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# Servitization in Manufacturing

The case of ABB Kabeldon

Hanna Sekander

Hugo Firmo

Supervisor: Ethan Gifford



**UNIVERSITY OF GOTHENBURG**  
**SCHOOL OF BUSINESS, ECONOMICS AND LAW**

Graduate School  
SCHOOL OF BUSINESS, ECONOMICS AND LAW  
UNIVERSITY OF GOTHENBURG  
Gothenburg, Sweden  
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Graduate School  
School of Business, Economics and Law  
University of Gothenburg  
S-405 30 Gothenburg  
Telephone +46 31-786 0000

Gothenburg, Sweden 2020

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School of Business, Economics and Law  
University of Gothenburg

## **Abstract**

In this qualitative case study, the phenomenon of servitization is analysed for ABB Kabeldon, a conventional manufacturer located in Sweden, with the purpose of finding the factors that influence the servitization potential of cable distribution cabinets and how best to address them. The conclusion reached is that the factors can be divided into key motivators, the rationale for the strategy, and challenges, the hurdles that lead some companies to a service paradox. In this case, the key motivators consist of profitability, customer relationships, and competitive advantage. The challenges comprise customer management, business model, development process, organisational structure, regulations, market readiness, and value chain. The last three challenges emerged from the empirical analysis and all other factors were present in the literature and empirically.

Keywords: Servitization, Business Models, Manufacturing, Product-Service Systems, Key Motivators, Challenges.

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# Contents

<b>List of Figures</b>	<b>ix</b>
<b>List of Tables</b>	<b>x</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Background . . . . .	1
1.2 Company Description . . . . .	2
1.3 Purpose and Research Questions . . . . .	3
1.4 Delimitations . . . . .	4
<b>2 Literature Review</b>	<b>5</b>
2.1 Servitization of Manufacturing . . . . .	5
2.1.1 Product-Service System . . . . .	7
2.1.2 Servitized business models . . . . .	7
2.1.3 Transitioning from products to services . . . . .	10
2.2 Effects of Servitization on Key Motivators . . . . .	12
2.2.1 Profitability . . . . .	12
2.2.2 Customer relationships . . . . .	14
2.2.3 Competitive advantage . . . . .	15
2.3 Challenges of Servitization . . . . .	15
2.3.1 Customer Management . . . . .	15
2.3.2 Business Model . . . . .	17
2.3.3 Development process . . . . .	18
2.3.4 Organisational Structure . . . . .	19
<b>3 Methods</b>	<b>21</b>
3.1 Research Strategy . . . . .	21
3.2 Research Design . . . . .	22
3.3 Data Gathering . . . . .	23
3.3.1 Secondary data collection . . . . .	23
3.3.2 Primary data collection . . . . .	23
3.4 Data Analysis . . . . .	25
3.5 Quality of the Study . . . . .	26
3.5.1 Validity . . . . .	26
3.5.2 Reliability . . . . .	26
<b>4 Empirical Findings</b>	<b>28</b>

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4.1	Key motivators . . . . .	28
4.1.1	Profitability . . . . .	28
4.1.2	Customer relationships . . . . .	30
4.1.3	Competitive advantage . . . . .	31
4.2	Challenges . . . . .	32
4.2.1	Customer management . . . . .	32
4.2.2	Business model . . . . .	36
4.2.3	Development process . . . . .	38
4.2.4	Organisational structure . . . . .	40
4.2.5	Regulations . . . . .	41
4.2.6	Market readiness . . . . .	42
4.2.7	Value chain . . . . .	42
<b>5</b>	<b>Analysis</b>	<b>44</b>
5.1	Key Motivators . . . . .	44
5.1.1	Profitability . . . . .	44
5.1.2	Customer relationships . . . . .	46
5.1.3	Competitive advantage . . . . .	47
5.2	Challenges . . . . .	47
5.2.1	Customer management . . . . .	47
5.2.2	Business model . . . . .	50
5.2.3	Development process . . . . .	53
5.2.4	Organisational structure . . . . .	54
5.2.5	Regulations . . . . .	56
5.2.6	Market readiness . . . . .	56
5.2.7	Value chain . . . . .	56
<b>6</b>	<b>Conclusion</b>	<b>58</b>
6.1	ABB's Servitization Potential . . . . .	58
6.2	Addressing the Factors . . . . .	60
6.3	Limitations . . . . .	62
6.4	Recommendations for Future Research . . . . .	63
	<b>References</b>	<b>64</b>
	<b>Appendix A ABB Kabledon CDCs</b>	<b>I</b>
	<b>Appendix B Code Tree</b>	<b>II</b>
	<b>Appendix C Interview Guides</b>	<b>III</b>
C.1	ABB . . . . .	III
C.2	Customers . . . . .	V
C.3	Government Agency . . . . .	VI

# List of Figures

1.1	Diagram for a CDC (ABB, 2019b) . . . . .	2
1.2	Chain of transactions. Adapted from the interview with ABB1 (see Table 3.1). . . . .	3
2.1	Vertical integration and servitization of manufacturers (Baines, Lightfoot, & Smart, 2011) . . . . .	6
2.2	The evolution of the concept of PSS (Baines et al., 2007) . . . . .	7
2.3	Product-service continuum (Oliva & Kallenberg, 2003) . . . . .	11
2.4	Roles and service-led trajectories. The thickness of the arrows and boxes are indicative of the prevalence of these roles and trajectories. (Kowalkowski, Gebauer, Kamp, & Parry, 2017) . . . . .	12
2.5	Firm value across different service ratios (Fang, Palmatier, & Steenkamp, 2008) . . . . .	13
2.6	Firm value across different service ratios moderated by service relatedness ( $A$ ) and resource slack ( $B$ ) (Fang et al., 2008) . . . . .	13
2.7	Firm value across different service ratios moderated by industry growth ( $A$ ) and industry turbulence ( $B$ ) (Fang et al., 2008) . . . . .	14
3.1	Diagram of the research strategy . . . . .	22
A.1	Outdoor CDC in a residential area (ABB, 2019b) . . . . .	I
A.2	CDC feeding an EV charger (ABB, 2019b) . . . . .	I

# List of Tables

2.1	Main and subtypes of PSS business models — adapted from Tukker (2004) . . . . .	9
3.1	Overview of the interviews . . . . .	24

# Introduction

## 1.1 Background

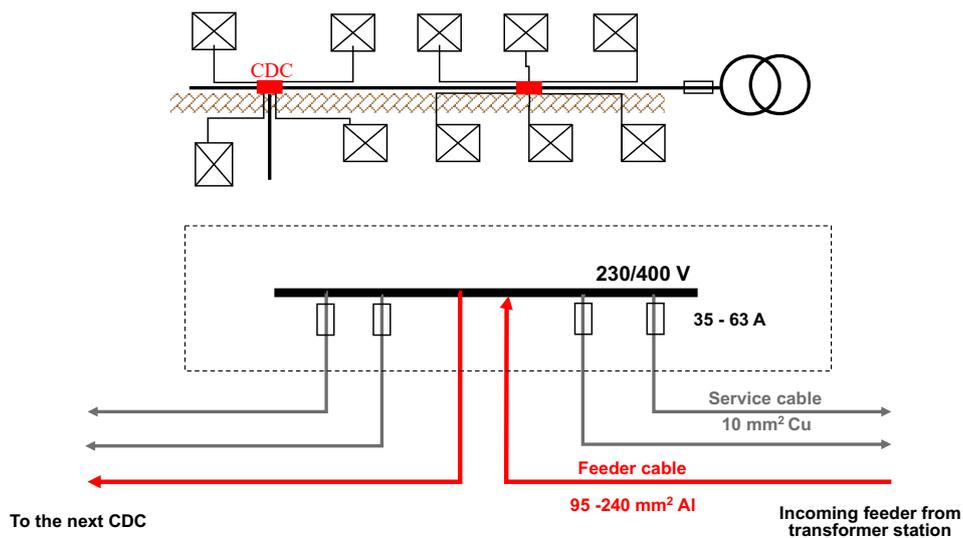
Manufacturers in mature industries can struggle to find new ways to differentiate their products (Cusumano, Kahl, & Suarez, 2015). As Porter (1998) explains, “as an industry matures its growth rate declines, resulting in intensified rivalry, declining profits, and (often) a shake-out” (p. 122). Some manufacturers tackle this problem by introducing services in their offerings, a phenomenon designated as *servitization* (Cusumano et al., 2015; Vandermerwe & Rada, 1988). This trend, that has been in the literature since the 80s, is driven by “deregulation, technology, globalization, and fierce competitive pressure” (Vandermerwe & Rada, 1988, p. 315). Demand for services such as maintenance and repair also tends to increase in the case of mature technologies (Cusumano et al., 2015). In the wake of the fourth industrial revolution, manufacturers are now transforming their business using digital solutions and services to expand their markets (Frank, Mendes, Ayala, & Ghezzi, 2019). Companies that consider servitization are required to modify their business model and organisation. Huikkola and Kohtamäki (2018) argue that the “transition from a product-dominant business model to a services-dominant model requires radical changes in strategy, structure, and organizational culture, where the company moves from product emphasis to customer emphasis” (p. 4).

While vitally important, business model innovation is difficult to achieve (Chesbrough, 2010). Moreover, many companies are unsuccessful in their transition and get low returns from services, despite large investments (Gebauer, Fleisch, & Friedli, 2005), and some later choose to deservitize (Kowalkowski et al., 2017). This calls for substantial research in the field to spur innovation, help companies to access latent value, discover new markets and reap the financial and strategic gains of servitization. In fact, there has been an effort from some scholars to identify the critical factors that influence servitization, for example: Tukker (2004); Fang et al. (2008); Gebauer et al. (2005); Benedettini, Neely, and Swink (2015). However, this is not the case within the Swedish context, where a lack of research can be identified, particularly in regard to traditional manufacturers. Taking into account context-specific factors, this study can provide Swedish companies with meaningful recommendations and guidelines, supplementary to the existing body of literature. Additionally, this work can help lay the foundations for the development of improved frameworks that could be of managerial and academic importance.

## 1.2 Company Description

The history of the ABB Group stretches back to the beginning of the 19th century. Only after a merger between Allmänna Svenska Elektriska Aktiebolaget (ASEA) and Brown, Boveri & Cie (BBC) the company became known as ABB (ABB, 2020b). Today, they conduct business in over 100 countries and employ around 147 000 people around the world. As of 2020, the main focus is on four business areas: Electrification, Industrial Automation, Motion, and Robotics & Discrete Automation. Electrification, the focal point of this thesis, aims to provide “products, digital solutions and services, from substation to socket, enabling safe, smart and sustainable electrification” (ABB, 2020c, para. 1). One of the product-types developed by this business area is cable distribution cabinets, which are a part of the low-voltage product family and will be in focus for the duration of the thesis.

A cable distribution cabinet (CDC) is a system that distributes low voltage power to subsidiary circuits, such as other CDCs, houses, companies or other facilities (ABB, 2019b). In the case of Sweden, mixed 230/400V three-phase power is fed to the CDC from a transformer and then distributed to other entities downstream, as illustrated in Figure 1.1.

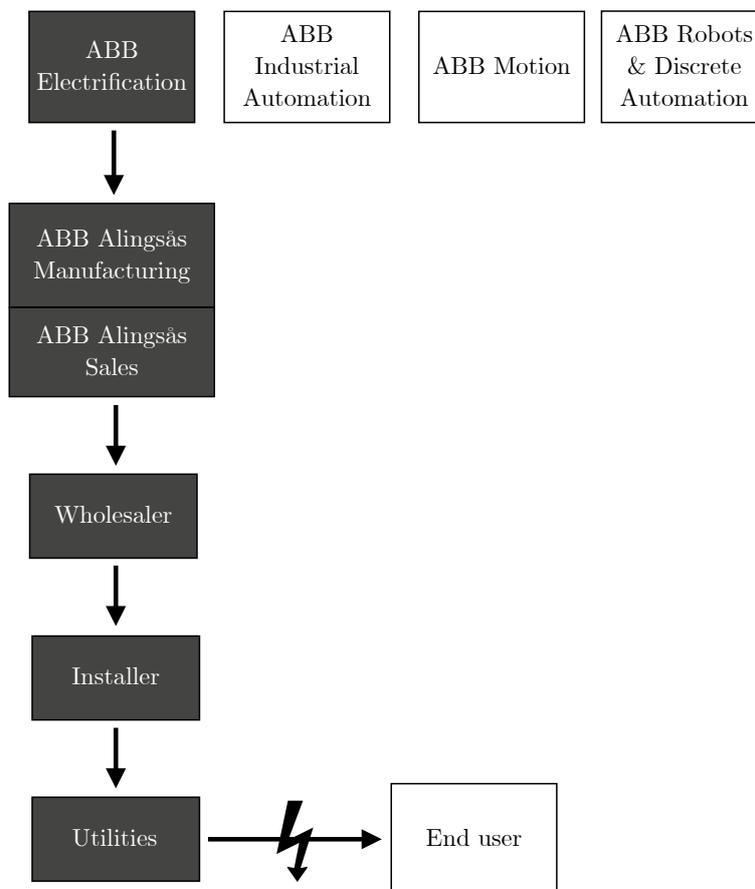


**Figure 1.1:** Diagram for a CDC (ABB, 2019b)

The cabinets are placed throughout the cities, as shown in Appendix A (ABB, 2020a), and are an essential part of the electrical infrastructure. They are considered a unified solution that includes the cabinet itself, busbars and fusegear. Safety is an essential factor that is contemplated in the installation, maintenance and regular operations of the system (ABB, 2019b).

ABB sells the CDCs and its components through wholesalers to utility companies, the electric grid owners, and installers (ABB, 2020a). The terms “utility company” and “electric grid owner” refer to the same type of actor and are the customers studied in this thesis. The ABB Sales department is in close cooperation with ABB Manufacturing and sells components for the CDCs and fusegear to wholesalers, who are responsible for keeping stocks of products and components.

The wholesalers, in turn, sell the products to the utility companies and, occasionally, through an installer, who puts the products in place for the utility company. The chain of transactions is summarised in Figure 1.2, below. ABB sells two types of CDCs in the Swedish market, CEWE and Kabeldon, both manufactured at the factory in Alingsås, in Sweden. The Kabeldon cabinets have been manufactured since the 1930s and have greatly improved over time in terms of safety and number of applications. The last great innovation leap took place in 1977, with the introduction of fully protected busbars. In the utility sector, this can be considered a relatively mature industry (ABB, 2019a). A possible strategy to extend the life cycle of the CDCs involves business model and incremental innovation, with the introduction of product-centric services and digital solutions.



**Figure 1.2:** Chain of transactions. Adapted from the interview with ABB1 (see Table 3.1).

### 1.3 Purpose and Research Questions

This study has two main purposes. The first is to contribute to the advancement of theory in the field of servitization. This is achieved by examining a practical case and investigating the factors that influence a company's servitization potential. In the context of this study, these factors can be defined as independent variables that, to a certain degree, influence the dependent variable, servitization potential. These

factors are grouped into two categories: motivators and challenges. The former is defined as the elements that drive companies to consider this strategy and the latter consists of the hurdles that can be expected. As later clarified in the third chapter, this study uses the qualitative research method, as such, all of the identified factors are measured qualitatively. Still, our purpose is that their identification and qualitative assessment can also contribute to future quantitative studies on the same matter.

The second purpose is to provide aid to the case company (ABB) on how to transition into a servitized business, considering the factors that influence their servitization potential. To fulfil this, two main research questions and one subquestion have been formulated.

**RQ1:** What factors influence the servitization potential for ABB's cable distribution cabinets?

**RQ1.1:** How do these factors influence the servitization potential?

**RQ2:** How should ABB address these factors?

## 1.4 Delimitations

The theoretical scope of this study is servitization in the manufacturing industry, using the case of ABB Kabeldon, a manufacturer of CDCs. Servitization potential in other industries is not considered. As a qualitative study, the quantitative importance of each factor is not determined and any numerical data provided during the data collection process is analysed qualitatively. Furthermore, the case limits itself to utility companies that are customers of ABB and operating in Sweden, despite the fact that ABB Kabeldon supplies multiple markets, globally. When discussing servitization with the manufacturer and customers, the technological potential or feasibility of the suggested services is not considered, only the ideas advanced by the respondents. Finally, the scope of the study is limited to the value chain in which ABB is inserted, not directly addressing competitors nor suppliers.

# 2

## Literature Review

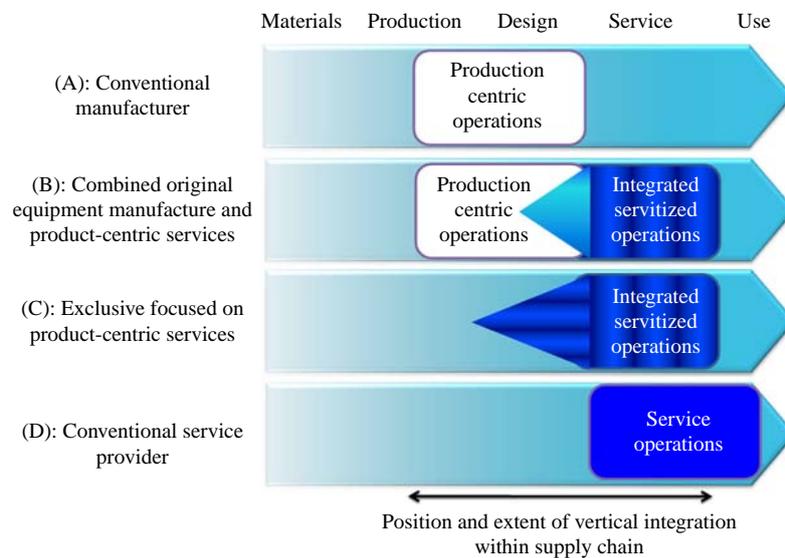
This chapter provides a theoretical introduction to the topics approached in this dissertation. We will begin by presenting relevant literature regarding servitization in manufacturing, laying the foundations for the rest of this work. We connect open innovation with servitization and introduce the concept of Product-Service Systems. The next subsection describes different perspectives on how companies transition from products to services. Subsequently, we provide an overview of how business models can best adjust to this phenomenon, along with the most prominent strategies. Finally, the effects of a servitization strategy on its key motivators and the challenges of a servitized business model are analysed.

