. Firstly, in addition to the strategic misalignment and lack of communication previously mentioned, some sources stated that site managers were reluctant to take on investment costs associated with temporary relieving staff to undergo training. Other costs could be attributed to necessary additions or adjustments needed in the facilities. Bonding processes typically place higher demands on ventilation, cleanliness and safety measures than some mechanical work, meaning that alterations to the service site would generally be unavoidable.

Additionally, site specific warranty work typically concerned batches answering to a specific internal project at the time, meaning that there are no excess capacity where they would feel comfortable risking the delays that could follow installing a new capability.

Lastly, a key aspect of selecting the appropriate site for receiving the capability stated in the interviews is a need for balance of how trained staff should be distributed. Having one member at each service site would be insufficient locally, while a central hub could fail to be responsive enough to demands across the entire region. Suggestions in the interview were focused on transferring the capability into the Motala site that currently carried out bonding work through the use of an external supplier.

Objective 4: Transfer Process and Training

Alstom currently houses an extensive training division for education of their multiple special processes, one of which is bonding. When asked about similarities regarding the special processes training programs, an interviewee explained that technical training is similar in the sense that the structure generally follows a concept of theory followed by practical training, and a final exam. Otherwise, the differences between training for the various special processes themselves are quite large.

The training process was stated to be well functioning in other special processes, also by respondents outside of the training organization mentioning welding or painting as successful examples.

One important factor regarding training and the subsequent control of the transferred capability is the need for updating both competence and certifications. With warranty contracts spanning over several years, new repair modules and spare parts are added and new bonding material might come into play. Along with the expira-

tion dates on certifications. Further emphasis was placed on a need for deliberate selection of educated resources, with suggestions of having a regional responsible technician that could audit and support local work.

One interview also stated that there will exist a need for managing staff education levels and the renewing of certifications in order to avoid a situation where the sites believe themselves to be equipped to handle bonding, while they technically are not since the certification has expired.

Sprint Review Meeting 1

The sprint review meeting facilitated valuable discussions between the stakeholders involved. It provided a communication channel for alignment and showcased several conflicting perspectives. One of the participants, a senior manager, said the following when presented with findings on project ambiguity and absence of bonding capabilities in the Nordics:

"I am a bit puzzled when I hear this... The bonding process is already in place?" – Senior Manager

This belief was later repeated by a member of the training division, while again no specifics as to where, who, and what was being done could be provided. Instead, theories arose around misinterpretations of how far the progress of the initial discussions around transferring the bonding capability had come.

Another stakeholder, a production engineer, had the following to say regarding past attempts of educating staff:

"And I know Västerås already tried to educate at least three or four people that they sent to Germany for this EAB [European Adhesive Bonding]. This is one week of education and I guess only one out of those three or four people passed the exam." – Production Engineer

5.2.2 Sprint 2

After the initial interviews, it was decided that two additional interviews would complement the existing findings along with a review of the company documents that had been identified in sprint 1. In addition, the gap analysis was initiated but not completed due to the lack of responses in time.

Objective 1: Assess Competitive Environment

One interview mentioned that bonding is less frequently used in warranty and maintenance and indicated that there is a connection between the quality of bonding work in new production and the resulting need for bonding to handle subsequent warranty claims. However, previous interviews on this topic stated that bonding would still be necessary due to crash repairs or other repairs that require the removal of bonded parts.

Objective 2: Identify Barriers

Barriers to transferring capability were again presented as closely related to individuals and employee resources at the recipient sites. One of the interviews stated that technicians who aim to be employed by Alstom should ideally have previous education in adhesive bonding, either from an institute or through internal education at the former employer. To highlight the problematic nature of this request, two managers from the site part of the organization stated that their technicians sometimes did not complete high school, meaning that higher education is simply non-existent in that part of the workforce. Furthermore, they added that it does not cause any concerns in day-to-day warranty operations, as other personal traits are more relevant than such qualifications.

Objective 4: Transfer Process and Training

When exploring the concept and potential training programs further, it was evident that the structure of the training organization was rather rigid. Although site-responsible perspectives raised concerns about the theoretical nature of the previous course and its relevance in practical bonding operations, one respondent explained that the education process is very specific and unable to be adjusted. This was later confirmed by additional actors throughout the training organization.

In an interview with a technical training manager, it was reported that the training process in Germany was carried out in close cooperation with a university specialized in adhesive bonding techniques. The university influenced both internal training programs and the course material offered. In some cases, staff went on week-long trips for intensive educational programs at the university.

Again, more emphasis was placed on the need for continuous training. The perspective was set on providing updates on certifications and not facilitating interactions between technicians as a way to increase knowledge. In the interviews, it was evident that continuous learning was defined as repeating the very formal technical training process with the end goal solely being to achieve certification, rather than a focus on the nature of the capability in question.

Sprint Review Meeting 2

The second sprint meeting discussion was centered on organizational alignment. The participants were partly approached with the findings of the first sprint and partly displayed some relevant theory on the topics. It became evident that several members recognized the lack of knowledge flows throughout the organization and the role of the sprint meeting itself as a valuable communication channel was once again raised.

More specifically, the findings of the initial sprints in combination with unsuccessful attempts to include information from more perspectives in the organization, such as the sales division, showed that there are three communication channels of particular interest. Firstly, the site financial conditions for receiving and housing the bonding capability had not been communicated to the project managers. It was found that

the sourcing decision of using an external supplier for warranty bonding work in Motala instead of bringing internal resources from a production site was based on an Excel spreadsheet that estimated costs of transport and logistics, to find that outsourcing would be around 28 euros cheaper per trip. Put into perspective that warranty delays have been stated to cost up to several tenths of thousands if it negatively affects the previously mentioned availability. Furthermore, the projects who took on the cost of warranty claims were unaware of the site financials related to that specific work, invoicing was done on hours needed, meaning that no cooperation was in place to overcome the financial barriers mentioned above.