### 2.1 Servitization of Manufacturing

The phenomenon of *servitization* was first described by Vandermerwe and Rada (1988) as a strategy used by corporations wherein value is added to their offerings through services. This customer-focused approach leads to new relationships with customers and competitive advantage through a value proposition that consists of a combination of “goods, services, support, self-service, and knowledge” (p. 314). Generally, the adoption of this strategy by manufacturing firms is driven by three key motivators: economics, customer demand and satisfaction, and competitive advantage (Oliva & Kallenberg, 2003; Lenka, Parida, Sjödin, & Wincent, 2018). For Vandermerwe and Rada (1988), this transition is driven by “deregulation, technology, globalization, and fierce competitive pressure” (p. 315). Regarding technological forces, the fourth industrial revolution, or Industry 4.0, cannot be overlooked. Companies are now in a “new industrial stage in which several emerging technologies”, such as the Internet of Things (IoT), cloud services, big data and analytics, “are converging to provide digital solutions” (Frank, Dalenogare, & Ayala, 2019, p. 15). Sony (2018) explains that “product and services are important components for the success of Industry 4.0” (p. 424) and note that manufacturers now develop products equipped with technology that collects data from the environment and their own status, guiding the production process autonomously. An end-to-end engineering integration goes beyond smart production and includes consumption by the customer, which is supported by the notion that digital technologies act as an enabler of servitization (Sony, 2018; Rymaszewska, Helo, & Gunasekaran, 2017; Frank, Mendes, et al., 2019).

Even though services have been sold by manufacturers for a long time, they are oftentimes considered a necessary evil and not an explicit part of the company’s

core strategy (Baines, Lightfoot, Benedettini, & Kay, 2009a). Servitization, however, provides the opportunity to move up the value chain and capture value from other activities. This is closely related to the concept of vertical integration, particularly regarding services that are closely coupled to the manufacturer's products, such as maintenance activities otherwise performed by other parties. This process can be seen as forwards integration of the manufacturer. The opposite, taking over activities of suppliers, is called backwards vertical integration (Baines et al., 2011). As illustrated in Figure 2.1, conventional manufacturers (see *A*) traditionally locate their value-adding activities within the production and design stages of the value chain. As they integrate their processes forwards, they move to a new configuration (see *B*) where manufacturing activities are combined with product-centric services. Service-centric companies, absorb design and production capabilities (see *C*) and, finally, conventional service providers focus solely on services (see *D*).



**Figure 2.1:** Vertical integration and servitization of manufacturers (Baines et al., 2011)

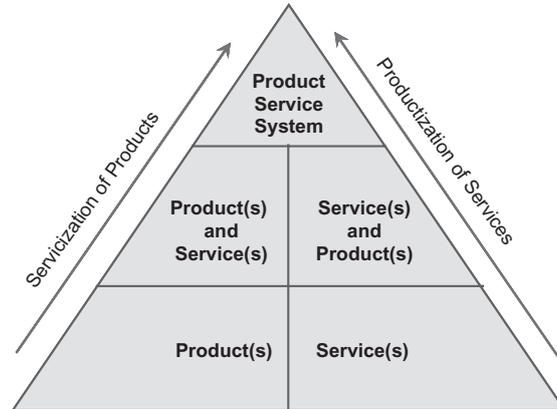
Chesbrough, Vanhaverbeke, and West (2006) define *open innovation* as “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation” (p. 1). Firms have used this paradigm in product development, combining internal and external ideas, reducing the cost of innovation and sharing its risks and rewards while reducing the time to market (Chesbrough, 2011b). Likewise, open innovation can be applied to services. Chesbrough (2011a) considers that companies should move from the traditional product-oriented value chain and adopt a new mindset focused on customer experience. Value is, in this case, co-created with the customer in an iterative process that results in a customer experience. Chesbrough (2011a) points out the particular nature of open service innovation, as services are intangible, subjective, hard to measure and customers often struggle to specify their needs. The author concludes by stating that companies that decide to follow this approach

should work closely with their customers, focus on utility and embed the company in the customer's organisation and processes. In turn, open service innovation can also lead to new ideas for products (Kastalli, Looy, & Neely, 2013).

### 2.1.1 Product-Service System

A *Product-Service System (PSS)* is a special case of servitization that combines products and services to fulfil the customer's needs, prioritising the sale of use over the sale of the product (Baines et al., 2007; Tukker & Tischner, 2006). Products and services are, thus, an integrated offer that delivers value in use, where performance or utilisation are valued over ownership. It is a broader dimension that involves the innovation of capabilities and processes to create mutual value through the transition from selling products to selling PSS (Baines et al., 2007; Neely, 2008). Parida, Sjödin, Wincent, and Kohtamäki (2014) explain that this strategy can lead to financial benefits and long-term competitive advantage. This results from higher profit margins and a steady flow of revenue due to long-term agreements.

Baines et al. (2007) argue that there is an evolution of the PSS concept, as portrayed in Figure 2.2. On the one side, the product identity evolves, initially focused on its material component, and moves to a position where the product becomes inseparable from the service system — the product becomes servitized. In an analogous way, there is a *productization* of services, including a product or a new service component that is marketed as a product.



**Figure 2.2:** The evolution of the concept of PSS (Baines et al., 2007)

A PSS solution must be designed at the systemic level and from the client's perspective, with early customer involvement (Lightfoot, Baines, & Smart, 2013; Sony, 2018) and internal organisational changes in the way it creates, delivers and captures value. This requires new processes, routines and capabilities (Parida et al., 2014).

### 2.1.2 Servitized business models

Business models are described by Magretta (2002) as being essential to any successful organisation. Despite the importance that the business model carries, there is a

lack of agreement in the field of research (Dasilva & Trkman, 2014) with multiple definitions being used in a variety of studies, such as: Osterwalder, Pigneur, and Tucci (2005); Johnson, Christensen, and Kagermann (2008); Teece (2010). The concepts have been described as “a rationale of how an organisation creates, delivers, and captures value” (Osterwalder, 2010, p. 14), “a story about how an organisation creates, delivers, and captures value” (Kaplan, 2012, p. 3), “a system of interconnected and interdependent activities that determines the way the company ‘does business’ with its customers, partners and vendors” (Amit & Zott, 2012, p. 42), and a “logic that connects technical potential with the realisation of economic value” (Chesbrough & Rosenbloom, 2002, p. 529). Also, it “articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers” (Teece, 2010, p. 173) and can be seen as “stories that explain how enterprises work”, that must pass “the narrative test and the numbers test” (Magretta, 2002, p. 87-90). Despite this lack of consensus, one can argue that there is some overarching agreement as to what a business model is meant to do: create a rationale and offer a structure for how a business is run in order to create and capture value for the organisation, as exemplified by Chesbrough and Rosenbloom (2002); Osterwalder (2010); Amit and Zott (2012).

Since manufacturers are acting in an increasingly competitive and global market, subject to shorter and shorter product innovation cycles and at risk of imitation and substitution, researchers highlight that companies have to find new ways to create, deliver and capture value. To that end, a growing number of product manufacturers is turning to services and service innovation to add on and combine with their products (Kastalli et al., 2013). These business models are based on the concept of Product-Service Systems (Tukker, 2004). However, it is not enough for companies to merely redesign their offering and value proposition, rather, they have to redesign their entire business model (Adrodegari & Saccani, 2017). This process of transitioning from a product-oriented business model to one that includes services has received little attention in research. Still, it is clear that the business model innovation process and its implementation are fraught with challenges. Understanding how they manifest themselves and can be managed in the business is of great importance (Adrodegari & Saccani, 2017).

The literature has suggested certain archetypes of servitized business models and PSS. Tukker (2004) describes three main categories consisting of eight overarching types of PSS, based on the relational level of product versus service content in the offering. The first category is product-oriented services, where the business is still geared towards product sales, but there is a hint of add-on services in the offering. The second category is use-oriented services, where the product is still the focal point of the business, but the manufacturer retains the ownership and control, and only the use of the product is made available to the customer. The final category is result-oriented services. In this category, there is no predetermined product specified in the agreement between the provider and the customer, rather, a result is agreed upon. This can be considered a pure service, even if there might be a product involved (Tukker, 2004). The categories, subtypes, and descriptions are summarised in Table 2.1.

**Table 2.1:** Main and subtypes of PSS business models — adapted from Tukker (2004)

<i>Product – oriented</i>	<i>Use – oriented</i>	<i>Result – oriented</i>
<b>Product related</b> The provider sells the product and provides services that are needed during its use, such as maintenance and a take-back agreement at the end of the life cycle.	<b>Product lease</b> The product is owned by the provider, who is also responsible for maintenance, repair and control. The lessee pays a regular fee to access and use the product.	<b>Activity management or outsourcing</b> One or several parts of a company’s activities are outsourced to a third party.
<b>Advice &amp; consultancy</b> The provider gives advice related to how the customer/consumer can use the product in the most efficient way.	<b>Product renting or sharing</b> Similar to product lease, but the renter does not have individual access to the product. Others can use it while the other customers do not.	<b>Pay-per-service unit</b> This model still has an often basic product in focus, but the customer is not paying for the product or the access to it, but rather the output; for example, a company charging per copy made by a copying-machine.
	<b>Product pooling</b> Similar to product renting or sharing, but allowing customers to simultaneously use the product. The provider retains control and is in charge of maintenance and repair.	<b>Functional result</b> The provider makes an agreement with the customer to deliver a certain result. Compared to activity management or outsourcing, the delivered result is more abstract.

As manufacturers move towards the service-end of the spectrum, the final need of the customer becomes increasingly more abstract and the focus on the product is lessened (Tukker, 2004).

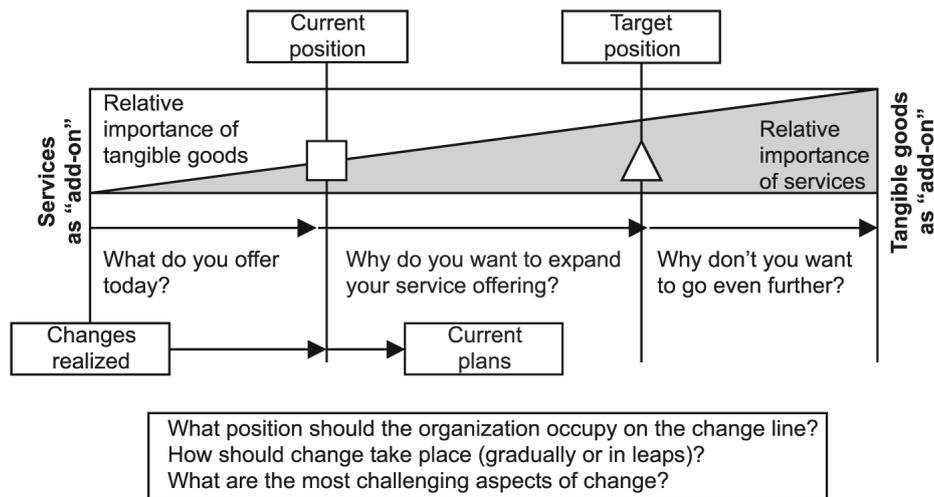
Huikkola and Kohtamäki (2018), rather than presenting business models as a service-content spectrum, outline four ideal types of servitized business models that can take different forms when implemented. The customer’s key needs are described in terms of the manufacturer’s capabilities and readiness to run the customer’s business process, as follows: (1) the product business model, (2) service-agreement business model, (3) process-oriented business model, and (4) performance-oriented business model. The first type is described as the manufacturer focusing on producing, selling, and delivering a product, adding on services such as maintenance, providing spare parts, and repairs. Thus, in this type of business model, the firm’s distribution channels and production facilities are vital resources to maintain. This model is similar to the product-oriented business model described by Tukker (2004). The second type of business model is based on offering product availability, supporting the use of the equipment, and reliability of the product’s function.

According to Huikkola and Kohtamäki (2018), this model provides a more stable income for the manufacturer as the need for services is often directly related to the use of the product. With this model, customer relationship management, field workers for services, and having an installed product base is crucial for success (Huikkola & Kohtamäki, 2018; Tukker, 2004). The third type describes a shift to more value-added operations for the manufacturer. Examples of services offered here are sales outsourcing, remote diagnostics and equipment upkeep and maintenance. This business model allows customers to shift from fixed costs to variable costs, while possibly improving their KPIs. However, as with the use-oriented PSS described by Tukker (2004), the customer is likely to have to relent some or all of the control of the product to the manufacturer (Huikkola & Kohtamäki, 2018; Tukker, 2004). Similar to the service-agreement business model, customer relationship management, in conjunction with a dedicated sales force, is key for this type of business model to become profitable. The final performance-oriented business model is akin to the result-oriented PSS presented by Tukker (2004), where the customer is paying for the output of the service, rather than the product itself. It can involve turnkey solutions, consulting services and data analytics. This business model encompasses all the resources and capabilities required by the three aforementioned types, due to its integrative nature (Huikkola & Kohtamäki, 2018).

Tukker (2004) and Huikkola and Kohtamäki (2018) conclude that there is no right business model for manufacturers that aim to engage in business model innovation to servitize their business. Huikkola and Kohtamäki (2018) argue that one desirable alternative could be to operate multiple or hybrid business models. Nonetheless, all alternatives have benefits and challenges must be considered and evaluated.

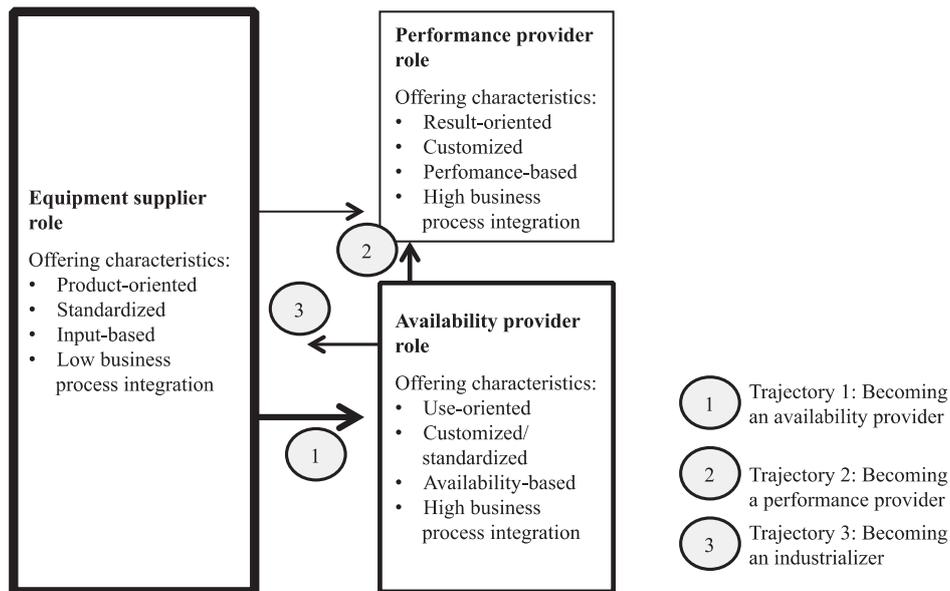
### **2.1.3 Transitioning from products to services**

The challenging task of moving from products to services requires an adjustment in capabilities, business model, and the way resources are managed (Oliva & Kallenberg, 2003). The transformation patterns have been analysed by Oliva and Kallenberg (2003), who describe servitization as a continuum, as depicted in Figure 2.3. Firms can be located anywhere in this spectrum, from not having any add-on services, to being service-centred and having products as the add-on. The transition is, hence, accepted as a continuous increase in the relative importance of services over time (Oliva & Kallenberg, 2003; Parida et al., 2014). The firms analysed by Oliva and Kallenberg (2003) that successfully servitized implemented the following steps: (1) consolidated product-related services, (2) entered the installed base service market, (3a) expanded the relationship-based services or (3b) expanded the process-centred services and (4) took over the end-user's operation.



**Figure 2.3:** Product-service continuum (Oliva & Kallenberg, 2003)

It must be noted that the notion of a continuous spectrum of servitization is not consensual. In fact, several authors challenge this idea, for example: Lenka et al. (2018); Kindström (2010); Kowalkowski, Windahl, Kindström, and Gebauer (2015); Kowalkowski et al. (2017). Lenka et al. (2018), in particular, found several examples organisational ambivalence, the co-existence of two opposing orientations. This ambivalence was observed at the strategic, tactical and operational levels. While this creates tension and conflicts, Lenka et al. (2018) also identified positive effects of this phenomenon, namely, resource optimisation (due to increased pressure and new synergies), reconfiguration of accountability (due to new operational frameworks, adjusted performance-measurements, and undertaking sense-making activities), and proactive decision making. Kindström (2010) considers a gradual transition from products to services an oversimplification and asserts that companies often occupy several positions along the continuum, simultaneously. Moreover, this transition does not always occur unidirectionally nor it is always successful, leading to deservitization and service dilution, also called a service compression strategy (Kowalkowski et al., 2017). Finally, as an alternative to the unidirectional path, Kowalkowski et al. (2015) define three service-led trajectories for manufacturers: “(1) becoming an availability provider, which is the focus of most transition literature; (2) becoming a performance provider, which resembles project-based sales and implies an even greater differentiation of what customers are offered; and, (3) becoming an ‘industrializer’, which is about standardizing previously customized solutions to promote repeatability and scalability” (p. 59). As illustrated in Figure 2.4, availability providers are use-oriented, offer customised and standardised solutions, are availability-based, and have high business process integration. Performance providers are result-oriented, offer customised solutions, are performance-based, and also have high business process integration. Finally, the “industrializer” is the traditional equipment supplier: product-oriented, standardised, input-based, and with low business process integration.



**Figure 2.4:** Roles and service-led trajectories. The thickness of the arrows and boxes are indicative of the prevalence of these roles and trajectories. (Kowalkowski et al., 2017)

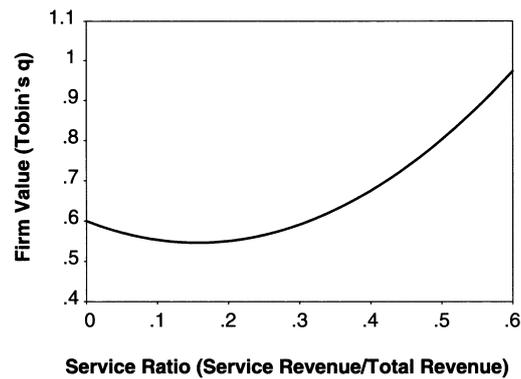
## 2.2 Effects of Servitization on Key Motivators

In this section, we will present existing literature regarding the effects of servitization on its key motivators: profitability, customer relationships and competitive advantage (Oliva & Kallenberg, 2003; Lenka et al., 2018).

### 2.2.1 Profitability

As previously mentioned, profitability is identified as one of the main reasons for introducing services in a manufacturer’s portfolio. Levente, Krisztina, Harry, and Yang (2017), for example, note that several papers support the idea that services can have a positive impact in profitability and, while “on average more intensive servitization yields higher service returns”, “service success is not always guaranteed” (p. 1017).