Second, communications from the sales division and the rest of the company were severely lacking. As mentioned above, a forecasting model or way of communicating the predicted demand for a bonding capability would generate valuable insights for both the production and service sites. Instead, it was difficult to find contact points in the organization and on several occasions efforts to ask around about contract contents resulted in being referred back to the site responsible for its warranty operations.

Lastly, the specific requirements for the sites placed by the various projects were also not completely clear. Several conflicting answers were given as to what would actually need to change at the Motala site, especially with respect to the specificity of such actions. Although the sites knew that they would be subject to facility adjustments, they could not be sure if this meant installing a brand new HVAC-system for bonding fumes or crack a window.

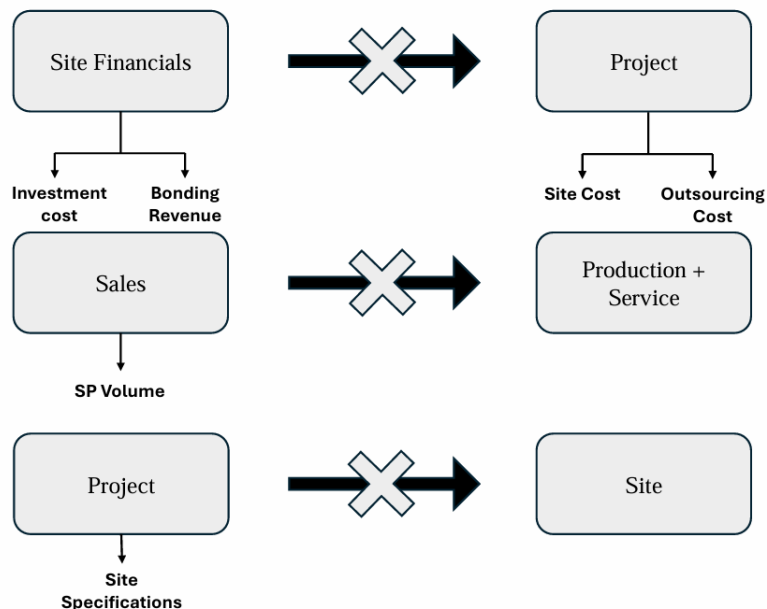


Figure 5.1: *Barriers in collecting data between functions within the organization.*

Two key insights from the second sprint review meeting were identified. Firstly, the lack of representation was prevalent in the capability transfer process. The participants showed strong agreement with the situation presented and a willingness to

move forward, but as some divisions were not represented, the meeting members were unable to explain why and how certain decisions were made. This was particularly evident in the discussions around forecasting and communication flow from the Bids & Tenders organization, which completely lacked representation throughout the thesis.

Second, the lack of ownership became an explanation as to why communication and decisions were not concise. Neither the sites nor individual projects were fully equipped with the formal power or complete information to take decisive actions that, in turn, would affect a multitude of other sites and projects. It was also said to hinder progress by not creating a sense of urgency for the involved parties.

5.2.3 Sprint 3

The third sprint consisted of 2 interviews, an AIM-workshop to explore motivational aspects reported in the previous sprints, reviews of additional company documents, a study visit with observations to explore the reported nature of the capability in more detail and the completion of the gap analysis.

Objective 1: Assess Competitive Environment

On closer examination of the various standard documents, it was evident that not all countries, projects, and customers place the same demands on the contract. Examples include using the Danish-European standard EN17460, the German standard DIN6701, or Alstom's internal standard DTRF150620. This meant that specific competitive demands could somewhat differ between projects, and therefore the appropriate behavior of the bonding capability would vary between sites and over time. Furthermore, the phrasing and wording of standard documents are rather vague, with examples such as "The bonding stations must be clean and tidy" causing severe uncertainty as to what practical demands are placed upon the facilities.

Observations of the bonding process carried out by the external supplier on site mainly showed the lack of specialized theoretical knowledge. Detailed instructions created by engineers in Germany were followed without any subjective changes, using the specified materials and quantities. Site conditions such as humidity and temperature were recorded, and, if within the supplier's specified limits, a test joint was created alongside the tram corrective bonding action. The technicians had various bonding certifications, but explained that technically determining the correct amounts, timings, and other details of the instructions were left to the employees in the office, meaning that the actual work they performed did not require chemical knowledge. However, when it came to testing the joint, the process required an individual technician to make a subjective judgment of the rigidity and glossiness of the joint. In practice, this means scraping away at some of the materials and bending the joint with manual force. A faulty joint was stated to be obvious in its performance, meaning that the error range of a human decision was well within the margin.

Objective 2: Identify Barriers

During the study visit, it was repeated again that the sites feel unmotivated to take

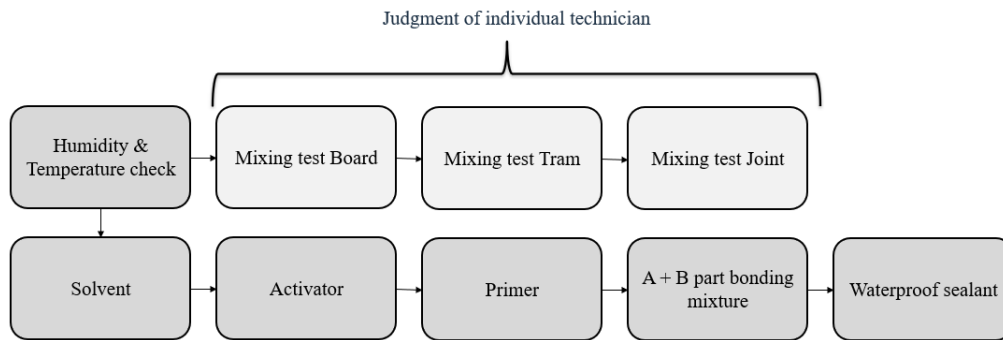


Figure 5.2: *Process steps involved in adhesive bonding of window frames.*

on investment cost for bonding capabilities when warranty bonding operations will negatively impact their margins if that means that they will have to discard external service orders. Furthermore, site management mentioned the importance of incentives, as they run a completely isolated budget that is evaluated independently. Additionally, with sites around the Nordics competing internally for the same contracts, there is a strategic misalignment with what the individual site considers as an attractive capability and what the organization as a whole does.

Another concern that was raised on the site was the lack of future planning. From the site's perspective, there is no bonding demand following the current one, as they have not received any indications that this would be the case. With the background of viewing simply the current project with bonding being outsourced, they therefore did not see any reason to house the capability themselves.

Objective 3: Recipient Site Selection

Observations from physical facilities showed that the site conditions deviate strongly from the standards, even when ambiguity is taken into account. The area used for bonding displayed no safety actions except for the use of nitrile gloves, the shop floor was used for other mechanical work and there were no controlling or regulating mechanisms of airflow, temperature, or humidity. Although the absence of special arrangements does not necessarily mean that the site is deemed insufficient for a particular contract, it was evident that the picture painted in the offices was strongly different from what happened on the shop floor.

Objective 4: Transfer Process and Training

In the interview with the technician who had previously undergone and failed the bonding technical training, the topic of theoretical demands was brought up once again. The technician explained how they passed the practical test with flying colors but failed to explain the scientific chemical interactions behind the process, and therefore were not eligible for bonding certification. Additionally, it was explained that the technician in question has passed other internal and more practical bonding training programs and was at the time performing other types of bonding work at the site. The concluding remark was that the training procedure associated with the bonding capability as it is today was not connected to the reality of warranty

operations in the Nordics.

Sprint Review Meeting 3

In the third sprint review meeting, the focus was primarily on evaluating the current state of training procedures and exploring whether the previously determined rigidity of the training process could be challenged similarly to the way the site conditions had. The answer from several of the participating members of the training division was a decisive no. Since the exams within the training process are tailored to fulfill a certain set of specifications in the standards, the exams and its content are not to be changed.

5.2.4 Sprint 4

In the fourth sprint, it was decided that the collected data was adequate and that the sprints would reach their end. The main objectives instead were to carry out the analysis meant to refine the data into presentable findings.

Sprint Review Meeting 4

The final sprint review meeting was mainly focused on presenting the aggregated findings and giving the opportunity for clarifications. Some discussions still arose, especially around the topic of motivation and knowledge transfer. A participant stated the following:

"From my observation, there is a reluctance to share knowledge due to the fear of jeopardizing the security of one's own job. It happens that a senior worker, instead of sharing knowledge, starts with consultancy to the firm. This way, the company will not lose its knowledge, but it won't be in-house." – Training Manager

Additional insights on future demand were provided as participants showed that instructions on increasing the focus on bonding were communicated throughout the operational hierarchy. Although not yet accompanied by numbers or explicit written strategic policies, trust in management was said to be a reason for action.

5.3 Remarks and Frequencies Across Interviews

The results of the interviews with common remarks related to the objective themes are compiled in Table 5.3. This idea is to showcase the frequency of certain remarks to find patterns and themes that are recurring. Tracking the remarks allows for a better understanding of certain patterns and the aspects the organization addresses to a greater extent than others. In this way, an organization could allocate resources in a more efficient manner to better address certain common recurring issues.

Table 5.3: *Thematic remarks and frequencies across interviews.*

Frequency	Remark	Theoretical Theme
4	There is no competitive advantage from exceeding standards	Competitiveness
4	Services have lower and different standard requirements than production	Organization
3	It's a challenge to find staff that is able and willing to learn	Training
3	Knowledge is lost when or if key individuals leave the organization	Training
3	There's a lack of communication and organizational silos	Organization
2	One main competitive strategy is to increase market shares	Competitiveness
2	One main competitive strategy is to decrease the number of external suppliers	Competitiveness
2	Serial production has higher volume and more repetition	Organization
2	There's a high reliability on individual skill for bonding	Organization
2	There are strong similarities between how SPs are built	Organization
2	Availability is generally the most important metric	Competitiveness
2	Services are more profitable than production of new stock	Competitiveness
2	Sites do not get paid much for internal project work	Competitiveness
2	External bonding suppliers are expensive	Competitiveness
2	There exist established and high-performing SPs in the organization	Training

5.4 Gap Analysis

The gap analysis conducted aimed to identify discrepancies between the current state and a target state. The structure provided highlights certain aspects that were noticed during the observations.

The aspects currently observed are divided into three categories, *critical*, *important* and *advisory*. Categorizing the findings can help Alstom prioritize areas of improvement. The structure enables an understanding of what can be seen as vital for implementing bonding, what significantly influence the quality and consistency, and also what contributes to long-term sustainability and well-being. Although the categories to some extent are subjective to the opinion of the authors, the selection of appropriate gaps within each category was also based on the emphasized requirements in the standards documents. The "target state" in this context therefore refers to both specific expressed necessary requirements, as well as general improvement directions.

Critical aspects highlights the aspects that are vital for bonding to be successful, such as cleanliness or operator certification. Without these, Alstom would not meet the regulatory requirements put in place and could not perform bonding at the site.

Important aspects highlights traceability and ventilation for the process. The ability to trace how well bonding has been performed can be used to understand deviations. Ventilation is important to remove the fumes from the bonding procedure.

Advisory aspects highlights two aspects that are worth considering for the health and safety of operators performing special processes.

The findings, summarized in Table 5.4, provided an overview of the current state of the site. Three findings emerged that are particularly concerning. First, there are no operators with a certification available today in-house, despite attempts to establish. Secondly, the safety equipment consisted of rubber gloves with no adequate protection against the bonding fumes. Finally, and particularly relevant to knowledge transfer, is the state of documentation. According to one of the technicians, the information is still recorded manually on paper, which can be an issue regarding traceability and access to knowledge.

5. Empirical Findings

Table 5.4: Comparison of parameters for Motala service in Sweden highlighting the differences between the current state and a desired state.