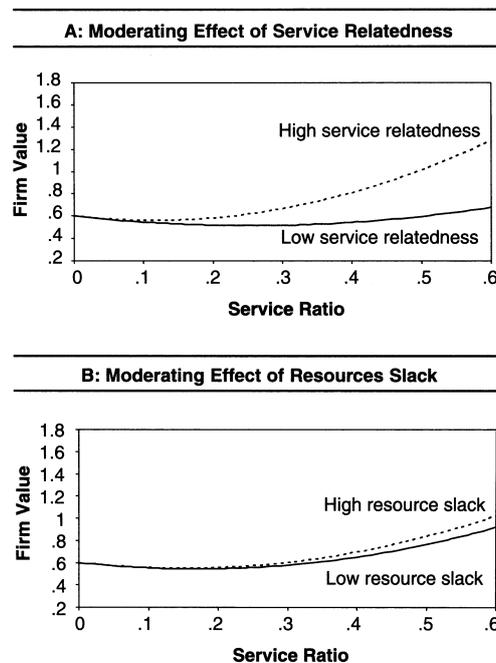
Fang et al. (2008) use the Tobin’s q ratio to determine firm value. Tobin’s q is closely connected to profitability (Hatem, 2017; Varaiya, Kerin, & Weeks, 1987) and “integrates multiple dimensions of performance (sales, profits, cash flow, earnings volatility)” (Fang et al., 2008, p. 1). The authors find that the impact on firm value of transitioning to services can be described by a U-shaped curve. A slightly negative impact is observed initially and the inflexion point is located at around 15%. Past that point, the two variables have a positive relationship. Service sales reach a critical mass in the 20-30% range, at which point service transition begins to positively impact firm value (Figure 2.5).



**Figure 2.5:** Firm value across different service ratios (Fang et al., 2008)

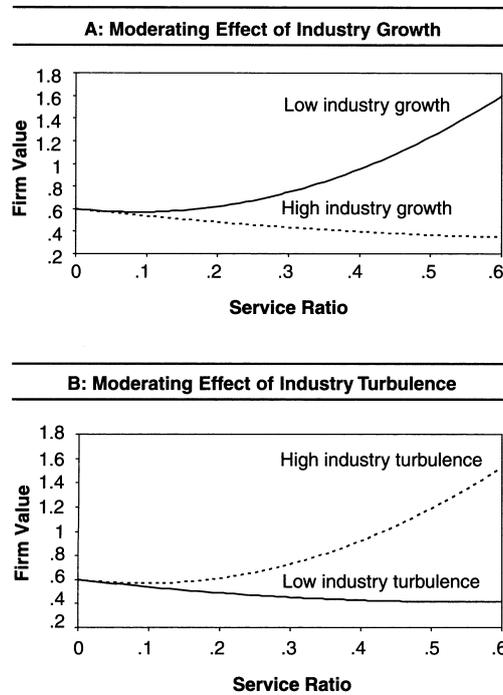
Similarly, Suarez, Cusumano, and Kahl (2013) also identify a U-curve in the financial performance of companies that increase their share of services. The authors observe that, in product-focused companies, services only improve operating margins once their relative importance grows past a certain point.

Moderating factors must be taken into account in this analysis. Levente et al. (2017) found “no direct relationship between economic context and service return” (p. 1027) and Fang et al. (2008) observed that neither firm market share nor industry competition are relevant moderators. Regarding company size, Neely (2008) argues that larger manufacturers tend to generate lower profits, as a percentage of sales. According to Fang et al. (2008), both service relatedness and the manufacturer’s resource slack, “the cushion of excess resources that a firm can use in a discretionary manner” (p. 5), positively moderate the relationship. High service relatedness, in particular, seems to have a significant effect (Figure 2.6).



**Figure 2.6:** Firm value across different service ratios moderated by service relatedness (A) and resource slack (B) (Fang et al., 2008)

Finally, Fang et al. (2008) found a significant and negative moderation of industry growth in the relationship between service ratio and firm value. The opposite happens in the case of industry turbulence, which positively moderates this function, as shown in Figure 2.7.



**Figure 2.7:** Firm value across different service ratios moderated by industry growth (A) and industry turbulence (B) (Fang et al., 2008)

## 2.2.2 Customer relationships

Servitization is a customer-centric strategy that involves a shift in customer interaction from transaction-based to relationship-based (Baines, Lightfoot, Benedettini, & Kay, 2009b). A stronger relationship can bring dividends in customer loyalty and make it easier to evaluate the company's performance over time (Kastalli et al., 2013; Fang et al., 2008). Visnjic Kastalli and Van Looy (2013) conclude that customer proximity, which comes as a consequence of increased service sales, leads to an increase in product sales. Some point to the existence of a constant feedback loop that helps continuously improve products and get more customer involvement. This leads to more knowledge about the products, improving feedback on them. However, whether firms can turn these gains into overall profitability of their business model is still unclear. Further, the authors add that manufacturers who choose to outsource their services can find it challenging to manage customer relationships, one of the company's most valuable assets. Vandermerwe (2000) agrees that relationships can be a part of a self-reinforcing loop that produces value, reduces costs and increases customer lock-on — the concept that customers freely choose loyalty, contrasting with customer lock-in, where the customer has no choice. There is, nevertheless, some risk associated with getting involved and solving the customer's problems, but doing so can be potentially rewarding in the longer term (Lightfoot et al., 2013).

### 2.2.3 Competitive advantage

The literature consistently acknowledges that long-term competitive advantage is an outcome of servitization (Parida et al., 2014; Bustinza, Bigdeli, Baines, & Elliot, 2015; Oliva & Kallenberg, 2003; Baines et al., 2009b; Chesbrough, 2011b). Some of the main explanations for this are the fact that services are less visible, more labour dependent and harder to imitate (Baines et al., 2009b; Oliva & Kallenberg, 2003). Lightfoot et al. (2013) further explain that another source of competitive advantage is the customer's understanding that value is not embedded in goods, but in use or functionality. Despite this theoretical consensus, there is still limited empirical evidence sustaining the linkage between servitization and competitive advantage. Nonetheless, research has, so far, been consistent with the literature (Vendrell-Herrero & Wilson, 2017).

## 2.3 Challenges of Servitization

As mentioned before, a fair share of challenges and obstacles is expected when a manufacturer decides to shift from a traditional product-oriented business model to a servitized one. Gebauer et al. (2005) note that a significant number of companies fail to achieve the expected returns from services, despite substantial investments, leading to a *service paradox*. The solid theoretical rationale behind servitization confronted with this empirical observation justifies that we take a closer look at the common hurdles hindering this strategy and how to overcome them. For Gebauer et al. (2005), manufacturing firms should take the following steps: (1) establish a market-oriented and clearly defined service development process, (2) focus service offers on the value proposition, (3) initiate relationship marketing, (4) define a clear service strategy, and (5) create a service culture. These adjustments are compatible with the framework developed by Zhang and Banerji (2017), which summarises some of the challenges identified by previous research. In the following subsections, these challenges and how they are interconnected will be further discussed.

### 2.3.1 Customer Management

With a servitized offering and expanded service innovation, there is an enhanced focus on the customers (Ibarra, Ganzarain, & Igartua, 2018). This increased customer-orientation calls for effective customer management. According to Zhang and Banerji (2017), this entails “building and maintaining a close relationship with customers through effective interactions and communications” (p. 221-222). This is associated with customer needs, ownership transfer, long-term relationship building, value co-creation, and information sharing (Zhang & Banerji, 2017).

#### 2.3.1.1 Matching customer needs

The concept of servitization is still relatively new to both manufacturers and clients, leading some researchers to point out that manufacturers should communicate the idea of a servitized offering to customers first, to ensure it matches their needs

(Zhang & Banerji, 2017). This has, however, been proven to be a lot harder than expected. One of the main reasons for this is that the customer is the one setting the boundaries for the value created and the manufacturer tries to match those needs (Vandermerwe & Rada, 1988). However, the value of a servitized offering is determined in use by the customer, not the manufacturer (Krueger, Chew, Ouetani, & Gitzel, 2015). So, a misalignment can occur between the value that the manufacturer wants to create and what is perceived by the customer. This is often due to a poor understanding of customer needs, right from the beginning (Zhang & Banerji, 2017). Also, the manufacturer has to adjust to possible evolutions of customer needs. Additionally, they have to consider the extent to which customers will be accepting of such services, since this means allowing the manufacturer to perform activities their customers could otherwise do in-house (Raddats, Burton, Zolkiewski, & Story, 2018).

Researchers have made some suggestions on how to match customer needs as accurately as possible, when developing their servitized offering. There is some consensus in the literature that customers should be involved early on in the process when developing the service offering to match their needs (Zhang & Banerji, 2017; Parida et al., 2014). Lightfoot et al. (2013) argue that the best method for manufacturers is to get involved in the customer's activity cycle and identify value gaps that they can fill. However, the more deeply involved the manufacturer becomes in the customer's processes and activity cycle, the higher the risk for the manufacturer, as a service-provider (Lightfoot et al., 2013). Part of that risk comes from managing the ownership transfer in a servitized business, which brings us to the next challenge.

### **2.3.1.2 Ownership transfer and control**

An inherent characteristic of servitization is the introduction of ownerless consumption, to a certain degree. Customers may not be willing to adopt this, since it implies a loss of control over the contracts with the manufacturer (Zhang & Banerji, 2017). This mindset is likely to result in challenges in customer relationship management, as not all customers may be enthusiastic about ownerless consumption and paying for the function or output, rather than a product that they would have control over (Lightfoot et al., 2013; Mont, 2002).

It is crucial to establish a social system where customer relationships are maintained, together with an environment where the servitization mindset is cultivated, to reap the benefits of moving to a service-based business model (Mont, 2000).

### **2.3.1.3 Long-term relationship building**

Servitization leads to an increasingly customer-driven business. Vandermerwe and Rada (1988) argue that it results in a shift in focus from the manufacturer aiming to simply satisfy the customer's needs to establishing and maintaining a long-term relationship with customers. This becomes imperative, as many contracts in servitized offerings stretch over a long period of time, unlike one-time transactions when purchasing a product. However, Zhang and Banerji (2017) defend that one

key success factor is the performance of the solution delivered by the manufacturer. Since this performance is heavily dependent on the operations team and human factors, there are multiple uncertainties that can negatively influence long-term relationship building. In contrast, Baines (2015) argues that servitized offerings promote intense customer relationships, but also emphasises the significance of managing these relationships. Kastalli et al. (2013) maintain that successful relationship management when delivering a servitized offering has the benefit of increasing customer loyalty for the manufacturer.

#### **2.3.1.4 Value co-creation**

In servitized businesses, a larger share of value is co-created with customers. That is the perspective of Zhang and Banerji (2017), who add that the integration in the customer's processes has to take place to a greater extent than in traditional product-based businesses. To achieve this, manufacturers have to engage in a major organisational transformation in the way they create, deliver, and capture value. This will require new processes and routines, with a special focus having to be given to value co-creation (Parida et al., 2014). Zhang and Banerji (2017) further point out that this type of deep integration can be very challenging to manage and that, if service personnel appear unprofessional, the manufacturer's reputation and credibility can be severely damaged.

#### **2.3.1.5 Information sharing**

As mentioned above, the value co-creation process in a servitized offering requires a greater level of integration in the customer's processes. Customer data is an important asset to maximise value co-creation, but gaining access to it can be an issue. Unsurprisingly, opening up the organisation to outsiders is something that customers may not be willing or permitted to do (Zhang & Banerji, 2017).

### **2.3.2 Business Model**

We have already discussed the importance of the business model and how it shapes the logic for the business in how it creates, delivers and captures value, but shifting from one business model to another presents important management and implementation challenges.

#### **2.3.2.1 Value proposition**

A central part of any business model is the value proposition, that is, what customer needs are being met by the company and what offering they are using. In a servitized business model, the value proposition changes from direct value delivery to value co-creation with the customers, where the value is in the use and function of the product, not in the ownership of the product itself (Zhang & Banerji, 2017; Lightfoot et al., 2013; Kindström, 2010). This can pose a challenge, since the mindset of the company might not be customer-oriented and, thus, fail to design a value proposition that aligns with the customer's needs (Zhang & Banerji, 2017). To

ensure this alignment, Vandermerwe (2000) and Lightfoot et al. (2013) suggest that the manufacturer should map the customer's activities and then work backwards to identify the value gaps in the customer experience.

### **2.3.2.2 Revenue mechanism**

To appropriate the value of a servitized business model manufacturers have to implement an adequate revenue mechanism. In product-based business models, it is common practice to base the price and revenue mechanism on costs. In servitized business models, however, the value is perceived by the customer and prices should no longer be based on the manufacturer's internal costs. Instead, value-based revenue models should be implemented (Kindström, 2010). This results in two challenges for the manufacturer. Firstly, value-based revenue models are inherently more complex than when prices can be based on costs and require new processes on the manufacturer's side (Bonnemeier, Burianek, & Reichwald, 2010). Secondly, it can be hard to reach an agreement with the customer on the value to be delivered. This process is challenging and time-consuming for both manufacturers and customers (Kindström, 2010; Zhang & Banerji, 2017). In addition, Mont (2002) argues that by transitioning from product to service orientation, the time-horizon for the manufacturer's revenue streams goes from short- to long-term. So, instead of being paid at the point of sale, as in traditional product-oriented business models, the manufacturer has a long-term amortisation. This change in revenue streams can be demanding, according to the author. Finally, it must be noted that in mature industries, buyers tend to be more price-sensitive as a result of having their own margins reduced and becoming better at purchasing (Porter, 1998).

## **2.3.3 Development process**

When designing a servitized offering, the manufacturer must consider the differences between a product and a service development process. This challenge consists of the integrated development process, performance measurements, and customer engagement, and encompasses all the processes, steps and routines to turn an idea into a deliverable offering (Zhang & Banerji, 2017).

### **2.3.3.1 Integrated development process**

Merging services and products required having an integrated product-service development process. Researchers argue that this is more complicated than it may seem, since the development process for a product is often vastly different and unsuitable for services (Kindström, 2010; Zhang & Banerji, 2017).

The requirements for developing services and products are very different. Services often require a higher amount of human capital and capabilities, while products require larger capital investments in the development process (Kindström, 2010). As a result, to successfully servitize, the manufacturer must build suitable development and innovation processes (Zhang & Banerji, 2017).

### **2.3.3.2 Performance measurements**

According to Maheepala, Warnakulasooriya, and Weerakoon Banda (2018), strategies that are measured are more likely to be successful. As a servitized offering is based on value creation, manufacturers must measure their success based on the value they deliver and meeting customer expectations. However, Zhang and Banerji (2017) point out that the key performance indicators (KPIs) existing in manufacturing companies are oriented towards manufactured goods and are rarely suitable for services.

With this in mind, Kastalli et al. (2013) call for a new, service-oriented, KPI system to be developed. The authors assert the importance of measuring service quality, customer satisfaction and loyalty, as well as evaluating the relationship between the customer and the manufacturer. However, Tukker (2004) warns that the service content and intangibility of the business model could be a barrier. The higher the service content, the more intangible and harder it is to measure the performance of the offering (Tukker, 2004).

### **2.3.3.3 Customer engagement**

Early customer inclusion in the development process is a key success factor in servitization. This has several benefits for manufacturers and customers. First, it ensures that there is a match between the offering and the customer's needs. Second, it aligns incentives between the parties, because the manufacturer can test and get feedback early on in the process, rather than by consumption. Finally, it creates a dialogue and relationship that allow for greater influence over customer decisions and maintain customer loyalty (Vandermerwe & Rada, 1988; Zhang & Banerji, 2017; Parida et al., 2014). Despite the benefits mentioned in the literature, customer involvement is not always accomplished (Zhang & Banerji, 2017).

## **2.3.4 Organisational Structure**

When introducing services, the manufacturer's organisational structure needs to accommodate both the existing and the new business and to adapt as they evolve over time (Burgelman & Doz, 2001). Therefore, this challenge refers to the manufacturer allocating resources, adjusting tools and routines, and supporting the implementation of servitization in the company (Zhang & Banerji, 2017). Organisational structure consists of culture change, communication, and inter-department collaboration.

### **2.3.4.1 Culture change**

When transitioning from a product-focused business model, the organisational culture has to change, as well. Servitizing requires going from a product-centric mindset to a customer- and service-centric one (Zhang & Banerji, 2017). This constitutes a problem for many manufacturing and product-oriented businesses and disturbs the organisation's existing culture (Zhang & Banerji, 2017; Lightfoot et al., 2013). Palo, Åkesson, and Löfberg (2019) and Oliva and Kallenberg (2003) argue

that it is hard to motivate an organisation that is still focused on selling products in also repairing them. An even bigger obstacle is to get the sales organisation to embrace and sell services that may have previously been done free of charge. Oliva and Kallenberg (2003) therefore argue for separating the product and the service-centred businesses, as this protects the emergence of a service culture.

However, it is not just the manufacturer's mindset that is going to have to change, but also the customer's, as they may now be asked to pay for services that they previously performed in-house (Palo et al., 2019). So, the manufacturer has to shift and change their internal culture, and also cultivate customer relationships to promote a mindset change (Oliva & Kallenberg, 2003; Palo et al., 2019).

#### **2.3.4.2 Communication**

Considering that, in a servitized business model, value is delivered through products, services and also service personnel, it is necessary to have effective internal and external communication with customers about the development of the service offerings (Zhang & Banerji, 2017). Effective communication has a noticeable impact on many other challenges. In fact, manufacturers that are successful in servitizing their business model recognise the need for close relationships with their customers and, therefore, develop routines and communications to build and maintain existing and new relationships with customers (Lightfoot et al., 2013). To effectively communicate and discuss monetary value with customers is also a key for success, given the intangible nature of services. This is a capability that sales forces rarely possess at the beginning of servitization (Huikkola & Kohtamäki, 2018).

#### **2.3.4.3 Inter-department collaboration**

The more complex the service delivery is, the more important inter-organisational collaboration becomes to create synergies and support the development of the product-service bundles. If product and service departments were previously separate, then the subsequent collaboration between departments becomes harder to foster, as services become more integrated in the manufacturer's business (Zhang & Banerji, 2017). In contrast, many authors suggest that arranging a separate unit for the servitized business or, at least, for managing services is a success factor (Kindström, 2010; Lightfoot et al., 2013; Oliva & Kallenberg, 2003). Kindström (2010) warns that separating products and services may also create obstacles accessing capabilities found in other departments. Therefore, promoting intra-firm collaboration and integrating competencies from different organisational units should be a priority.

# 3

## Methods

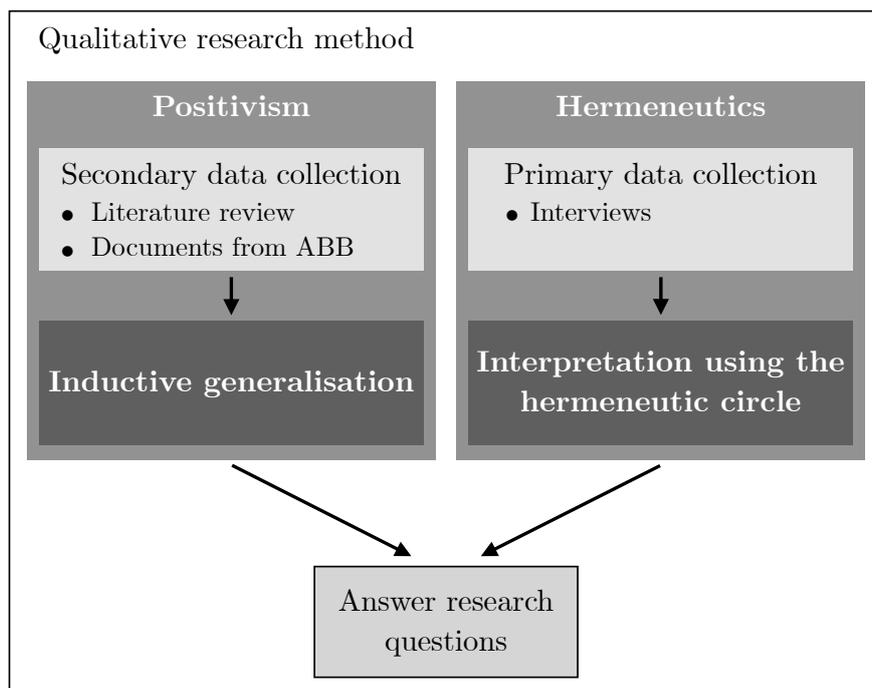
### 3.1 Research Strategy

This project was carried out using a qualitative research method. Bryman and Bell (2011) explain that this strategy “usually emphasizes words rather than quantification in the collection and analysis of data” and it “embodies a view of social reality as a constantly shifting emergent property of individuals’ creation” (p. 27). Notwithstanding the qualitative nature of the data collection and analysis, this study is grounded on two meta-theories: positivism and hermeneutics. As such, our proposed solution takes into account the multi-faced essence and complexity of our problem. We, henceforth, explain how these two perspectives on the nature of reality are combined in our research. We begin by using the positivist tradition to analyse the phenomenon of servitization in the context of business model innovation. Therefore, our conclusions should be empirically grounded for subsequent generalisations to be made. Our approach is, thus, methodologically inductive, that is, a number of single cases is used to establish a general truth — a step that involves a risky leap (Alvesson & Sköldbberg, 2009). This approach was considered the most appropriate to be able to, firstly, understand how other companies have adjusted their strategies to similar drivers and challenges as those that ABB Kabeldon is currently subjected to and, then, be able to develop and use other theories to explain and prescribe a response to the challenges. In this perspective, we accept, as a premise, that a business model is something that can be perceived, observed and generalised.

Some authors argue that a business model, rather than something concrete and observable, is a mental model. For example, Chesbrough and Rosenbloom (2002), consider that a “successful business model creates a heuristic logic that connects technical potential with the realization of economic value” (p. 529). This heuristic may be in the minds of employees and business executives. Moreover, the context must also be taken into account, namely when carrying out and analysing our semi-structured interviews. Regarding the second research question, a successful implementation of servitization is not only dependent on its theoretical justification, but also on good change management practices, hence a context-sensitive approach is needed to gauge the relations between actors and how they should adapt to a new reality. So, for a more comprehensive understanding of this phenomenon, in a subsequent step, we take another look at this problem using the meta-theory of hermeneutics. Qualitative research is also consistent with the hermeneutical and interpretivist school of thought, concerning “the empathic understanding of human action” (Bryman & Bell, 2011, p. 16). The hermeneutic perspective can be

defined as the “theory of interpretation”, through which researchers will understand the author “better than he understood himself” (Dilthey & Wheeler, 2003, p. 80). Building on this idea, Paul Ricoeur highlights the importance of explanation, as a secondary phenomenon that complements understanding (Ricoeur, 1990). In this case, the methodology is the hermeneutic circle, the idea that there is an inherent circularity of all understanding, a constant relationship between the part and the whole (Norris, 2005). On that account, this research project requires the realisation that the meaning of the interviews has to be contextualised as a part of a whole that includes the companies, industry, country and intrinsic characteristics of the interviewees. Furthermore, “comprehension can only come about through a tacit foreknowledge that alerts us to salient features of the text which would otherwise escape notice” (Norris, 2005, para. 1).

To summarise, as illustrated in Figure 3.1, the qualitative method supports our entire research. Our strategy then consists of using the combination of two different meta-theories, positivism for our secondary data and hermeneutics for primary data. After that, inductive generalisation and interpretation take place, respectively. Finally, the combination of our reasoning and understanding is used to formally answer the research questions.



**Figure 3.1:** Diagram of the research strategy

## 3.2 Research Design

Considering the chosen research strategy, as described in the previous section, we can now delineate the research design framework for this project. The chosen design must be compatible with our research method, with this in mind, we used the case study design with a management level of observation. Bryman and Bell

(2011) explain that a case study design encompasses the detailed analysis of a single case and is concerned with the particular nature of that case. Along with being widely used in business research, the authors point out that it can concern a single organisation. Being exploratory in nature, this design allows for an intensive examination of the setting — resulting in greater depth of analysis, rather than breadth. Bryman and Bell (2011) add that case studies are often associated with qualitative research and that this design often favours qualitative methods, such as participant observation and interviewing. Considering the focus on depth in this project, we may define it as an intrinsic case (Bryman & Bell, 2011), which sustains additional learning about the subject-matter and generates insights that take into account the particularities of ABB’s situation.

### **3.3 Data Gathering**

#### **3.3.1 Secondary data collection**

A literature review was carried out as a first step in the data gathering process. This way, we were able to build upon our knowledge about the company and industry. Using the research design above-described, we aimed to have what Bryman and Bell (2011) call an alternative approach, where the aim is “to produce rich, holistic, and particularized explanations that are located in situational context through using multiple methods of data collection to uncover conflicting meanings and interpretations” (p. 61). For this reason, this project includes a variety of secondary data sources. Electronic databases were used to find relevant articles, books and dissertations, using a variety of keywords relating to servitization, manufacturing, and servitized business models. The electronic databases used in this research were Supersearch (Supersök, by the University of Gothenburg), Google Scholar, and Macquarie Library. Two important criteria for the selected articles were that the articles had to be peer-reviewed and with a significant number of citations. Articles were also screened for further references that were considered relevant for our research, thereby creating a snowball-effect when selecting relevant articles. Furthermore, various documents were gathered from ABB’s website and used to understand the company and the products.

#### **3.3.2 Primary data collection**

Primary data was collected from interviews with key members from ABB, important customers in the utility sector, and a government agency. Apart from this agency, which was contacted via email, the interviews were semi-structured, using an interview guide to ensure cross-case comparability (Bryman & Bell, 2011). The questions followed the topics found during the secondary data collection, allowing the researchers to stay within the intended research scope. Furthermore, most questions were open-ended and reflexive, with the intention of generating dialogue, while others were lineal and had an investigative purpose (Tomm, 1988). The guides and email correspondence are shown on Appendix C. Semi-structured interviews allow for a great deal of leeway in responses and the overall interaction (Bryman

& Bell, 2011), and favoured the identification of new factors, possibly not present in the literature, as well as the interpretation of the responses. Going off-topic, at times, allowed the researchers to unveil new insights and enrich the interviews, as is described by Bryman and Bell (2011). Nevertheless, all prepared questions were always asked to the interviewees. One respondent, in particular, was interviewed twice on different occasions, which is another possible feature of qualitative research (Bryman & Bell, 2011). With the intention of having a single interview style and higher cross-interview comparability (Bryman & Bell, 2011), both researchers were present in all interviews and designed the guides together.

**Table 3.1:** Overview of the interviews

<i>Name</i>	<i>Date</i>	<i>Company</i>	<i>Position</i>	<i>Location</i>	<i>Length (min)</i>
ABB1	7th January	ABB	Global Product Manager	Skype	36
ABB2	6th March	ABB	Sales Manager Sweden	ABB Kabeldon	66
ABB3	10th March	ABB	Finance Business Partner	Skype	46
ABB4	10th March	ABB	Global Product Manager	Skype	57
C-A	2nd April	Company A	Planning Engineer	Skype	45
C-B	7th April	Company B	Cable and Net Grid Specialist	Skype	36
C-C	21st April	Company C	Head of Strategy & Business Development	Skype	34
GA	21st April	Government Agency	Analyst	Email	–

### 3.3.2.1 Selection of interviewees

For the primary data collection, it was important to contact respondents that could provide relevant insights for our research. Based on the literature review and preliminary field research, we decided to interview employees from different departments at ABB Kabeldon and utility companies. Regarding ABB, the sampling method was opportunistic, meaning that the interviews were performed with the people that we were given access to, as described by Bryman and Bell (2011). The interviewees were from different departments and competences, allowing us to get diverse perspectives on the potential impact of servitization in the organisation. As for the respondents on the customer end, a snowball sampling method was applied, meaning that all respondents were asked to suggest other interviewees (Bryman & Bell, 2011). This was done both for ABB and their customers. We were provided with a list of clients from two respondents from ABB. These clients were then contacted by email, with a description of our research, as well as a request for an interview. Due to the then developing COVID-19 epidemic,

only Skype, telephone, or other methods of remote interviewing were suggested, to uphold the social distancing recommendations. Due to the unresponsiveness of some customers, the final number of respondents outside of ABB ended at three. Some differences between these customers are worth noting: Company A and Company B are utility companies and Company C is a manufacturer of power transmission solutions, such as secondary substations, for which they purchase components from ABB. Company C has recently started servitizing, offering installations and maintenance services for their secondary substations, which allowed for a discussion on the potential motivators and challenges with servitization. In an attempt to get more relevant data, a questionnaire version of the interview guide was created and sent to those who did not respond to the initial request, as well as a few more customers indicated by our contact person at ABB Kabeldon. However, no responses were registered. Finally, a government agency was contacted through purposive sampling, meaning that the agency was directly selected and not based on probability sampling or chosen at random (Bryman & Bell, 2011). In order to get a timely response, the questions were asked directly via email.

### 3.4 Data Analysis

Grounded theory was used in the data collection and data analysis process. This qualitative methodology is frequently used in the field of business and management as a coding technique for its potential in the development of new concepts and theory generation (Myers, 2020). Strauss and Corbin (2008) denote grounded theory as “theoretical constructs derived from qualitative analysis of data” (p. 2). This approach to research has been categorised by some scholars as a positivist methodology and others as a hermeneutic methodology (Åge, 2011). In this study, grounded theory is seen as a pragmatic way to bridge the gap between the two schools of thought used in this research. In this methodology, data collection and analysis are two processes occurring at the same time, iteratively, meaning that the researcher is analysing the data while gathering it (Bryman & Bell, 2011). This is a process in which “constant comparisons” are made between the findings and theory (Glaser, 1999, p. 838). The first iteration consisted of developing the interview guide, using predetermined codes that were identified based on the literature review and preliminary field research. Subsequently, both primary and secondary data were axial coded using Atlas.ti. A thematic analysis of the empirical data in tandem with the literature resulted in the emergence of new codes. The final code tree is presented in Appendix B. As explained by Gioia, Corley, and Hamilton (2013) grounded theory allows for more than building a data structure. It also provides the opportunity to construct a model that describes the dynamic interrelationships between concepts, codes, and theory, which is materialised in the analysis presented in the fifth chapter.

## 3.5 Quality of the Study

### 3.5.1 Validity

Validity refers to the level of accuracy of the measurements and conclusions that the researchers make based on the collected data, as explained by Bryman and Bell (2011). The authors state that “the goal of case study analysis should ... be to concentrate on the uniqueness of the case and to develop a deep understanding of its complexity” (p. 61). The issue of external validity, or the generalisability of the results, is prominent since a case study research design is used. However, the aim of this research is not to generalise the conclusions as a truth for all manufacturers that seek servitization, but rather to understand the factors that influence a given manufacturer’s servitization potential and how they can be managed. We argue that being given different perspectives from manufacturers, customers and a government agency allowed for a deeper and context-sensitive analysis. This, together with the identification of new factors, could facilitate the description of a part of the Swedish industry.

Internal validity refers to how well the empirical data matches the conclusions that the researchers draw (Bryman & Bell, 2011). For this research, internal validity was increased by sending the quotes and arguments used in the empirical findings back to the respective interviewees for corroboration. This allowed them to validate or discard our interpretations and provide clarifications where needed. This way, the risk of misinterpretation and faulty conclusions was reduced, filtering the most significant material and triggering a deeper understanding of the phenomena. This practice can be seen as a part of a fundamental effort within the research integrity dimension, which should be at the core of the research enterprise (Policy, 2002). Furthermore, in qualitative research there is always the risk for biases, both from the researchers and the interviewees, as the participants can have different interpretations of the same problem, constructs, or situation (Bryman & Bell, 2011). While it is difficult to account for and determine which biases are present, attempts were continuously made to limit whichever became apparent. Nonetheless, it can be important for the reader to note the effects that personal biases may have on the findings.

### 3.5.2 Reliability

In the context of qualitative research, Bryman and Bell (2011) explain that reliability can be defined as the replicability of the results, as described by LeCompte and Goetz (1982). In other words, it is an evaluation of whether the same results and conclusions would be reached if a similar study was conducted (Bryman & Bell, 2011). Reliability can be divided as external and internal. External reliability concerns the degree to which a study can be replicated. In qualitative research, this is proven to be difficult, because the context and setting can change over time (Bryman & Bell, 2011). In this study, the social setting within the company, customers, regulations, and other variables can change, impacting replicability. Furthermore, the study concerns only one case, which may reduce replicability outside this context,

even if the same methodology is applied. Bryman and Bell (2011) state that internal reliability concerns whether data is interpreted the same way by all researchers participating in the study and analysis. In order to improve the internal reliability of this study, both researchers participated in the interviews and kept continuous discussions during the coding and analysis process. Hence, any discrepancies in the interpretation of data were brought to light and resolved.

# 4

## Empirical Findings

In this chapter, we will present the empirical results from our field research, specifically the interviews with key members from ABB Kabeldon, representatives from utility companies, a representative from a supplier of power transmission solutions, and one governmental agency. A summarised description of the interviewees can be found in Table 3.1.

Considering the problem definition and the result of the literature review and initial primary data collection, we developed a framework that divided our research in two overarching topics: key motivators for servitization and challenges, each with their respective components, as described in the previous chapter. These components were defined as first and second-order codes for the qualitative systematic analysis. This analysis further enabled the identification of three supplementary codes: regulations, market readiness, and value chain, all challenges of servitization in this case. The complete code tree can be found in Appendix B. The findings presented below follow the same structure as the codes and include the most relevant views from the interviewees on each topic.

### 4.1 Key motivators

This section presents the relevant empirical data regarding the key motivators of servitization: profitability, customer relationships, and competitive advantage.

#### 4.1.1 Profitability

The empirical findings on this first motivator were assessed according to the following variables: service ratio, service relatedness, resource slack, industry growth, and industry turbulence.

##### 4.1.1.1 Service ratio

Service ratio was identified in the literature review as one of the components that influence profitability, one of the key motivators for servitization. A Finance Business Partner from ABB (ABB3) admits that when using a servitized business model they “would have a very steady stream of income for these products for their lifespan”, adding that, currently, they “don’t have any service revenues or any other kinds of contracts”, only product sales.

#### 4.1.1.2 Service relatedness

In terms of service relatedness, which has a moderating effect on profitability, the interviewed Sales Manager (ABB2) specifies that customers would pay to be able to determine the age and state of a fuse. Additionally, C-B mentions that their biggest challenge is to educate their employees on the technical aspects of the CDCs and recommends ABB start an education program for employees of Company A and other clients.

#### 4.1.1.3 Resource slack

Regarding ABB's resource slack, another factor with a moderating effect on profitability, a Global Product Manager (ABB4) says that ABB has limited resources, but has the necessary competence within the company in all fields. Also, there is money to be invested in promising projects. Later reiterating that "if the project is promising, there's money behind that can be invested".

#### 4.1.1.4 Industry growth

When talking about the cable distribution industry, ABB1 mentions that it has been growing, especially in the past five years. A Cable and Net Grid Specialist from Company B (C-B) shares the same opinion about the industry, elaborating on the causes for such growth. According to this specialist, in Sweden, Company B has "a big problem", because many cabinets are very old, so they are no longer allowed by the government to charge their customers. Therefore, the company has "decided to change 65 000 in the upcoming year, for the future" and more "in the next four to six years. If we get people and we get someone who can do it". Finally, C-B concludes: "other companies have the same problem. So, in the future, there are a lot of cabinets that you have to sell in Sweden".

#### 4.1.1.5 Industry turbulence

Concerning industry turbulence, a Planning Engineer from Company A (C-A) starts by emphasising the lack of turbulence, implying the existence of industry stability. The reason for this is that it is still affordable to connect to the grid in the city, compared to the suburbs or the countryside. Therefore, "industries will never go off-grid in such a way. The cost for them would be too high, in receiving the same safety in electricity or energy delivery, that they will probably never switch to off-grid solutions". While demand from the final consumer is expected to remain stable, C-A mentions that some turbulence could occur as a result of the way they charge customers: "we are more looking at the ways we are charging the customers. Moving from an energy-based charging structure to more of an annual cost, but we are ... at the start of the process with electric cars and PVs. We are sort of on the fences of where this is going". Nevertheless, the risk of changing the charging structure is expected to be manageable. In the long-term, according to C-A, another driver of demand volatility is a reduction in the prices of solar panels, which could enable the possibility of not using the electric grid. However, at present, this is not an option, due to the high costs, compared to connecting to the grid. The interviewee adds

that in 20 years this situation might change and houses that are built away from the city may not have to be connected to the grid. C-A concludes that this is an issue and it might be possible to get a cheaper connection to the grid by providing battery storage, “that is, the energy consumption is not via the grid, but the grid helps ... with the energy when it’s not sunny and ... [the] car doesn’t charge. That is a long-term risk for our business”. Still, C-A believes that these potential fluctuations in demand would not significantly threaten Company A’s liquidity, as a result of their monopolist position and the fact that “everyone needs electricity, so, usually, money is not that big of an issue”.