Parameter	Site (Currently)	Site (Target)	Observation
<i>Critical</i>			
<i>Cleanliness</i>	Painted floors with markers	Workstations, zone ownership, cleaning logs	Multi-purpose facility with heavy maintenance causes dust and dirt to spread
<i>Operator Certification</i>	N/A	Level 1, Level 2	Proposal of regional Level 2 or Level 3
<i>Safety</i>	Protective gloves	Face masks, facility ventilation	Staff worried about being exposed to chemicals
<i>Bonding Quality Control</i>	Subjective test joints with new material	Standardized procedures, comparable material	Identical material will never be available for worn tram components
<i>Important</i>			
<i>Ventilation</i>	No designated ventilation	Ventilation in place	No system available to extract fumes
<i>Humidity</i>	Observation using test unit	Continuously managing humidity with control mechanisms	N/A
<i>Temperature</i>	Observation using test unit	Continuously managing temperature with control mechanisms	Nordic sites are situated in harsher climates
<i>Advisory</i>			
<i>Documentation</i>	Catalogs	Digital catalogs	N/A

5.5 Workshop

More insights on employee resources at service sites came from the AIM workshop, which showed that lack of motivation was a key issue to successfully transfer the bonding capability to Motala. The main question of the workshop was "Why would someone not want to participate in a bonding training program?" and the answers were rather consistent in a strong unwillingness to change into something that the technicians did not feel offered anything better. "I am happy with what I am doing now" was a typical sentiment during the workshop, and strong difficulties to envision themselves working with chemicals at all were prevalent throughout. The workshop also displayed a skepticism towards healthiness related to the absence of safety measures displayed on site. The participants explained how they were able to watch the external technicians doing bonding work all day "knee deep in the fumes", which further decreased the motivation to do the same.

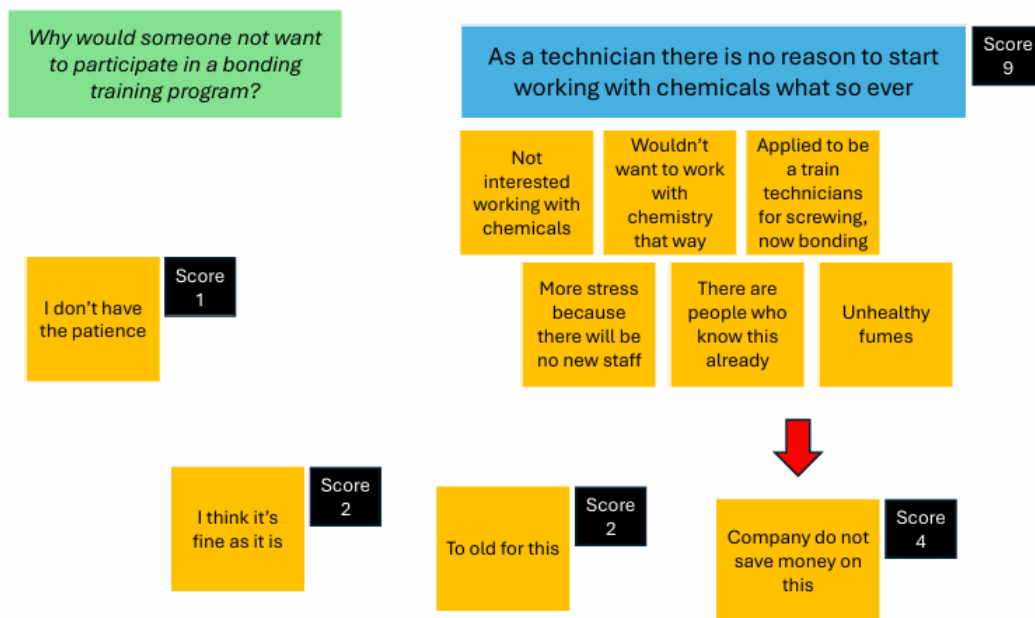


Figure 5.3: *The resulting board after a completed aim workshop with technicians in Motala.*

During the visit, other mentioned reasons for not receiving a bonding certificate included fear of failure when trying something new, a bad reputation of the training experience itself, and satisfaction with the current career path. "No one wants to do bonding" was stated as universal truth by one of the supervisors.

6

Implications

This chapter connects the empirical findings and the theoretical references presented in previous chapters to establish the theoretical implications for each research objective. Two of the objectives are concerned with the basis of the studied phenomena, while two represent the managerial implications that would follow in that context.

6.1 Competitive Assessment

Two main perspectives on competitiveness have been presented and debated in the theory discussion. While Herrmann (2008) conducted research on how the external competitive environment seemed to be overshadowed by competitive alignment on resources, both Collis (1994) and Beamish and Chakravarty (2021) presented opposing views that capabilities either do not provide a sustainable competitive advantage or that RBV has not been adopted to application for MNC's. The empirical findings from the sprints showcased insights into both these contextual situations, including the industry environment and the internal resources of a firm.

6.1.1 Industry Based Competitiveness in Warranty Operations

The collective findings related to the first objectives showed that the quality aspect of work in warranty operations presents a prominent feature with respect to quality levels. Firstly, the general expectation of the level of quality is lower than that of serial production. Customers place lower requirements on aftermarket services and the quality of warranty work is considered less important. Second, it was not found that exceeding the desired quality yielded additional advantages. Two managers stated the absence of any revenue streams as a result of higher quality in any scope, and that no functionality of higher quality was requested by other parts of the organization. Combining this with the project manager's statement that warranty work is entirely a cost segment for an organization, investments associated with quality improvements after the specified level has been reached would be unnecessary.

A distinctive qualitative aspect present in the studied industry was the adherence to externally regulated production standards. The standards identified were partly connected to the railway industry itself, but also to the production methods of, for example, welding and adhesive bonding, techniques present in other manufacturing industries as well. This could mean that a recurring aspect in the warranty context consists of standard requirements, which in turn makes quality a particularity critical factor up to the previously mentioned point where it is no longer needed.