On ABB’s side, there is a clear concern regarding their forecasting capacity and, hence, measuring the actual industry turbulence. Their low inventory and the difficulty estimating demand in the long-run are pointed out as adversities by ABB3.

*One challenge that we do have is that ... the order stock is very short. The forecast that we have, from the sales perspective, is very much based on ‘we think that next year is going to be more or less like this year, maybe a little be up’. So, it’s very difficult. We do get indications sometimes that now we need to replace these many cabinets over many, many years ... If a real downturn came, we would have a hard time seeing it beforehand. That is a big challenge, the actual market forecast. – ABB3*

ABB3 describes the current revenue volatility as normal and following the usual historical seasonality.

#### 4.1.2 Customer relationships

Improving customer relationships is another motivation for companies that embrace servitization. ABB1 emphasises the company’s good relationship with wholesalers, which they intend on maintaining. ABB4 asserts that customers know about the “products and know how to use them, which is a great advantage”, adding that they “have close bonds with the customers”. ABB3 was optimistic about the potential of servitization improving and simplifying customer relationships if a separate department or entity were to focus entirely on this aspect.

*It could also be a potential improvement from the customer’s perspective, that is, making things easier for them. They sign a contract that, ‘we’re not buying a product, but we are buying a fuse function in the net’ and if that is not working they have one key account or one representative from ABB that they are contacting. That could be the direction, as well. – ABB3*

Likewise, ABB4 believes that services could improve customer relationships, pointing out the opportunities for collaboration.

*I think it would be just positive, because then we get the opportunity to have a closer collaboration and take the customer closer to us, and*

*make sure they're using the products we want them to use. – ABB4*

Company C provides some services, thus already having a first-hand experience in this matter. C-C, the company's Head of Strategy & Business Development, explained that a subsidiary company is responsible for some of the services. This had a very positive impact on their relationship with customers.

### 4.1.3 Competitive advantage

The last key motivator in our framework is competitive advantage. Firstly, the factors that currently assure ABB's competitive advantage are determined, followed by the potential advantages that a servitized strategy could bring.

Interviewees identified numerous factors that contribute to ABB's competitive advantage. ABB1 explains that ABB is the only provider in the market making all of these components together, as one system, being able to sell directly to a wholesaler and provide all the components. The same interviewee says that competitors, on the other hand, purchase from different companies and assemble it to be a system and do not develop the basic product themselves.

*We have the technical knowledge, the R&D work and capacity, so we develop the components ourselves. – ABB1*

ABB1 strongly emphasises the high quality and safety of the product, but recognises that “competitors are becoming safer, as well”, adding that safety is a requirement and that competitors are now almost as safe as ABB. Still, safety has been a big differentiator for the company. Furthermore, ABB is well-established and has been in this business since the 30s, with its R&D knowledge in-house. This factor is also pointed out by one of ABB's customers, C-B: “they [ABB] are used in our grid, maybe mostly because of tradition. There were no other options in the past ... but that has been changing now and we are looking at other products”. ABB4 adds that the competitors are usually smaller manufacturers that do not have the capacity that ABB has when it comes to delivering large volumes in a short amount of time. ABB2 also stresses the importance of quality and capabilities as a source of competitive advantage: “our products have better quality. Also, there are no competitors with the complete system”. ABB3 also assures that their products are of high quality, which is supported by their track record. There are only a few cases of failing systems or quality issues in the field.

In terms of how some form of a servitized business model could contribute to ABB's competitive advantage, ABB2 says that “from ABB's point-of-view, ... [it] would be an advantage if we could get the customer to want to lease or hire products”, but warns that customers “are not willing to pay any extra”. For ABB3, the advantages of this kind of business model are, as follows:

*[It is] a way to tie yourself closer to the end-customer to have more of an integrated partnership with them through leasing agreements, et cetera. Then you might have a beneficial position considering competitors*

*coming into the market, taking market share, because then you have a completely different situation with the customers already. That could be a potential benefit to customers. – ABB3.*

## 4.2 Challenges

The empirical findings regarding the main identified challenges of servitization are presented in this section.

### 4.2.1 Customer management

Due to the increased customer-orientation that servitization entails, challenges can arise concerning customer management, ownership transfer and control, long-term relationship building, value co-creation, and information sharing.

#### 4.2.1.1 Matching customer needs

Historically, ABB has been at the forefront of matching customer needs, especially with the products that have been developed together with the customers, matching their requirements, according to both ABB2 and ABB4.

*The products that we have today have, for many years, been developed together with the customer. There is the standard that you have to fulfil and we have our products, that we have developed and added some things. – ABB2*

However, according to ABB1 and ABB4, customer habits are evolving. ABB1 explains that customers are getting more aware of costs and try to push prices down. ABB4 highlights the market pressures experienced by the customers and believes that ABB could play a role in lessening some of them.

*What our customers are facing is that they want to renew the grid, but they don't get enough money to do it. So, if we can, maybe lower the investments for them. That would be the aim, to improve their KPIs. – ABB4*

ABB2 claims that it is unclear whether servitizing can create value that is easily identifiable by their customers, both with service add-ons and advanced solutions, such as leasing or pay-per-use.

*We have asked the utilities if they need anything more, if we are looking at our products. They don't know. Actually, they don't need any more measuring or anything else from the cabinet ... They don't see the benefits in having a lot of systems in the cabinets today, because it's quite easy for them to find out that something is wrong. – ABB2*

However, C-A seems to contradict this perspective, which can be illustrated by the following example:

*If ABB offers a sort of service where we can see that ‘cabinets 3, 5 and 7 are very hot’, this is not something we do and ... could be useful. So, if ABB had an infrastructure around that, that could be something we might be interested in, because it would be a large project to build up ourselves. – C-A.*

Furthermore, C-A argues that purchasing a servitized offering transcends having their needs met. There is, according to the interviewee, a fine balance between getting the necessary functions, such as monitorization, and being willing to pay for them.

C-C argues for a considerable level of immersion in the customer’s business. This not only allows for a better understanding of the challenges that customers face, but also how their needs evolve. The intention is to make the manufacturer’s business more agile, claims C-C. With the goal of providing tailor-made solutions, C-C gathers small teams with a wide range of competences over a large development department.

#### **4.2.1.2 Ownership transfer and control**

The respondents provided conflicting perspectives regarding ownership transfer and control in the context of servitization. ABB2 claims that maintaining the ownership and control of the cabinets could be positive, even if it meant absorbing maintenance and upkeep as new responsibilities for ABB, due to the high quality of their products.

*Our products have better quality than our competitors’. That could be an advantage for us. If we could increase the guarantee length and could also supply the maintenance for a certain amount of money, I think it would be safer for the customer to buy ABB in that case. – ABB2*

ABB4 shares this mindset, as exemplified by the following statement:

*I don’t see a big problem ... We own them and if they need to be replaced then we do it, so, provide the service. – ABB4.*

In contrast, C-A, a customer of ABB, insists that transferring ownership and losing control over the asset would be infeasible to utility companies. This is mainly due to the way utility companies get paid and their responsibility to provide energy without interruptions. This means that they require full access to all components in the grid and ownership is fundamental in that process, explains C-A.

According to ABB3, the general trend amongst ABB’s customers is a growing reluctance to lock up money and investments into assets, choosing instead to increase operational costs. By shifting product ownership to ABB, as would happen in a leasing type of service model, the customer could benefit from the function of the

asset without locking up the money. However, the issue of risk is brought up by the respondent: “We shift a big part of the risk towards ABB instead, which means that we would have to have these inventories in our books for a very, very long time”. C-C also brings up the risks for the manufacturer when retaining asset ownership and servitizing, by selling the function or output to the utility companies. When asked whether utility companies could see a benefit in not having control over the assets, the respondent advanced:

*Of course, if you can transfer the risk to us. In that case, we can be part of the compensation for the end customer [energy consumers], in the case of interruption or failure, and compensation for third parties. In that case, I can see it benefiting the utilities. But, of course, in that case, it's extremely high risk from our point-of-view, if we take full control or ownership of the product. – C-C.*

The source of the risk is the fact that the CDCs, the product at the centre of the offering, are a part of the critical infrastructure in Sweden. In the event of interruption or failure in the delivery of electricity, the manufacturer would be responsible for third party compensation, which could be substantial, claims C-C.

#### **4.2.1.3 Long-term relationship building**

According to ABB4, their brand and high quality product would work in their favour, should they choose to servitize: “We are well-known and have a good reputation on the market. So, they know about our products and know how to use them, which is a great advantage”. The respondent also believes that servitizing, and thereby getting closer customer relationships, can help tie the customers to ABB. This can allow them to control which products are being used and increase customer loyalty.

Continuing along this line, the historical significance of ABB is underlined. ABB4, C-A, and C-B argue that the history and the already existing relationships between the actors could be the reason why ABB, or another manufacturer in this industry, could successfully servitize. The two former respondents indicate that there is a certain level of trust in the manufacturer’s expertise and knowledge. Without this, ABB would not be able to get the customers to try their service offerings. Respondent C-A explains that their trust in ABB’s abilities to explore future possibilities is well established, concluding that smaller competitors of ABB would not be trusted with this endeavour.

When asked what could improve the long-term relationship building and increase customer loyalty, C-C reminds us that customer focus is key. This consists mostly of availability, being there for the customer when needed and when there are issues with the solution. This both has the benefit of increasing customer loyalty and finding new solutions that can create value for the manufacturer and customer.

#### **4.2.1.4 Value co-creation**

On the subject of value co-creation and having greater customer integration in the processes, ABB4 claims that more customer involvement, especially in the

development process, would not be a significant challenge, since they already have extensive experience in doing that. However, going in the other direction and being more involved in the customer's processes can be challenging, because they have to realign their priorities and the way they work.

*I think it's a bigger challenge for us to be more involved with the customer rather than the customer being involved with us, because we're trying to involve our customers a lot, today. – ABB4*

ABB4 continues that a successful integration can help ABB to better understand how their products are being applied and how to improve them. As previously mentioned by the same respondent, the company's reputation and expertise can help facilitate this integration.

Respondent C-A describes a few types of services that can help co-create value, that are feasible and needed. Even if more advanced servitized business models are not currently adequate, there are still co-creation mechanisms to be explored. This could be, for example, minor technological add-ons, such as sensors, with an infrastructure managed by ABB, where the insights are shared with the customers.

When asked about the challenges and benefits as a service provider co-creating value, C-C points out the necessity to get involved with the customer's business. Servitization is not solely about the products, but the whole business. The respondent argues that a prerequisite for servitization is understanding the customer's business. This is especially important because the customer's business might change together with the manufacturer's, argues C-C. As a benefit, a successful integration can lead to new solutions that were previously unknown, as ABB4 also explains. C-C concludes that a better way to create value is to not only involve the customer and the manufacturer in the development process, but all actors that might be of importance, which includes component suppliers.

#### **4.2.1.5 Information sharing**

Increased information sharing is, for ABB4, something that would allow the manufacturer to get closer to the customer. In contrast, C-A explains that information sharing, especially concerning the grid and energy consumption, can be hard to achieve since the grid is a part of the critical infrastructure and, therefore, information about it is sensitive and a matter of national security. The respondent adds: "Sharing customer data on consumption ... is legally not allowed. It has to be scrubbed and anonymised in order for us to be allowed to share that data". This concern is echoed by C-C, who states that utility companies, being a part of the critical infrastructure, may not want to share information in the value creation process. Both C-A and C-C recognise that, even though customer data is difficult to share, it could help the value creation process and make the servitized solution run more smoothly. Still, both interviewees see a possibility in sharing information about the condition of the assets that are at the centre of the service. C-C continues that, by sharing more information, the manufacturer and the customer stand a better chance at being on the same page, improving the long-term relationship and

facilitating the identification of solutions to any issues that might arise.

*If you get the same information [as the customers], you can have the same agenda and also discuss the same topics. Both you and the customer have the exact same information. That is something I believe would improve the relationship. Also, that you are focusing on the same questions and looking for the same answers. – C-C*

## 4.2.2 Business model

Our assessment of the challenges that affect the business model consists of defining the value proposition and revenue mechanism. Both dimensions are approached considering their current and potential future configurations.

### 4.2.2.1 Value proposition

ABB's value proposition is defined by ABB1 as coming down to selling a high-quality product with a prolonged lifetime and a high level of safety, which is considered one main aspect in the market and has been a very significant differentiator. Regarding the relationship between price and value creation, the interviewee says that a key to success would be to keep their price levels low and, simultaneously, help customers improve their business. For ABB1, another part of the company's value proposition has to do with the way products are installed. Products, in general, differ from the competition by being modular and very quick and precise to install. ABB2 also mentioned quality, safety, and easy installation as parts of the value proposition.

*When the customers call and say that you only have to fulfil the standards, then we could have a problem with the prices, so they are buying quality. We are adding things in our products that are not mentioned in the standards. – ABB2*

C-B underlines, precisely, the importance of costs, both the price of the CDCs themselves and the cost of installation. Company B is looking for cabinets that are easy to work with and with familiar tools. A slow installation would also mean higher costs which could be a deal-breaker. ABB2 states that the value proposition is the total solution, including the cabinets, fuses, and cables, all previously tested as a system. ABB3, in consonance, says: "the obvious part is the technological solution ... and actual function of the product". In terms of safety, the interviewee maintains that ABB enables the low-voltage infrastructure to safely deliver electricity to society at large.

ABB4 complements the value proposition expressing the ambition to lower investments for customers as a way to improve their KPIs. According to the interviewee, customers are familiar with these products, know how to use them, and maintain close ties with ABB. These bonds and good market reputation constitute a great advantage. ABB4 is confident that customers highly value quality and the certainty that they know who to contact in case of trouble. Another feature of the value proposition is connected to the whole supply chain and their collaboration

with the wholesalers, who keep the stock, assuring product availability for them and the end-customer, which is pointed out as another advantage.

Regarding how a new value proposition that includes services could affect the company's reputation, ABB4 considers that being adapted to current customer needs and having a good offering is beneficial for the customer, so a new value proposition should not negatively impact reputation. On the side of customers, C-A explains that Company A is sometimes unaware of the state of the CDCs until someone reports a problem. Though the ability to have additional measurements in the cabinet would be advantageous, the Planning Engineer recognises that there is a difficult balance between getting new functions and being willing to pay for them. Company A is interested in having a grid that lasts "for 100 years" and rejects short-term investments. C-B refers that Company B values slot availability in the cabinets and that there is no need for more quality than what is required by the Swedish government. Moreover, C-B adds that the biggest challenge for his company is to educate their employees in terms of the technical aspects and suggests: "[ABB should] start something related to education in how you handle your cabinets". For C-C, focusing on the customers, supporting, listening to them and solving their problems is a part of the value proposition of Company C and that generates customer loyalty.

#### 4.2.2.2 Revenue mechanism

In terms of the revenue mechanism, ABB2 says that while there is certainly a global trend of moving from capital expenditures to operating expenses, that is still not visible among their customers. In fact, when asked if going from a one-time payment to paying monthly or bi-yearly, to lease the CDCs, would be interesting for Company B, C-B simply replied: "No". Nonetheless, ABB3 explains that there are some frame agreements covering three to five years, where ABB agrees to deliver a number of cabinets every year. These agreements, the respondent says, are typically good for ABB, because they allow the company to know that they will have revenue in the upcoming years. Unlike ABB2, ABB3 recognises that, even from a customer point-of-view, there is generally a trend towards operating expenses.

*Companies don't want to spend as much money, or don't want to lock off their money as much in fixed assets, but more on operational costs, if possible. – ABB3*

Even though ABB3 considers business models based on pay-per-use or leasing "very interesting", the respondent alerts that their products have a long lifetime and can operate without major problems for up to 60 years, which could constitute an obstacle in motivating customers to adopt a business model of this kind. The Finance Business Partner explains that customers would probably need an additional reason, a better offer, that would justify leasing, for example. This would allow ABB to have a steady stream of income during the product lifespan and also throughout the year. ABB3 explains that due to the cold Swedish climate, the cabinets cannot be installed underground during winter. A servitized contract would smoothen the revenue stream and, "typically, even and smoother is better". The respondent elaborates

that there is an expected increase in demand as society expands and cabins age, but, in the event of a sales drop, a leasing contract would assure a steady stream of income. Still, ABB3 alerts that they would lose a part of the margin to the leasing provider. Alternatively, if ABB ran the product and created a different offering including services and maintenance, they would need to charge a premium for that.

A new revenue mechanism is something that raises other challenges, according to ABB4. A business model that implies product ownership from ABB, would possibly require more funds, initially, since the first cash flows would be much lower than if the product were sold. On top of this, the respondent adds, the break-even point is still unknown. C-C explains that Company C is still unable to see the benefits from their services, mostly as a consequence of the huge cash flow challenge. Company C buys 30 to 60% of their products from other suppliers, meaning that a change in the flow of payments on the customer's end implies a change in payments to their suppliers, or else they would need a "new financial structure and be some kind of bank", says C-C.

C-A considers that the cost would be their biggest challenge in terms of adopting a servitized solution from ABB, with a different revenue mechanism. C-C also mentions sales and pricing as their biggest challenges when servitizing and advises that this strategy should be implemented step-by-step.

### **4.2.3 Development process**

An adequate development process enables strategy implementation and is evaluated in three parts, as follows: integrated development process, performance measurement and customer engagement.

#### **4.2.3.1 Integrated development process**

As explained by ABB2, backwards compatibility must be taken into consideration when designing new products: "it is very important that they are compatible with old systems, so you can use new fusegear in the old cabinets and vice-versa". This is seen as a barrier, because it locks ABB to previous systems, some over 50 years old, reducing their flexibility. ABB4 highlights that the biggest problem regarding the development process would be to build up the workforce to handle the servitized part of the business.

#### **4.2.3.2 Performance measurement**

The three departments that we got in touch with report tracking one common KPI: revenue. Both the financial and the product management department also monitor gross margin. In case a servitized business model is adopted, ABB3 and ABB4 agree that some KPIs would have to change or be adjusted, at least for that part of the business. ABB3 explains that most indicators, such as orders, would stay the same, but yearly revenue would be lower and split over time. The respondent acknowledges that this is dependent on how the business develops. ABB3 believes that EBITA would have to increase to justify having lower sales volume and higher risk. Also, the respondent adds that, in this scenario, the networking capital would

be dependent on whether the product is owned by ABB or a leasing partner. Product measurement and performance tracking could be so challenging that ABB3 considers that a dedicated service organisation would be needed.

*The current organisation that we have needs to focus on delivering products as cost-efficiently as possible, with the highest possible quality, et cetera, more or less with the same drivers that we have today, but they would then deliver it to this service organisation providing the lease of the products. I think it would be very difficult to actually integrate it into the same [drivers]. – ABB3*

The interviewed Global Product Manager gives a few examples of new KPIs that could be used in the service offering: efficiency, revenue or profit per service task or person in the service team.

#### **4.2.3.3 Customer Engagement**

ABB4 is confident that customers will be interested in getting involved with ABB and underlines the great customer relationships. The biggest challenge, according to ABB4 is to get ABB to seek customer involvement, rather than the other way around. In fact, all customers that we interviewed agreed that they would be interested in being involved in the development of a new solution. C-A says that “if anyone can do it it’s probably ABB” and adds: “if a smaller company came to us and said: ‘we are thinking about cabinets as a service to you’, I would probably not even respond to the email”. Still, C-A reminds us that there are many challenges associated with having a service-based cabinet business, nevertheless, they are available for discussions.

C-C believes that ABB and Company C should work closely together with the end-customer, seeking co-creation between ABB, Company C and the utility companies. Despite the existing collaboration, C-C points out that this is something that can always be improved and that these three entities need to work together more and create partnerships.

*You need to know your customer in a better way and the customer is helping you develop your business and you’re helping the customer to improve and develop ... We talked about customer loyalty, but I think during this process you will find some new demands and also new products when you have this kind of customer engagement. So, I think the output can also be some new products, potentially. Not only finding services. – C-C*

Company C already works very close to customers and most of their products are developed together with them. This allows Company C to develop new products despite being small and not having a product development department.

## 4.2.4 Organisational structure

Organisational structure concerns managing the change in culture, external and internal communications, and inter-department collaboration, when introducing servitization in a product-focused organisation.

### 4.2.4.1 Culture change

On the topic of culture and mindset change, the respondents from ABB offer different perspectives. ABB2, working in sales, argues that ABB “wants to sell the product and send the bill” and that the subject of servitizing the CDCs has already been approached, over a decade ago. At that time, the suggestion of servitizing the business model and possibly leasing or renting the CDCs was rejected.

In contrast, ABB3 and ABB4 claim that ABB Kabeldon is currently falling behind other business areas of ABB in terms of services. ABB3 says: “other parts of ABB are working a lot with service business, as well, but for us, from what I know, that has never been the case”. ABB4 believes that moving towards a service-oriented business model is in line with the strategy for all of ABB: “[it] is clearly stated in our strategic directive that we want to deliver service and solutions rather than products”. A change in culture and mindset is required, but that is in line with the current strategy, argue the respondents. ABB4 concludes that it is not an issue of whether they want to shift the mindset, but rather whether they have the actual organisation to do it. ABB3 shares a similar opinion, stating:

*Since it is such a completely different business model, I’m thinking if you need, maybe, almost a separate organisation for this ... It would probably be organised in their own way, to lift them out of the typical product delivery organisation. I think they need to be a stand-alone, almost. I think so, because it is a completely different mindset. – ABB3.*

This separation, however, can create complexity from a customer’s perspective, according to ABB3.

C-C pinpoints culture change as the main challenge for a manufacturer transitioning to a service-oriented business model. Company C created a service-oriented sister company. The reason for this separation, states C-C, is the differences in culture between managing a service- and a product-oriented business. A new unit manages the solutions and the project-based side of the business, while the original organisation is still focused on manufacturing. Furthermore, the respondent reckons that the change in mindset has to occur across all departments and competences.

Respondent C-A considers that no change in mindset would be needed if ABB were to provide information on the health of an asset. On the other hand, “if someone else owned the products and maintained them for us then we would just be an entity ordering someone to do these things. I don’t know who the electricity grid would be. That would require a lot of change in mindset”, C-A continues. This opinion is summarised by another respondent:

*These companies are a culture of maintenance people ... So, it would*

*be a major shift in how they operate, in how their entire business model looks. There would be a considerable reduction in the operational part of their business.* – ABB3.

#### 4.2.4.2 Communication

In regards to the expected changes in communication resulting from servitization, ABB4, C-A, and C-C agree that increased and more intimate communication is to be expected. C-A states clearly that servitizing the assets would result in more communication between them and the manufacturer. Most importantly, communication would have to be fast and efficient:

*If the cabinet is broken, then we would have to communicate with ABB and they would have to fix it, so that would be the communication we have with them. Communication would be fundamental.* – C-A.

Respondent C-C believes that communication would be more integrated between the manufacturer and the customer to improve relationship building and to allow for complete transparency between the actors. C-C continues that the manufacturer needs to be “fact-oriented, direct and, of course, more on demand”.

ABB3 states that internal communication can be a challenge when servitizing, considering the tendencies to create silos, especially with the sales department and the rest of the organisation. Organisational complexity is another relevant issue that is already creating hurdles for the company, reveals ABB3. Introducing services in ABB’s business, increasing organisational complexity, could hinder communication with customers.

#### 4.2.4.3 Inter-department collaboration

When asked about the current state of inter-department collaboration, ABB4 shares that, while there is a good level of collaboration in Alingsås, that is not the case with other divisions and departments at ABB, some of which already servitizing. The respondent relates this to the fact that each department has its own KPIs and priorities. ABB4 argues that, should the company servitize their business model, the collaboration between units would have to improve, especially if they move towards a higher service-content business model, such as leasing. Collaboration can also involve different business areas to develop new service offerings. At the same time, the respondent argues that having a separate business or business unit can be a possible path. This strategy is something that Company C has chosen to adopt when adapting to offering services. As explained by C-C, the entire company has to be involved and all departments have to make an effort in the transition.

#### 4.2.5 Regulations

In this industry, regulations can impact servitization potential. ABB2 shares apprehension about certain aspects of servitization, especially if the business model involves transferring the ownership of the CDC to the manufacturer, with the

customer paying for the use and access to the product. The concern is rooted in the regulations and frameworks that the utility companies have to abide by. C-A says that the way utility companies and grid owners get paid by the consumer is based on how much the company invests in the electric grid infrastructure.

*The way electricity distribution companies get paid is that all of our components are summed up ... Since we are a monopoly we can't charge the customer whatever we want. This is controlled by the energy market authority. – C-A*

C-C argues that a servitized business model involving asset ownership by the manufacturer would require changes in the regulatory model. When inquired about the regulatory model, the Government Agency states that grid owners are allowed to rent or buy the access rights to an asset, partially contradicting the answers of other interviewees. The agency sets guidelines and a framework in accordance with the Swedish Electricity Laws (Ellagen) and, within these guidelines, grid owners can set the fees for the energy consumer at their own discretion. The guidelines aim to be neutral, technology- and solution-wise, to encourage grid owners to find the most cost-effective solutions. However, since the electric grid is a monopoly, fees have to be non-discriminatory, reasonable, and objective.

#### 4.2.6 Market readiness

Another factor that came up during the interviews is market readiness. ABB2 and C-A explain that the utility companies are very conservative. ABB2 shares that utility companies are “afraid when new products are entering the market. Not only new products, but also new ways of doing things”. ABB’s customers do not want to do something that could jeopardise the grid and affect their business and income.

Customers show aversion to services that may take away aspects of their core business. C-A explains that they would have to reinvent themselves if ABB’s servitization process went to an extreme.

*Our business is having an electric grid, taking care of that and making sure that the customer gets electricity. Leaving main parts, maintenance or parts of construction to someone else, then who would we be? – C-A*

#### 4.2.7 Value chain

Respondents ABB4 and C-C indicate that servitization can create ripple-effects throughout the value chain that could alter the dynamic between the actors. In the case of ABB, a close relationship is maintained with the wholesalers, responsible for keeping components in stock and bridging the gap between ABB and some customers. ABB4 explains that the relationship with the wholesalers is very beneficial as they manage some customer relationships and offer warehousing.

*In the long run, if we see that the habits of customers change so that*

*the wholesaler doesn't have any value anymore there's no reason to keep them or to keep that strategy. The hard part is the time in between now and the future, how we should handle it during that time. – ABB4*

C-C puts more emphasis on the changes in cash flow and expectations of the other actors in the value chain. If the manufacturer changes the cash flow from the customers, then the cash flow upstream in the value chain would have to change too, requiring further adaptations in the whole value chain, the respondent concludes.

# 5

## Analysis

In this chapter, we reflect upon the empirical findings in reference to the literature review, forming the basis to answer the research questions. This analysis connects the inductive generalisation of the literature, together with our interpretation of the interviews. Thus, our adapted framework introduced in the second chapter is used, including the newly identified challenges: regulations, market readiness, and value chain. Two of these, regulations and market readiness, are specific to ABB and their customers, and the third, value network, is applicable to any manufacturer in the process of servitizing. Finally, in each section, the main managerial implications are presented.

### 5.1 Key Motivators

This section will analyse the key motivators for servitization, putting the spotlight on the case of ABB and how these objectives can be reached.

#### 5.1.1 Profitability

The first key motivator here analysed is profitability. Empirical research, such as Fang et al. (2008), correlates profitability with several variables, out of which, five are studied in this case: service ratio, service relatedness, resource slack, industry growth, and industry turbulence. While no causality relationship is established by scholars, these empirical observations, generalised to the case of ABB, offer a starting point to discuss their servitization potential.

##### 5.1.1.1 Service ratio

The literature shows that servitization and, in particular, PSS can lead to financial benefits, due to higher profit margins and a steady flow of revenue (Parida et al., 2014). Levente et al. (2017) explain that more intensive servitization tends to lead to higher returns. The U-shaped curve shown in Figure 2.5, supports this statement, but indicates that companies need to reach a critical mass before they can reap the benefits of this strategy. Then, the hypothesis is that a servitizing company can expect a negative impact of servitization until a service ratio of approximately 30% is achieved. Two main points are brought to light by ABB3 regarding service ratio. First, confirms that a steady flow of income is, in fact, something positive for the company, which could be achieved with the introduction of services. Second, ABB's revenue currently comes exclusively from product sales. This shows that, on the

one hand, there are incentives to having a servitized strategy, but given that no steps have yet been taken in this direction, ABB is forced to start from scratch and possibly experience losses until the critical mass is reached.

#### 5.1.1.2 Service relatedness

Technology is one of the drivers of servitization (Vandermerwe & Rada, 1988). The usage of digital solutions, such as the IoT and big data, was discussed both with clients and ABB. Equipping the CDCs with sensors is something that all parties seemed to be interested in. Additionally, educating professionals in installation procedures, as suggested by C-B, would undoubtedly be more intangible than the sensors, but nevertheless closely related to what ABB currently offers, just not with the formality of it being an education program. Big data raises important legal issues, later discussed in the subsection on information sharing, and, therefore, is not seen as a viable option. All things considered, the proposed services involve some technological innovations and are product-centred. This suggests a high level of service relatedness when compared to ABB's current offering. Fang et al. (2008) find that high service relatedness positively moderate firm value. This relationship is particularly relevant once the service ratio is higher than 20% (Figure 2.6 – A). Accordingly, the services here considered may positively moderate firm value and, specifically, profitability.

#### 5.1.1.3 Resource slack

ABB's resource slack, that is, the cushion of excess resources free to be used in a discretionary way (Fang et al., 2008), also positively moderates the relationship between firm value and service rate. This is also more visible in higher service ratios (Figure 2.6 – B). ABB4 says that there is money to be invested in promising projects, indicating that there is some resource slack. The actual value must be determined by the company, which has access to all the necessary financial data. While it is difficult to gauge the exact resource slack, ABB4's response suggests a positive effect of this factor in their servitization potential.

#### 5.1.1.4 Industry growth

Fang et al. (2008) point to a strong negative moderating effect of industry growth, meaning that low growth is associated with a significant increase in firm value. Conversely, ABB1 and C-B agreed that the industry is expected to grow in the upcoming years. The exact growth rate was not determined in this study and could be a better indicator of how this factor can influence servitization. High industry growth, as illustrated in Figure 2.7 – A, seems to have little influence on firm value. Even if this factor does not support servitization, other arguments could be made. Firstly, high industry growth does not negatively affect firm value, secondly, if this industry stalled or contracted, services would be expected to strongly and positively impact firm value and, thus, profitability. Finally, ABB has been building these cabinets for several decades and this can be considered a mature industry, which suggests that growth should be relatively low.

### 5.1.1.5 Industry turbulence

The effect on firm value is opposite in the case of industry turbulence (Figure 2.7 – B). High turbulence positively moderates the relationship, so, for a servitizing company, profitability should be higher in a turbulent industry. Little effect is expected in the case of low turbulence. In this regard, C-A and ABB3 agree that there is currently low turbulence in the industry. The situation could, however, shift as the value chain adjusts to innovations, new business models, and societal changes, as indicated by C-A. Unforeseen turbulence should also be considered, as well as ways to mitigate it. Although C-A does not see fluctuations in demand as a significant threat for Company A, ABB3 is more cautious and points to their forecasting difficulties. However, even if liquidity is not directly an issue for utility companies, the electricity sector has multiple stakeholders that must be considered. Governments, investors and the society as a whole could suffer great losses in a crisis, even if money is readily available to the most critical entities. The literature does not indicate that industry turbulence is expected to reduce as a result of servitization, but rather that servitization is likely to increase firm value in high turbulence conditions. Therefore, one can conclude that servitization could be sought, not as a way to profit in a stable industry, but as a risk mitigation strategy in the event of a downturn.

### 5.1.2 Customer relationships

A large body of literature connects servitization with customer-centricity, both from the point-of-view of design and effects. A shift to a relationship-based interaction leads to stronger customer relationships and reinforces a positive feedback loop where service sales increase product sales and increase customer lock-on (Baines et al., 2009b; Kastalli et al., 2013; Fang et al., 2008; Vandermerwe, 2000).

Despite the fact that the company currently has transaction-based relationships, the respondents from ABB are confident about the quality of their customer relationships. The fact that all interviewed clients show a willingness to work together with ABB in the development of new solutions substantiates this claim. Our findings are also aligned with the theoretical premise that customer relationships are a key motivator for servitization, considering ABB3 and ABB4's belief in the positive influence of services in this matter. Also, ABB1 asserts that customers are knowledgeable about the products and that this constitutes a "great advantage". This strengthens the idea that ABB can create a feedback loop that leads to increased product and service sales, leveraging on knowledge creation and dissemination, resulting from providing services. ABB3 suggests the creation of a separate department or entity focused on services. There is theoretical and empirical support for this, with the caveat that letting customer relationships be managed by third parties can be detrimental, as explained in the subsection on inter-department collaboration. Nevertheless, we observe that C-C, being in the same industry as ABB, used a subsidiary company to manage some of their services with great success, so this option may be adequate in some cases.

### 5.1.3 Competitive advantage

The last key motivator here analysed is competitive advantage, which is widely recognised in the literature as both an outcome and a motivator for servitization. Currently, ABB's competitive advantage is centred around the products and is tied to their high quality and safety and also the company's technical knowledge, R&D capacity, and the network that they have established over the years.

This motivator is present in the case of ABB, as evidenced by ABB2 and ABB3, who mention the option of leasing. This is, however, only one of many possible PSS (Table 2.1). Baines et al. (2009b) and Oliva and Kallenberg (2003) consider that the additional competitive advantage derives from the fact that services are more intangible, labour dependent and difficult to imitate. This pattern is consistent with the two major services observed in the empirical data: sensors and the education program. Both, and particularly the latter, have these three characteristics referred by the authors. The thought that competitive advantage could originate from customers understanding that the value is in the function and not the product itself (Lightfoot et al., 2013) may be challenging, due to the fact that owning the product is, in itself, the core business of some companies, as later explained in the subsection on market readiness. This could, nevertheless, be the first step to change the mentality of all entities in this industry and influence the organisation of the entire value chain. The intangibility factor would be an inherent characteristic of the education program, possibly making it harder to imitate. The sensor may increase product functionality, which could help change the culture in the industry and buying dynamics, moving away from product-orientation towards result-orientation. ABB3 mentions customer retention as another possible source of competitive advantage. This would be due to the existence of contracts locking the customer and giving ABB additional leverage. This factor is not explicitly approached in the servitization literature, rather, authors tend to emphasise the value of soft power, such as customer lock-on (Vandermerwe, 2000). Even so, this may be another reason to consider services, as long as it does not erode customer relationships.

## 5.2 Challenges

This section will analyse the main challenges for ABB in the adoption of a servitized strategy. This discussion is of great importance to reduce the chances of a service paradox.

### 5.2.1 Customer management

#### 5.2.1.1 Matching customer needs

With servitization, the ability to match customer needs can become more challenging than in a product-focused business, as the value of a service is determined in use by the customer (Krueger et al., 2015). Zhang and Banerji (2017) warn of potential misalignments that might occur between the value that the manufacturer wants

to create and the value that is perceived by the customers. ABB2 argues that it is uncertain whether ABB and the customer would be able to see the value of servitizing the products. C-A, however, refers that, for utility companies, there is potential value to be explored at the lower end of the servitization spectrum, with a higher relative importance of tangible goods. Nevertheless, there is scepticism towards service-based offerings. This could suggest the existence of a misalignment between what the manufacturer believes the customers need and how value can be created for them, as is described by Zhang and Banerji (2017). That being the case, the misalignment is occurring despite ABB's strong customer relationships and experience in developing solutions together with customers.

In order to match the customer's needs, Parida et al. (2014) suggest involving customers early on in the development process. Lightfoot et al. (2013) go further and argue that manufacturers should immerse and integrate themselves into the customer's business to find the value gaps in the activity cycle. This mindset is echoed by C-C, who claims that manufacturers need to thoroughly understand the customer's business and how their needs develop over time. This can also be done by having smaller project teams, individualised to each customer, which, according to C-C, creates the agility to adapt to changing needs over time.

#### **5.2.1.2 Ownership transfer and control**

A common feature of servitization is the ownerless consumption by the customer (Zhang & Banerji, 2017), a switch that is not always well received. In the case of ABB, ownership transfer and control would be a noticeable challenge. This stems from two underlying reasons: lack of incentives for the customer and risk management. From the point-of-view of the customers, C-A argues that ownership, control and access to the assets are vital for the utility companies to keep their operations running smoothly. It is based on this that they get paid, according to current regulations, which are discussed in further detail later on. This lack of enthusiasm to pay for the output or the function, losing product control and ownership, corroborates the explanations of Lightfoot et al. (2013) and Mont (2002). ABB2 and ABB4 argue for the benefits of servitizing the business, but ABB3 and C-C raise an important issue: gaining the ownership and control would likely result in risk absorption. This could be beneficial for the customer, but not for the manufacturer, because the burden of managing a part of the critical infrastructure could be significant and it is not a part of ABB's expertise. Therefore, the mediating effects of cultivating a servitized mindset, as suggested by Mont (2002), may be insufficient, since ownership and control play such an important role in this market.