In sprint 1, another reported aspect of warranty work is the demand for a broad competence behavior of the capability. A manager declared that a service site within

warranty also offers a considerable amount of other services. This could be the case for many companies in the industry, as the volume of warranty work was reported to be low compared to that of serial production, meaning that a single service site would not be occupied solely by warranty operations. Furthermore, with multiple customers or projects in the case study, facilitating a considerable variety of demanded capabilities and resources from each type of work could increase the risk of counteracting capabilities. Configurations of misaligned resources as a result of such variety could create obstacles to fully utilizing others (Lafuente et al., 2016), consequently being of particular concern in warranty operations.

Lastly, instead of quality and cost being competitive drivers, one interviewee indicated that speed could be a strategically valuable aspect for customers in warranty operations. The study found a case-specific KPI of availability, when upon extrapolation into other industries would mean that customers of warranty work prioritize quick responses. To summarize, the local context as discussed by Beamish and Chakravarty (2021) would in the case of warranty operations be a particularly strong focus on quality up to a specified, but lower in relation to serial production, level, where a speedy response could provide a competitive advantage instead. The competitive alignment of the transferred capability must, therefore, reflect these strategic alignments, highlighting a need for competitive influences on the transfer process into warranty operations.

6.1.2 Resource Based Competitiveness in Warranty Operations

Alternatively to evaluate the requirements of external environments, the RBV offers ways to evaluate resources as a source of competitive advantages. In the case study, merely the existence of certified staff results in the ability to offer a specialized process contingent on a regulatory standard, as it gives access to otherwise restricted services. Although adhesive bonding certifications are specific to the case study, the principle was also observed for other processes as well, such as welding, indicating that human capital (Lafuente et al., 2016) can be an important source of competitive advantage in the warranty industry.

International capability transfers within MNC's could also cause a firm to forfeit a competitive resource. This was illustrated by an interview with a technical training manager in sprint 2. The interviewee described a local source of knowledge close to the recipient organization, an educational instance for adhesive bonding in Germany, which would no longer be connected to the capability after transfer to the Nordics. The bridging tie would thereby be severed, no longer providing information related to the capability's competitiveness which in turn would negatively impact the possibilities for the MNC to sustain a competitive capability (McEvily & Zaheer, 1999). However, if an MNC were to keep its tie alive by maintaining a communication network (Lafuente et al., 2016) or similar, the competitive contribution would instead increase along with the geographic dispersion. Capability transfers in MNC's therefore cannot be assumed to always cause a removal of such ties and consequently lower the competitiveness of the capability.

Lastly, the case findings of the first sprint showed that the performance of serial production sites affected the demand for the capability in the warranty scope, as higher quality with fewer defects in serial production were reported to generate fewer claims to be handled. This shows the need for a systemic perspective on resources and capabilities in warranty industries, as the behavior of a certain capability could disrupt the function of another (Lafuente et al., 2016). For an MNC, this aspect would be increasingly more concerning, as the findings show that such capabilities can be deployed a large spatial distance from the transfer destination.

In summary, resources related to the transferred capability cannot be assumed to remain identical in the local context. One aspect is that the warranty industry might introduce new competitive resources, such as staff certifications, while another could be the potential loss of bridging ties or the impact of distant resources stemming from an organization being an MNC. Therefore, the competitive alignment of a transferred capability must reflect the available strategic resources. Even when such resources are not deliberately included as a factor affecting the transfer process, they will unavoidably impact the process in either way by acting as what this could be introduced as *resource-based* barriers to capability transfer. This concept will be elaborated on further in Section 6.2.4, as it was found to specifically relate to the facility category of transfer barriers.

6.2 Identify Barriers

The transfer of a capability, such as a special process, can be hindered by a variety of different knowledge barriers, as described in Husain et al. (2017), Riege (2005), and Tanriverdi and Iacono (1999). Drawing on the empirical findings from the sprints and the current theoretical framework, this section analyzes three broad categories; staff, financial, and organization, which have been uncovered throughout the study. That is, the study identified established theoretical barriers also within the MNC context. In addition, a category of barriers identified showed the existence of *resources-based* barriers that would hinder the transfer of a capability.

6.2.1 Staff

One major barrier when transferring capabilities is related to staff, which has been revealed from the interviews and a workshop. Challenges related to intrinsic motivation (Ko et al., 2005), such as limited engagement and unwillingness to participate in training programs, are factors that affect the ability of the organization to absorb knowledge (Cohen & Levinthal, 1990; Van Wijk et al., 2007). In addition, the availability of staff who are eligible to participate in a special process training, gaps in educational background, or language barriers further create barriers to a successful transfer. As described by Riege (2005), these challenges correspond to individual barriers, such as lack of trust in the process or differences in educational levels that affect the performance of the company and the possibility of transferring a capability. By more properly managing the challenges related to staff, with a targeted training program, addressing declining motivation with underlying reason,

and adapting language communications, a multinational company can increase the likelihood of a successful transfer of a capability.

6.2.2 Financial

The empirical findings of the financial barriers uncovered during the second sprint and the second sprint review meeting were related to three parts. Firstly, without a clear confirmed demand forecast, the sites saw little motivation to deploy a capability that seemingly lacked a clear purpose. Although the nature of the warranty industry was found to be low in volume and irregular in its demands, predicting future demands in detail is naturally more difficult, especially in a diverse MNC with local deviations. Furthermore, empirical findings showed that service sites generally organize warranty work for multiple projects at the same time, meaning that it is necessary to show an aggregated demand for all projects corresponding to a certain site. Otherwise, the financial barriers of unpredictable and non-cumulative demand would deter sites from accepting the capability transfer.

Similarly to the first issue, a site was hesitant to take on investment cost, not only when the payoff was unclear but also because of its suspected impact on day-to-day operations from not having staff available for training or excess capacity in the schedule for delays. The findings also showed that the benefits of transferring the capability to the service sites purely accrue to the project that no longer needs to outsource. The general implication is therefore that sites carrying out warranty work, being purely a cost driver for the firm, generally will have to make investments that render financial savings in other areas of the organization, which results in a lack of financial motivation.