#### **5.2.1.3 Long-term relationship building**

Vandermerwe and Rada (1988) argue that the emphasis on matching customer needs can change to managing long-term relationships between the manufacturer and the customer. Three interviewees, ABB4, C-A, and C-B, bring up the already existing long-term relationships between the customers and ABB, which is based upon the trust in ABB's expertise. Since service performance is often dependent on human factors (Zhang & Banerji, 2017), this existing relationship and high trust level

could mitigate some of the uncertainties surrounding this issue. C-C emphasises the importance of customer focus and availability as key factors to ensure long-term customer loyalty, which is in line with the observations of Kastalli et al. (2013), that effective relationship management can be a means to achieve customer loyalty.

The literature characterises long-term relationships as both a driver and a consequence of servitization (Vandermerwe & Rada, 1988; Zhang & Banerji, 2017; Baines, 2015). However, little is said about companies with already strong and long-lasting customer relationships, how that could be used to leverage their position in the transition and the expected results. Our findings highlight the importance of these existing relationships in a manufacturer's servitization potential and future relationship dynamics. In this case, ABB's servitization potential seems to be heightened by their long history of customer proximity.

#### 5.2.1.4 Value co-creation

According to Zhang and Banerji (2017), servitization results in increased value co-creation with deeper integration of the manufacturer in the customer's processes. Value co-creation is a central part of open innovation. Likewise, in this field, it is argued that companies should embed themselves in the customer's organisation (Chesbrough, 2011a). According to ABB4, being integrated into the customer's processes can pose a challenge for ABB since the current organisation is not ready for such integration, confirming the need for new routines and organisational transformation described by Parida et al. (2014). In contrast, more customer involvement would not be a barrier since that is already common practice. This can be linked to ABB's long-term relationships with their customers, especially in the product development stage. C-A is of a similar mindset, acknowledging that there is value to be co-created by having ABB more integrated into their processes. No intention to seek a deeper integration could be observed though, as would be required in high service content business models (Tukker, 2004).

C-C indicates that the value co-creation process results from taking into account the customer's entire business and not just the product. Successful integration in the customer's processes can lead to new solutions, services, and products, according to open service innovation literature (Kastalli et al., 2013), which is sustained by ABB4 and C-C's experience. To reap additional benefits, C-C suggests the inclusion of suppliers upstream of the manufacturer in the value co-creation process, an aspect that is not the focus of servitization literature.

#### 5.2.1.5 Information sharing

In servitization, and particularly in the process of value co-creation, increased information sharing is necessary, however, some information may be commercially sensitive for customers (Zhang & Banerji, 2017). This potential obstacle is noted by some of ABB's customers. C-A maintains that they, as a utility company, have legal restrictions on the information that they are allowed to share, due to the critical nature of their business. The only way to do this would be by anonymising and strictly controlling data, a belief that is reiterated by C-C. Information sharing seems to be a challenge for servitization in this market. This, however, is dependent on the

type of information that is at stake. Nevertheless, the dimension of this challenge could be lessened with a type of integration that does not require the usage of sensitive data. For example, information about the health of an asset is shareable, while information about the electric grid could be confidential. This could mean that, in this industry, the high service content business models described by Tukker (2004) and Huikkola and Kohtamäki (2018) could be harder to implement as they would likely require more information transparency. Without this, the opportunities for value co-creation could be reduced.

Respondents ABB4 and C-C point out that while not all information can be shared, an increase in information has the potential to improve transparency and customer relationships.

## 5.2.2 Business model

Researchers have different perspectives on what business models consist of. Some of the other factors approached in this study can be helpful in defining an effective business model for ABB, but in this subsection, the focus is directed to two particular aspects, the value proposition and the revenue mechanism, taking into account the empirical findings.

### 5.2.2.1 Value proposition

Vandermerwe and Rada (1988) say that, in servitization, value is added to a company's offerings through services. These can be a part of a product-service bundle that includes goods, support, self-service and knowledge (Vandermerwe & Rada, 1988; Zhang & Banerji, 2017). For manufacturers, like ABB, servitization allows companies to vertically integrate activities in the value chain that were otherwise performed by third parties (Baines et al., 2011). The author explains that conventional manufacturers are product-centric, being involved in production and design (see Figure 2.1). As of today, ABB stands as a conventional manufacturer and does not have "any service revenues or any other kinds of contracts" (ABB3). The current value proposition consists of selling a safe and high-quality product, with a prolonged lifetime, that is easy to install and work with, and is readily available. This is something that customers can relate to. If ABB were to forwards integrate, the company would be moving to stage B, combining equipment manufacturing with product-centric services. When this option was put on the table, some interviewees, both clients and members from ABB, showed apprehension. After all, they would be taking a part of the business of their own customers, with whom they keep a good relationship, so the market may not be ready for this kind of strategy. Alternatively, ABB can choose to create and provide services that are not yet in the value chain and have servitized operations without threatening the core business of other companies. Product-Service Systems, as described by Baines et al. (2007); Tukker and Tischner (2006), allow for value creation through the combination of products and services. A servitization of products, i.e, moving towards a PSS would mean that, to a certain extent, products and services would start having a common identity. In its extreme form, product and service would be inseparable, meaning that, for example, ABB starts selling the function of the cabinets, rather than the object itself, or, looking

at the rest of the value chain, the existence of a total net grid management, in coordination with other partners.

At this point, therefore, the challenge is in deciding which value-adding services ABB could incorporate in its offering and to what extent this affects the overall value proposition. In terms of services, adding sensors to the cabinets was discussed. These sensors could be sold as an add-on service, together with the cabinet, as explained by ABB4. This would not threaten the business of other customers and would potentially allow the company to capture additional value. The literature describes digital technologies as an enabler of servitization. In this case, the company would take advantage of their technical expertise to develop these new components. This step would bring the first services to the company, but not change the product-centric aspect of the business model. In our interviews, the need for these devices was identified in the case of Company A. C-A says that the state of the cabinets is not always known and that measurements could be advantageous.

Another fundamental part of the business is installing the CDCs. ABB currently creates value in this field by making products easier to install and staying in touch with their clients (ABB2; ABB4). C-B suggests that ABB could get involved in educating professionals in installation practices, because this is one of the biggest challenges for Company B. Also, slow installation means higher costs and that can be a deal-breaker. Reducing installation times can be a way to reduce the overall costs for clients, improving their KPIs — an ambition expressed by ABB4. There is, thus, some empirical evidence of customer demand for add-on services, justifying further investigation in this matter.

The process of developing a new servitized value proposition must be designed from a client’s perspective, with early involvement, taking into account their value gaps and activities (Lightfoot et al., 2013; Sony, 2018; Vandermerwe, 2000), and focusing on value co-creation rather than direct value delivery (Zhang & Banerji, 2017).

### 5.2.2.2 Revenue mechanism

Adrodegari and Sacconi (2017) explain that manufacturers must redesign their entire business model, not just the value proposition. We will now analyse how that could be applied to the case of ABB. As previously mentioned, there are different approaches to business model types and their respective revenue mechanisms. Tukker (2004) describes a spectrum of PSS business models: product-oriented, use-oriented, and result-oriented, each with their subtypes of models. A mechanism that allowed customers to turn large capital expenditures into long-term operating costs could, theoretically, be thought as advantageous in terms of liquidity. In the event of several CDCs having to be replaced, the burden of a one-time purchase could be too high. However, as mentioned in the subsection on industry turbulence, utility companies like Company A do not think in these terms. This rationale does not apply to companies in a monopolist position, especially when they are a part of a critical infrastructure that would likely get easy access funds, even in turbulent times. C-B is also not sold on the idea of a result- or use-oriented approach and outright rejected these alternatives. All things being equal, the costs remain as the deciding factor for these companies, a typical feature of mature industries (Porter,

1998). Finally, ABB2 attests that customers have still not expressed the need to move away from capital expenditures and ABB3 is clear that customers would need an additional reason to want a servitized offer. Our data suggests that such a reason is still not apparent to customers. Therefore, the empirical findings indicate that, at the moment, clients seem most receptive to product-oriented business models. Even though ABB presently does not provide any services, other companies do, such as maintenance, so there is a complete separation between product and services. If ABB introduced add-on services to their offering, as discussed in the previous subsection, the company would be moving towards Tukker's first category of PSS business models: product-oriented services. This archetype would allow ABB to remain product-centric and introduce supplementary services.

Huikkola and Kohtamäki (2018) describe a relationship between the customer's key needs and the manufacturer's ability to run their business process. In this framework, the product business model is similar to the product-oriented model. For ABB, the requirement of having adequate distribution channels would not be an issue, considering their close collaboration with wholesalers and the rest of the supply chain. The second type of business model, according to this framework, is the service-agreement model, based on offering the function through product availability, which allows for a stable revenue, a relevant factor as reported by ABB3. The third and fourth types require a greater level of servitization and significant loss of control of the product on the side of customers, which, despite the possible advantages for ABB, as already discussed, is an idea that does not seem to appeal to customers. A particular feature of Huikkola and Kohtamäki's framework is the acknowledgement that it is not possible for a servitizing manufacturer to design a perfect business model, thus operating multiple or hybrid business models is seen as a reasonable possibility.

This connects us to the discussion on how ABB should implement their business model innovations and, in particular, a new revenue mechanism. Similarly, there are conflicting theoretical approaches to moving from products to services, seeing servitization as a continuum (Oliva & Kallenberg, 2003) or having a service-led trajectory (Kowalkowski et al., 2015). The continuum perspective allows for straightforward goal setting by identifying where we are, the current position, and where we want to go, the target position (see Figure 2.3). Considering that ABB is currently at the lower end of this spectrum, new services will be an add-on, unless the logic of the business is disrupted and the relative importance of services and products is inverted. Additionally, Oliva and Kallenberg (2003) identified, empirically, four sequential stages followed by firms that successfully servitize. At this point, ABB would have to implement the first step: consolidating product-related services. There are, though, multiple observations of companies that do not transition gradually or unidirectionally, but rather simultaneously occupy several positions in the spectrum, at times also deservitizing as they adjust their business models (Kindström, 2010; Kowalkowski et al., 2017). Embracing and trying to benefit from this ambivalence may help ABB adjust and optimise the revenue mechanism. So, rather than defining a specific target position on a spectrum of servitization, ABB could instead consider following a trajectory towards being an availability or a performance provider. Each step taken in the service growth trajectory can take

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into account the subtypes of PSS business models previously presented (see Table 2.1), with their respective implications in the revenue mechanism.

### 5.2.3 Development process

#### 5.2.3.1 Integrated development process

As services and products are very different in nature, their development process is also different. According to Kindström (2010), developing services requires a high amount of human capital and capabilities, however, ABB4 believes that the development of these capabilities could be a challenge. Furthermore, ABB2 brings up the fact that backwards compatibility must be assured, constraining the organisation's innovation possibilities when developing a servitized offering. This could hinder ABB's ability to develop offers of high service relatedness, a positive moderator of profitability, if these innovations required significant changes in the cabinets. With these aspects in mind, ABB would have to formulate a suitable integrated development and innovation process that includes products and services.

#### 5.2.3.2 Performance measurement

The theory stresses the importance of performance measuring (Maheepala et al., 2018). The challenge for ABB when servitizing is that the current KPIs are partially unsuitable to measure the performance of services and product-service systems. The current KPIs are product-focused, according to the explanations made by ABB3 and ABB4. While some of these KPIs may remain relevant following servitization, a new system that includes service-oriented KPIs would have to be introduced in the organisation (Kastalli et al., 2013). ABB3 argues that the monitoring of services would have to be aimed towards their efficiency, which relates to the recommendations made by Kastalli et al. (2013).

Tukker (2004) argues that there are difficulties in measuring services properly, which is aggravated in high service content scenarios, due to the intangibility of services. The inherent differences between services and products have to be addressed, to be able to measure performance accurately. As a solution to this, ABB3 suggests a system that keeps measurements separate, because product-focused KPIs would still be of importance. The effect of having two sets of KPIs can be connected to the concept of organisational ambivalence, resulting in a reconfiguration of accountability in the business practices (Lenka et al., 2018). This further supports the idea that embracing ambivalence may be worth considering.

#### 5.2.3.3 Customer engagement

There is some interdependence between the ability to match the customer's needs and customer engagement in the development process. The literature is clear that the manufacturer should engage with the customers early on in the development process, maintaining an active dialogue and testing alternatives (Vandermerwe & Rada, 1988; Zhang & Banerji, 2017; Parida et al., 2014; Lightfoot et al., 2013; Sony, 2018). This, however, is not always accomplished (Zhang & Banerji, 2017). In

the case of ABB, engaging customers in the development process does not appear to be a significant challenge. Based on the interviews with ABB4, C-A, and C-C, customer relationships already seem central to ABB. Customers show a willingness to be involved in the development of new service- or product-related solutions. Similarly, ABB wants to fully understand the needs of the customers in this process. Furthermore, the customer should be viewed as a partner in servitization and the development process (C-C). The better the relationship is at this stage, the better the chances of reaping the benefits from mutual business development, according to C-C, emphasising customer engagement as a key success factor in servitization, as indicated by Vandermerwe and Rada (1988); Zhang and Banerji (2017); Parida et al. (2014).

## 5.2.4 Organisational structure

### 5.2.4.1 Culture change

The literature puts culture change as one of the main challenges in servitization. When transitioning from products to services, a mindset change is required both in the customer's and the manufacturer's organisation (Zhang & Banerji, 2017). Resistance to change can be expected, creating a barrier for the transition (Zhang & Banerji, 2017; Lightfoot et al., 2013). The interviews reveal a separation between culture and mindset at a department and management level. ABB2, working in sales, insists that the business in Alingsås only wants to focus on selling products and, historically, services have not been welcomed. In contrast, ABB4 states that servitizing and becoming a solutions provider is the goal and strategy of the whole business area. ABB3 elaborates that ABB Kabeldon is falling behind other business areas that have already successfully servitized. This misalignment in mindset could amplify the challenges pointed out by Oliva and Kallenberg (2003) and Palo et al. (2019). In this case, getting sales and other departments onboard and in the right cultural mindset would be necessary. As explained by C-C, it is not only sales that would need to adjust their mindset, but the entire organisation.

A solution to this challenge is advanced by ABB4 and was adopted by Company C. A separate business unit can be created to manage services and the cultural clash between the traditional business and the new service-based one. Company C has a separate unit for installations and maintenance services, a strategy supported by Tukker (2004); Huikkola and Kohtamäki (2018). Company C's decision to separate the units suggests that the culture clash can be substantial, even for manufacturers with product-centric services. This argument could be complementary to the idea that creating a separate unit can protect the emergence of a service mindset (Oliva & Kallenberg, 2003). As previously mentioned, this separation can come with its own set of challenges. Lenka et al. (2018) discuss the issue of organisational ambivalence and, while the focus of the authors is on ambivalence within departments, having a separate unit for services in parallel with a product-oriented organisation could result in similar tensions. The manufacturer has to evaluate if this method would work in their case, or if changes to the current company culture and identity could be counterproductive. With this in mind, a gradual transition of the relative importance of services could be preferable.

The need for cultural change on the customer's side (Palo et al., 2019) is clear to C-A and ABB3. Two examples of servitization were discussed with C-A, an add-on service and a use-oriented model for the CDCs. The response was clear: only the use-oriented solution would require a culture change, which, in this case, would be significant. While no direct relationship between service level and the extent of culture change can be advanced from this observation, this finding may justify further investigation in this area. Postulating that a greater variation in service content requires a greater cultural adaptation, ABB should consider a gradual approach to servitization. Nonetheless, ownership transfer is a significant factor in this industry, which could overshadow the direct impact of culture change and possibly be the root cause of this aversion to change.

#### 5.2.4.2 Communication

Zhang and Banerji (2017) stress the importance of effective internal and external communication when servitizing due to its impact on other challenges, namely relationship building, customer engagement, and information sharing. This importance is also underlined by C-A, who explains that ABB's services could play a vital role in their operations, which can be related to the level of manufacturer integration in the customer's processes.

According to Lightfoot et al. (2013), the manufacturer needs to develop the necessary routines and communications to build stronger relationships with the customers. This is sustained by C-C, who argues that communication between the manufacturer and the customer should be more integrated to foster the relationship. The respondent also relates this to trust, as effective communication facilitates transparency. This is in line with the connection between relationship building and communication presented in the literature (Zhang & Banerji, 2017).

The sales department plays a central role in communication and can be the source of some challenges (Huikkola & Kohtamäki, 2018). The tendency to work in silos and the complexity of the communication systems, pointed out by ABB3, alert for the importance of improving communication. Adding services to ABB's offering could increase complexity and interfere with the internal and external information flow.

#### 5.2.4.3 Inter-department collaboration

Researchers argue that with servitization a higher degree of inter-department collaboration is required (Zhang & Banerji, 2017). This stance is confirmed by ABB4, who points to the possibility of collaborating with different business areas, other than just between departments. However, this is something that the company already struggles with and there is no system to support efficient inter-departmental collaboration. Therefore, ABB4's suggestion to separate the business could be a part of the solution. With a separation of the product- and service-oriented sides of the business, the need for inter-department collaboration would increase (Kindström, 2010), which must be anticipated. If inter-department collaboration is an issue prior to servitization, separating business units would probably not solve it. ABB would need to promote collaboration and integrate competencies from different

organisational units. Furthermore, while creating a separate business unit is not a form of outsourcing, some aspects of customer relationships could end up being disregarded. This factor must be taken into account, because customer relationships are one of ABB's strongest assets and an essential part of servitization.

### 5.2.5 Regulations

Utility companies abide by various regulations that put constraints on their business model, making it harder for manufacturers to experiment with their own model. This has to be taken into account when developing a new value proposition as any changes must be manageable by the customers. In this industry, this challenge is related to ownership transfer and control. As a result of being a monopoly, in the utility market, revenue is regulated (C-A; C-C). This directly affects the way that utility companies generate revenue and, consequently, their willingness to transfer ownership. Deregulation is described by Vandermerwe and Rada (1988) as a driver of servitization, however, in this case, the apparent lack of this driver could represent a barrier.

This seems to be a significant underlying factor influencing the outlook on ownership and control, and culture change. However, it is important to note that, according to GA, there is more room to experiment than ABB and the utility companies report. Manufacturers and customers have the possibility to influence regulations, as long as they remain fair and promote grid efficiency, opening the door for servitized business models, if there is a demand for them.