Lastly, as external service orders was found to yield higher margins than internal warranty work, the site were reluctant to accept the transferred capability regardless of the cost associated with the transfer process itself. Having been evaluated on their own budgets, service sites in an MNC were found to independently move away from the warranty industry to improve their respective financial performance. This is a distinctive financial factor that is closely connected to the warranty industry as well as a budgeting topic that could be found in other MNC's. However, all three versions of the financial barrier presented are also in line with Tanriverdi and Iacono (1999)'s definition as they show a failure to attract all stakeholders through the warranty business model.

6.2.3 Organizational

It was evident that organizational factors affect the process of transferring a capability. The empirical findings, especially during the first sprint review meeting, showed that organizational silos hindered the flow of knowledge and communication between people. This lack of communication created a situation in which the ability to forecast future financial demand was diminished. This finding highlights how barriers can reinforce each other as described by Husain et al. (2017). In addition, ownership and responsibility for transferring the capability were poorly defined, increasing

the likelihood of fragmented execution and delays. In the study, when interviewing and conducting sprint review meetings, the involved stakeholders were not present in person. Communication was made over Teams, considering that people were located in various countries without the ability to sit down face-to-face, which is typical for an MNC. These conditions illustrate how factors related to the organization, especially in a MNC context, should consider the difficulties in effective communication that can reinforce other barriers and furthermore create uncertainty regarding lack of ownership and responsibility.

6.2.4 Facilities

The findings, especially during observations and the visit to the service site, indicate that sites performing warranty work are, as previously discussed, required to house a large variety of capabilities to meet a diverse demand of services. The case study found clear gaps between the site conditions compared to what was specified in the standards to fully satisfy the capability to be transferred. Aspects such as cleanliness and climate control were the result of other demands and types of services being present next to the adhesive bonding process, while the lack of safety measures and standardized documentation processes were not. Some conditions related to facilities are the result of characteristics of the warranty industry itself. Others could be a consequence of an MNC where not every division or site follows the same procedures. What they have in common is that facility barriers are concerned not with how the knowledge aspect of the capability would be transferred, but the conditions to utilize it properly. This would therefore constitute a *resource barrier* to capability transfer.

Another finding reported by an industrialization manager in Germany that showed how capability transfers into warranty operations might be disturbed was the fact that the bonding capability studied in the case included a testing procedure, which in turn required a material sample identical to the actual joint on the railway car. Of course, since warranty operations are carried out in isolation from the serial production facility and at a different point in time, this would always be impossible. The theoretical implication of this problem is that these two aspects are distinctive of the warranty industry, which again embodies a resource barrier similar to the RBV in the internal inimitability (J. B. Barney, 1995) of the capability to be transferred, or what Husain et al. (2017) identified as lack of infrastructure.

6.3 Managerial Implications

Following the competitive assessment and identification of barriers, the final two objectives are more concerned with the selection of a suitable recipient site and how to practically manage the transfer process. Implications drawn from findings and theory in these areas are related to the assessments in the previous sections while targeting a managerial perspective on how to approach the transfer.

6.3.1 Recipient Site Selection

Previously discussed findings and the identified implications relating to financial barriers and site motivations raised concerns when it came to predictions and demand forecasts. Although an MNC that transfers a capability into warranty operations needs to be aware of some persistent aspect of the issue, such as warranty demand that is inherently unpredictable, it can mitigate the impact of others, such as aggregation of the demand from the whole customer base through forecasting (Husain et al., 2017). Tanriverdi and Iacono (1999) suggest to develop a suitable business model that ensures compensation and reimbursements to the site, supporting the motivation and willingness to adopt a new capability. Furthermore, implications of additional financial barriers, such as the issue of lower margins and individual budgeting, indicate that such models would also have to incorporate the subsequent effects of the capability after deployment. Doing so would be aligned with Lafuente et al. (2016) and Teece (2007), which implies the need for a systemic evaluation and a dynamic approach to target financial barriers.

Comments in the final sprint review indicated that an MNC could be subject to local information monopolies, where a group or a member of the staff will be less inclined to change as a result of motivational mechanisms (Gooderham, 2007). Therefore, suggestions from Ko et al. (2005) implies that an MNC specifically has to be aware of the individual staff resources selected to consider for capability transfer, as extrinsic motivations, such as increased salary, were unlikely to impact the intrinsically motivated individual. This was further supported in the empirical data, where a managerial asset stated that monetary compensation for staff was unlikely to drive a change in behavior or motivation towards the capability.

Resource barriers can be seen as a considerable challenge in capability transfer for a recipient site. As discussed previously, insufficient cleanliness or lack of climate control can obstruct the transfer process of a capability. On the topic of resources, Lafuente et al. (2016) offers an interesting lens through "pillars" that an organization can use when certain aspects are not aligned. For an organization working with warranty where demands vary, which could cause misaligned resources, an organization requires harmonization across technical and facility-related areas. However, a specific capability might require one or several critical resources, and an organization experiencing this situation would instead find itself in the need to specifically target the bottleneck resource (Lafuente et al., 2016). This means that a general managerial implication cannot decisively favor either a harmonization or bottleneck resource strategy, as their appropriateness depends on situations that can arise within the warranty industries. Instead, it would require an assessment of the individual situation.

Another interesting aspect is the discussion by Andersén (2010) in which an organization should acquire the necessary resources to transfer the capability. For an MNC, with a global presence, the aspect of internal imitability becomes important. Instead of copying a competitor, an organization could imitate or acquire the necessary resource internally. For an organization looking to propose a first site, facility

readiness in terms of resources should be matched to the demands of the capability and on the strategic alignment through critical resources and harmonization. Additionally, an assessment of the imitability of resources must be considered, as resources involved in an internal capability cannot be assumed to be imitable, as evident by the case findings of severed bridging ties, or lack of identical warranty material.

6.3.2 Transfer Process and Training

One main component of transferring the capability is the adaptation to the local conditions mentioned above. The findings highlighted warranty-specific conditions as well as internal resources that would affect how a capability can be competitive in another way than at its donor location. In the case, demands placed on the capability in order to leverage and align with available resources identified an issue of lower absorptive capacity as a result of staff educational levels, while the lower quality requirements meant that this knowledge could be considered excessive and not appropriate in the warranty context. Beamish and Chakravarty (2021) highlights the need to consider such changes in local conditions when performing a capability transfer, and Van Wijk et al. (2007) specifically recommends a streamlined process with fewer knowledge sources. Together with the previous implications on warranty that specifically require a wider range of competence within the capability, the transfer process would ideally be dynamic in nature, as an integrated part of how the firm adapts, transfers, and manages resources (Teece, 2007). More precisely, the combinative aspect as discussed by Zander and Kogut (1995) and Nonaka (1994) can extend the scope of the capability to suit warranty-specific conditions, while the integrative (Grant, 1996) can identify and select competitively attractive parts of the capability to transfer with respect to the available resources.

Additionally, the transfer process itself would have to extend beyond the initial deployment of a capability, as multiple training managers stated that the regulatory certifications required within the warranty industry need continuous updates and revisions, meaning that the transferred capability needs to be managed after it has been adopted at the recipient site. Collis (1994) suggests two managerial practices to approach continuous capability control, either through a stepwise implementation of the transferred capability or by constantly re-evaluating the competitive sphere, the available resources and how to align the capability. Long-lasting warranty contracts could indicate that warranty operations would not require the same degree of continuous monitoring, since the internal competitiveness of a capability therefore could be somewhat ensured. Additionally, with diversity and ambiguity found in MNC's, gradually adapting the capability could be an appropriate way to ensure competitive alignment in the transfer process.

Another notable aspect when the bonding process was observed was the degree of tacitness. It was evident from the observations that the practical bonding process itself was explicit, with clear guidelines and routines for how to properly perform it. Despite this level of explicitness, sprint review meetings indicated a large amount of tacitness and ambiguity in the surrounding information related to the capability.

Hence, an MNC transferring a capability into warranty operations could be subject to a degree of tacitness surrounding the capability, resulting in a capability that is difficult to transfer, as tacit knowledge by nature is difficult to articulate and difficult to transfer (North & Kumta, 2018). To transfer a capability, Farnese et al. (2019) describes an operationalization of the SECI model, more specifically how to convert tacit to explicit knowledge, which is recommended by North and Kumta (2018), since explicit knowledge is more formal and codified more easily. Converting tacit knowledge to explicit knowledge is known as *externalization* and for an organization this implies structured reflection and the conversion of ideas into formal concepts to enable a collective understanding (Farnese et al., 2019). Furthermore, Gooderham (2007) elaborates on the role of *socialization mechanism*, such as mentorship or face-to-face interaction for sharing tacit knowledge. Therefore, for an MNC aiming to transfer a capability into warranty operations, the reliance on documentation and explicit processes may be insufficient. A structured process for both externalization and socialization is necessary to capture and transfer knowledge, explicit and tacit.

With indications that an MNC could be subject to considerable organizational barriers in the form of absent communication channels, lack of ownership, and representations. Gooderham (2007) suggests a third relevant managerial mechanism that aims to establish transmission channels into the organization. A practical approach could be through formal proximity by grouping divisions or designing intranet systems. This would increase structural social capital within an MNC, facilitating the development of dynamic capabilities (McEvily & Zaheer, 1999), as discussed above, as well as knowledge transfer (Gooderham, 2007). Lastly, Chen and Lovvorn (2011) specifically introduces the need for identity and commitment in international knowledge transfer, which is aligned with the findings of lack of ownership and representation in the MNC, as organizational barriers to capability transfer.

7

Discussion

This chapter presents the discussion of how the thesis contributes to the existing scientific field. It discusses the objectives set out to be achieved and provides a discussion of future research on the topic.

7.1 General Discussions

Theoretical Gaps

This thesis set out to address two primary gaps in the literature on capability transfer. First, warranty-specific conditions, where the existing resource focuses on manufacturing in general. Warranty introduces distinct constraints such as variations and variety across projects and locations. The thesis contributes to a more nuanced understanding of how a capability transfer can be handled in this context.

Secondly, how does competitiveness influence capability transfer. Although frameworks such as RBV or Porter's generic competitive strategies are common and very well known, this thesis contributes to a more in-depth understanding of how competitiveness can be applied with operational capability transfer in warranty operations.

Method and Case

With only one case company, the results are limited to not include comparisons to others, which could have added interesting perspectives on the results. At the same time, the ethnographic method offered a significant insight and understanding of the studied phenomena, adding valuable nuance to the analysis of data. The inclusion of additional case companies would have resulted in time and resource constraints obstructing the depth in analysis.

As the organization is an MNC, a natural consequence was that some resources were located outside of the Nordics. Stakeholders located in Germany or Greece were therefore only contacted through online communication channels such as Teams meetings, e-mails, and phone calls. Face-to-face meetings could potentially have resulted in other findings, as the setting and environment would be different.

Level of Contribution

The thesis contributes to the scientific field of research on warranty industries by applying established theory in a new context. Barriers already present in general settings were found to exist in warranty situations as well, in various capacities. Furthermore, the managerial practices and approaches discussed in the realm of knowledge transfer coincided with empirical findings from the MNC studied.

However, the thesis could argue that to a certain degree builds new theory as it specifically introduces the concept of competitive influence on capability transfer

in warranty operations as well as the presence of *resource barriers*. Assessing the specific competitive context while also suggesting how a capability transfer process would be influenced by it, using parallels to RBV and competitive capability research, could not be found in previous research.

Interestingly, it is evident that capabilities are built on both resources and knowledge. The traditional knowledge barriers mentioned in this thesis can be seen as insufficient in the context and introduce a need for resource barriers in addition to being able to fully understand a capability transfer process.

7.2 Future Research

An important consideration with this study is that the actual transfer of the bonding capability was not completed, and therefore the presented concepts could not be validated. In some cases, the collected data can be seen as partially complete because of the uncertainties that will emerge when the final implementation takes place. For that reason, it could be valuable with further research after implementation has been performed to validate the findings and the implications made.

Future research could extend the conclusions inferred in this thesis by examining the concept of combining competitiveness and capability transfer in other industries or organizations. This could provide valuable insight as to the general applicability of managerial implications and determine whether the results are attributed to an industry or specific only to the case company.

The thesis also offers a discussion about the difference between a resource that is unfavorable for competitive capabilities and a barrier to transfer of the same capability. To what extent a resource or lack thereof acts as a barrier and if it should be regarded as one would be an interesting topic for future research.

Developing on the concept of barriers, this thesis and its scope were only able to capture the aspect of facilities. Future research could continue on the concept of *resource barriers* and find further evidence of its impact on capability transfer.

Lastly, the concepts suggested in this thesis do not take into account the organizational resources and efforts required to carry out the actual adaptation. Exploring whether the costs of actively managing a capability process are justified by the results of competitive adaptation is an interesting area. Furthermore, future research could examine the appropriateness of applying the concept in various industry settings against this aspect, investigating if some environments have more to gain from actively adapting a transfer process than others.

8

Conclusion

This chapter presents the conclusion, which is a short summary of what the authors regard as the most important implications, findings, and theoretical connections.

Operating in the warranty industry has a number of competitive associations, such as the emphasized importance of quality performance up to a certain level where it is no longer advisable to increase it no matter how small the investment. Other distinguishing competitive characteristics are the variety in site demand, resulting in a need for broad competencies within the capability. Together with theory stating that capabilities must be aligned with competitiveness in a local context, the study suggests that the capability transfer process needs competitive influences when transferring a capability into warranty operations.

Findings closely related to the RBV perspective showed that human capital could be a source of competitive advantage in warranty operations. Conversely, transferring capabilities in MNC's could sever important ties and hurt the competitiveness of the transferred capability, while keeping the network intact could prevent the loss, and even improve the competitiveness of the capability. Lastly, it was implicated that the capability in its warranty context will be greatly affected by the behavior of other capabilities, meaning that a systemic approach is necessary to manage and understand the competitiveness.

The findings displayed a number of barriers related to the warranty industry and MNC's. Staff related barriers concerned both low motivation and other individual barriers in the form of educational knowledge resulting in a lower absorptive capacity. Financial barriers specifically tied to the warranty industry were found to stem from three sources. Firstly, the difficulties of aggregating and predicting demand. Second, reluctance to bear investment costs as no additional revenue is generated from warranty. And third, warranty orders are naturally less attractive to service sites in an MNC that also offers external service work. Some organizational barriers were found to stem from the lack of communication channels, ownership, and representation within an MNC, further demonstrating how one barrier can reinforce another. The gaps between the available facilities and capability requirements, as well as the situation with materials in test joints, showed that warranty operations and MNC's are accompanied by the introduced concept of *resource-based* barriers.

For managerial implications, the findings and theory resulted in a number of suggested approaches to facilitate and manage the transfer process. Firstly, to combat some of the financial barriers specific to MNC and warranty conditions, an organization should carry out forecasting of aggregated demands as well as the development of an internal business model that compensates warranty sites for the cost related to

the transfer itself and its subsequent deployment. Second, MNC's must be deliberate in their recipient selection, considering that some individual barriers related to intrinsic motivation are unlikely to be affected by extrinsic efforts. Third, a general managerial implication of how to systemically approach the variety showcased by resources within warranty operations cannot be favoring a harmonization strategy alone, as evident by the case study highlighting the potential occurrence of a critical resource that needs to be prioritized as a bottleneck. Similarly, the resources available for a proposed facility must be aligned with capability demands, and the internal imitability of such resources cannot be guaranteed.

The actual transfer process itself was suggested to first take on a dynamic shape with combinative aspects ensuring that the capability extends to fulfill warranty-specific competitive demands, and integrative aspects selecting only the parts of the capability that would be competitive with available resources in the local context. Furthermore, the transfer process should extend beyond the initial deployment to ensure continuous competitive alignment. Preferably, this could be done gradually by introducing different levels of the capability.

To manage tacitness, an organization aiming to transfer a capability into warranty operations should manage not only the explicit knowledge but also the tacit knowledge through socialization mechanisms or externalization of knowledge. Structured reflection or mentoring are methods that an organization can use. In addition, to overcome the identified organizational barriers of lack of ownership and representation, suggestions of establishing commitment, identifies, and transmission channels by, for example, formal proximity.

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A

Interview Template

The interviews followed a semi-structured approach with some predetermined questions to obtain a basic understanding of bonding and the interviewee. However, depending on how the interviewee answered, the focus switched from the template to asking questions that would lead to a more in-depth discussion and collectively exhaust the subject.

1. What is your role in the organization?
 - (a) Responsibility (results, personnel)
 - (b) Seniority
 - (c) Previous experience of bonding
2. What is your understanding of the need for bonding in the Nordics?
 - (a) What drives this need?
 - (b) What is the current situation and do you see a change in the future?
3. Do you know what type of strategy Alstom has today in their projects?
 - (a) What type of directives do you have?
 - (b) What is your approach to participating in special process training?
 - (i) Necessary/Unnecessary?
 - (c) **If discussing competitiveness:** How do you see the possibility of making bonding competitive?
 - (i) **Yes...** How do you think it can be competitive? Cost leadership, quality... etc?
 - (ii) **No...** What is the reason or your understanding of why it cannot be competitive?
 - (d) Do you know what the customer appreciates today and considers important in choosing Alstom with regard to the services of their trams?
4. What is said about standards and procedures? What is set in stone, and where do we have the possibility to change bonding to make it more strategic?
5. Do we need bonding in, for example, Norway as well, or would it be sufficient to centralize it in Sweden?
6. How far have we come with the deployment of bonding today?
7. Do you have any previous experience of developing and/or deploying other competencies?

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