### 5.2.6 Market readiness

The challenge of market readiness relates to the cultural and mindset changes that need to occur in the group of organisations that make up this market. More than the individual changes discussed in the subsection on cultural change, the empirical findings denote the necessity to change the overall business model narrative in the market. Currently, several services that ABB could consider implementing would overlap with the core business and identity of some customers, limiting the servitization opportunities. Some customers already have the competencies and resources to perform the value-adding activities that ABB may want to introduce. Thus, without a cultural and identity change in the market, offering services that may overlap with the customer's core business could be a counterproductive servitization effort. On top of this, risk aversion is a characteristic of utility companies, particularly when it comes to trying new untested solutions (ABB2). Early customer engagement in the development process and truly understanding their needs can facilitate the development of a better business model and promote the required cultural change in this market to back servitization (Vandermerwe & Rada, 1988; Zhang & Banerji, 2017; Parida et al., 2014).

### 5.2.7 Value chain

Several authors advocate for including the customer early on in the development process; for example: Vandermerwe and Rada (1988); Zhang and Banerji (2017);

Parida et al. (2014). The empirical findings indicate that manufacturers should go further and look at the entire value chain, as changing the business model can create ripple effects up and downstream. In this case, two stakeholders are pinpointed by the respondents: the wholesalers, downstream of ABB, and the suppliers, upstream. In terms of the wholesalers, they currently increase ABB's agility, by assuring stock availability, and also engage in some customer management functions. However, their role in the value chain could become unclear with servitization. They could become partially obsolete, if ABB integrated their capabilities in their business, possibly also damaging the relationship with ABB. This option reflects the opportunity to forwards integrate functions in the value chain, presented by Baines et al. (2011). Another option would be having the wholesalers still acting as a point of sale, keeping stocks, which is essential to the business, and managing customer relationships to a greater degree. In this second scenario, the need for improved external communication would be even higher. Zhang and Banerji (2017) point to the fact that efficient communication with customers is necessary and the findings bring to light that communication with other entities in the value chain cannot be neglected.

Regarding ABB's suppliers, C-C reveals that changes in the business model that affect cash flow are only possible if the suppliers upstream are ready for the possible effects on their respective cash flows. So, changes in the revenue mechanism, the way it is described by Mont (2002), going from a one-point transaction at the point of sale, to long-term amortisation with regular payments, can impact the manufacturer's ability to pay their suppliers, which should be accounted for. Therefore, increased communication and close relationship management with the suppliers seem to be necessary for the success of servitization.

# 6

## Conclusion

This chapter presents the conclusions of this study and directly addresses the research questions. A summary of our findings and analysis can be found, along with the respective managerial implications. This is followed by a discussion on the limitations of this paper and recommendations for future research.

### 6.1 ABB's Servitization Potential

The first research question and subquestion here discussed are, as follows:

***RQ1:** What factors influence the servitization potential for ABB's cable distribution cabinets?*

***RQ1.1:** How do these factors influence the servitization potential?*

This research study concludes that the factors that influence servitization potential can be grouped into two main themes: key motivators and challenges. On the one hand, the key motivators represent the rationale for the adoption of a servitized strategy and consist of three main factors: profitability, customer relationships and competitive advantage. On the other hand, challenges represent the hurdles that hinder servitization, the reasons why some manufacturers fall into the service paradox trap. The identified obstacles are: customer management, designing and implementing the business model, the development process, organisational structure, regulations, market readiness, and the value chain. Some of these factors consist of a combination of variables through which the servitization potential and the impact of each factor in the overall strategy is gauged. On Appendix B, the complete tree of factors and variables can be visualised.

The three key motivators analysed in this study are present in the case of ABB. The first motivator, profitability, consists of five variables: service ratio, service relatedness, resource slack, industry growth, and industry turbulence. To maximise gains, a servitizing company should try to reach a critical mass in service revenue. Short-term losses can be expected until that point is reached, which is a possibility in the case of ABB, given that their revenue currently comes solely from products. High service relatedness is desirable, as it positively moderates firm value and, thus, profitability. An analogous relationship occurs with resource slack. In both cases, ABB is favourably positioned. Servitization is particularly beneficial in low industry growth conditions and is not a disadvantage in a high-growth industry.

This study did not measure the exact rate, but some growth can be expected in the upcoming years for ABB. Industry turbulence moderates profitability in the opposite way, being more beneficial to servitize in a highly turbulent industry, with little impact being expected in low turbulence conditions. Therefore, servitization could also be investigated as part of a risk mitigation strategy aimed at maximising profits in low growth and high turbulence scenarios.

Customer relationships are central to the concept of servitization. As a result of moving from transaction-based to relationship-based interactions, customer relationships are strengthened, reinforcing a positive feedback loop that boosts both product and service sales. It is reasonable to infer that servitization has the potential to improve ABB's already strong bonds with clients.

Companies gain a competitive advantage from the fact that services are intangible, labour dependent, and hard to imitate, which is the case with the two add-on services discussed in the interviews: sensors and an education program. Soft power is highlighted in the literature — customers choose to be locked to the company's products and services, because of their superior value. This is another source of competitive advantage and is connected with improved customer relationships.

All the challenges analysed in this study are present in the case of ABB to various extents. Customer management consists of five variables: matching customer needs, ownership transfer and control, long-term relationship building, value co-creation, and information sharing. Matching customer needs can be proven difficult due to a misalignment between the value created by the manufacturer and what is perceived by the customers. This misalignment is noticeable in ABB's business. It can be difficult to get the customers interested in ownerless consumption, shifting the control of the product to the manufacturer. In this case, letting the customer own the product seems vital, due to their mindset and regulations. ABB also has to consider the risk transfer that would result from owning the products. Servitization results in a shift from focusing on satisfying the customer's needs to also establishing and managing long-term relationships. This is not a prominent challenge for ABB. The company has well-functioning long-term relationships with the customers, which may be an advantage when servitizing and contribute to enabling value co-creation. Barriers to information sharing limit ABB's ability to be integrated into the customer's processes, but the possibility to share non-sensitive data allows for some servitized offerings.

A servitized business model adds value to customers through services. A Product-Service System is a special case in which a product is a part of a service bundle that can include both goods and services, such as support, self-service, and knowledge. ABB is currently a conventional manufacturer that sells a high-quality product. Including services in their value proposition means moving towards a PSS where products and services have a common identity. In its extreme form, this would mean selling the function of the CDCs, rather than the product itself. Sensors and an education program can be considered add-ons and do not significantly change the product-orientation of the business model. Finally, any servitized value proposition must be designed with early customer involvement and from their point-of-view. Regarding the revenue mechanism, two perspectives stand out. The first is that PSS

business models are a spectrum that goes from product to result orientation, where ABB stands as a completely product-oriented manufacturer. Another perspective is that manufacturers can focus on their role in the value chain and operate multiple or hybrid business models. From this angle, ABB can be considered an equipment supplier. Defining the revenue mechanism can be challenging, but there are several subtypes of PSS business models for the company to choose from, according to their capabilities and customer interest.

Implementing servitization includes making sure that the outputs match the requirements and that standards are met. For that, three variables are taken into account: integrated development process, performance measurements, and customer engagement. The differences between products and services have to be contemplated in the manufacturer's development process. This is linked to having adapted KPIs and early customer involvement in the process. This is not yet prioritised at ABB, but the company seems to have a good idea of how it could be done.

The challenge of the organisational structure is based on three variables: culture change, communication, and inter-department collaboration. Culture change entails shifting from a product-centric mindset to a service-focused one, both from the manufacturer and the customer's point-of-view. This challenge has a strong presence in this case, since ABB has a product-centric culture, with a tendency for silo-thinking, and the customers have a rigid mindset in how they run their business. To shift this mindset and ensure effective service delivery, communication is essential. External communication with customers is already good, but can be expected to become even more closely integrated if ABB servitizes. However, the internal communication structures between ABB Kabeldon and off-site units and departments within ABB seem less efficient. If ABB chooses to create a separate unit to manage servitization, a better system or structure for inter-department collaboration should be considered.

Three further challenges are identified in the research: regulations, market readiness, and value chain. In the utility market, grid owners are a regulated monopoly. This impacts ownership transfer and control and, by extension, the customer's attitude towards servitizing. The market is not yet ready for an extreme form of servitization, namely due to the ownership issues created by the current regulations and culture. The customers are not ready to let an outsider own the cabinets, as that undermines their core business. However, updating these regulations is a possibility, as long as those changes promote fairness and efficiency in the market, and all entities agree to them. Furthermore, the effects of servitization on the value chain also have to be assessed. Other actors can be affected by new business models, pressuring them to make adjustments.

## 6.2 Addressing the Factors

In light of the factors that influence the servitization potential of ABB's cable distribution cabinets, the second research question directly addresses the managerial implications of these findings.

*RQ2: How should ABB address these factors?*

Servitization can lead to short-term losses in some companies. ABB should adopt a strategy that accounts for this possibility and the need to mitigate these losses until the critical mass is reached. New services should be closely related to the product and ABB's core business. More financial resources increase the chances of success, so this strategy should only take place once a reasonable budget can be allocated. Industry growth and turbulence and not controllable factors, but they can give clues on when servitization should be introduced and which strategy should be adopted under different economic environments.

Customer relationships are one of ABB's biggest assets in this context. The company has the potential to leverage on this to be able to shift to a relationship-based interaction with customers. Outsourcing services to a third-party must be seen with caution, because some of the latent value unlocked by servitization is directly connected to customer relationships, which could be lost with an intermediary. A new unit within ABB Kabeldon that combines the expertise from various departments may yield better results.

Services offer new possibilities in terms of competitive advantage. Assuring their intangibility, labour dependence and difficulty to imitate could result in a magnified competitive edge. Steps should also be taken to influence the customer's understanding of the way value is delivered to them, increasing loyalty and slowly changing the product identity.

There are several aspects in regards to customer management that ABB would have to consider when servitizing. The misalignment between the manufacturer and the customer perceptions of servitization has to be reduced. To manage this, ABB can leverage on their close customer relationships to create a thorough dialogue and understand the customer's entire business, finding the value gaps. Ownership transfer and information sharing are barriers to getting integrated into the customer's business processes, due to the current regulations and mindset. Business models that result in ownership transfer and require access to large amounts of customer data are not recommended.

There is value to be captured with services even without interfering with the business model of other companies. This strongly suggests that ABB's value proposition should consist of new services, rather than forwards integrating some of the functions of their clients. The sensors and the education program, in specific, would match these requirements. Having to choose between product and service orientation is a false dichotomy. The company can have both orientations simultaneously, with several business models, operating in several places in the spectrum and adjusting with time. This ambivalence can surely raise additional challenges, but can also be beneficial. With respect to the subtype of PSS, the choice should follow the current product identity, servitization level, and take into account the issues regarding ownership transfer. Therefore, a product-oriented business model is likely to be advantageous at this stage.

In terms of the development process, the challenges seem to be mainly internal to ABB. The current relationships with the customers are well-functioning and there is an active engagement in the development process, which can be transferred to the process of developing services. The main focus should be in

formulating an integrated process for the servitized offering, as none is currently in place. To measure the success of services, a new KPI system would also be required. Since product-centric KPIs are still valid for that part of the business, two sets of indicators are recommended. This separation may be appropriate, but being measured on different parameters can also be detrimental to inter-department collaboration, which should be taken into consideration.

A central part of servitization is managing the changes in the organisational structure. Other challenges are closely related to this and, therefore, organisational and cultural changes must be considered as an essential part of the transition to a service-focused business. The sales department is an important point of contact for the customers and can play a determinant role in this organisational shift that affects all of ABB. Furthermore, ABB has to create routines and strategies to manage customer relationships, to cultivate a servitized mindset at the customer's end. Establishing a separate unit is a possible route to manage the culture clash and build a service mindset from the start. However, this separation calls for the improvement of internal communications and inter-department collaboration, to prevent the isolation of the new servitized unit. Having professionals from various departments in the new unit can also facilitate the transition.

Regulations, market readiness, and value chain require the involvement of more actors than ABB and their customers. Given that regulations can be updated, ABB, together with the other stakeholders in the industry, should study how new rules could improve the overall efficiency of the network. The entire value chain and the market must be mobilised to accommodate a servitized mindset. An incremental approach with add-on services that are still product-focused may be favourable and allow for a smoother transition with lower risk.

### 6.3 Limitations

The first limitation of this research project is the premise that, to a certain extent, business models are measurable and observable. This study does not directly take into account socio-cultural aspects and power relations within the company that shape behaviour and, therefore, the way any business model modification can be implemented.

Despite interviewing respondents with different roles in the investigated industry, the sample was still small. The COVID-19 outbreak led to considerable limitations to our movement and pressured professionals from all areas. As a result, some respondents withdrew from participating and others had to be interviewed over Skype. It is possible that face-to-face interviews could have produced superior results, especially considering the hermeneutical side of our methodology. A small sample also makes it more difficult to identify interviewee biases.

Another limitation is connected to the subjective side of our methodology, as the researchers do not have a full understanding of the industry or cognitive biases of the interviewees. Finally, the usage of a case study design makes this research project harder to replicate and generalise.

## 6.4 Recommendations for Future Research

Several avenues for future research can be pointed out, as follows:

- Future researchers should target a wider sample of interviewees, companies, and countries generating more empirical data that will help draw more solid conclusions on servitization. These and newly developed hypotheses can then be tested and falsified, using the tools of critical rationalism.
- Another possible direction is to assess the individual and relative importance of the factors that affect servitization potential. This could ultimately result in a mathematical model for better decision-making.
- Social constructivist theory could be used to analyse organisational changes. This could shed light on how language and relations influence business model transition in the context of servitization.
- Finally, the COVID-19 pandemic, which broke out as this research study was being conducted, and the 2008 financial crisis are just two recent reminders that black swan events do take place and with long-lasting impacts, sometimes globally. It is clear that organisations should seek more than efficiency and profit generation and work on the resilience of their systems. This is particularly important for ABB and other companies dealing with critical infrastructure. We believe that further research should be conducted to determine how servitization can impact the resilience of business models and complex systems, such as the electricity grid.

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# A

## ABB Kabeldon CDCs



Figure A.1: Outdoor CDC in a residential area (ABB, 2019b)



Figure A.2: CDC feeding an EV charger (ABB, 2019b)

# B

## Code Tree

- Key motivators
  - Profitability
    - \* Service ratio
    - \* Service relatedness
    - \* Resource slack
    - \* Industry growth
    - \* Industry turbulence
  - Customer relationships
  - Competitive advantage
- Challenges
  - Customer management
    - \* Matching customer needs
    - \* Ownership transfer and control
    - \* Long-term relationship building
    - \* Value co-creation
    - \* Information sharing
  - Business model
    - \* Value proposition
    - \* Revenue mechanism
  - Development process
    - \* Integrated development process
    - \* Performance measurement
    - \* Customer engagement
  - Organisational structure
    - \* Culture change
    - \* Communication
    - \* Inter-department collaboration
  - Regulations
  - Market readiness
  - Value chain

# C

## Interview Guides

### C.1 ABB

#### *Introductory questions*

- What is your role at ABB?
- What role does your department play at ABB Kabeldon?

#### *Customer Management*

##### **Matching customer needs**

- What is your target market at ABB Kabeldon?

##### **Ownership transfer and control**

- How important is it to have control over your distribution boards and cable distribution cabinets?
- How will ownership transfer be affected should ABB servitize their products?

##### **Long-term relationship building**

- What generates customer loyalty?

##### **Value co-creation**

- What benefits and challenges do you see in being integrated in the customer's processes to deliver service offerings?

##### **Information sharing**

- Does information sharing represent a threat?
- To what extent is it done, nowadays?
- Could it help improve the relationship with ABB in the long-term?

#### *Business model*

##### **Value proposition**

- How do you believe ABB Kabeldon currently creates value for the customer?
- What customer needs are already being met?
- What are they currently missing in their experience?
- How could ABB Kabeldon create value by servitizing?
- What is it that ABB offers that competitors do not?
- What makes ABB's solution hard to copy?
- What financial benefits are customers looking for?

### **Revenue mechanism**

- How do you earn revenue?
- Do customers always purchase the products all at once?
- If you went for a different kind of revenue model, such as leasing or pay-per-use, what effects would that have on ABB and the customers?
- Have customers expressed the desire to lease the products?
- Has ABB studied which form of leasing would be more beneficial?
- What are the biggest financial factors challenging ABB's current business model?

### *Development Process*

### **Performance measurements and KPIs**

- What KPIs is your department currently using?
- How will these KPIs be affected if ABB servitizes their business model?
- Does ABB regularly review their KPIs?

### **Customer engagement**

- What benefits and challenges do you see in involving the customer in the development phase?

### *Organisational Structure*

### **Culture change**

- Would it be a challenge for ABB to market itself as a service provider?
- How would that affect the company culture?

### **Communication**

- How will communications with the customer change with servitization?

### **Inter-department collaboration**

- Is there a lot of collaboration between the different departments?
- How will that be affected if ABB servitizes?

*General*

- What will be the biggest challenge for ABB if they servitize their products?

## **C.2 Customers**

*Introductory questions*

- What is your role at your company?
- What role does your department play?

*Customer Management*

### **Ownership transfer and control**

- How important is it to have control over your distribution boards and cable distribution cabinets?
- How will ownership transfer be affected should ABB servitize their products?

### **Long-term relationship building**

- What generates customer loyalty, on your side?

### **Value co-creation**

- What benefits and challenges do you see in having the ABB integrated in your processes?

### **Information sharing**

- Does sharing information represent a threat?
- To what extent is it done, nowadays?

*Business model*

### **Value proposition**

- How does ABB create value for you, today?
- Why are you using ABB's products?
- Why are their products beneficial to you?
- Is there anything missing in your customer experience?
- How could ABB create value for you by servitizing?

- Would it be difficult to change your company's mindset to adapt to buying the function rather than the asset?
- What does ABB offer that competitors do not?
- Which factors could make you start considering alternatives?

### **Revenue mechanism**

- Do you tend to favour capital expenditures over operating expenditures or vice-versa?
- Do you see any benefits or challenges in going from a single transaction payment to a different flow of payments?

### *Development Process*

### **Customer engagement**

- What benefits and challenges do you see in being involved in the development of a new product-service solution?
- Would your company be willing to work closely with ABB and be involved in that process?

### *Organisational Structure*

### **Culture change**

- Would it be a challenge to let an outsider perform some tasks that are currently done in-house, such as maintenance and upkeep?
- What would the main challenge in this change of mindset be?

### **Communication**

- How will communications with the supplier change with servitization?

### *General*

- What would be the biggest challenge for you, as a customer, if ABB were to servitize their products?

## **C.3 Government Agency**

### *Email correspondence — Original, in Swedish*

- I er åsikt, finns det utrymme för att elnätsföretagen kan leasa eller på annat sätt hyra kabelskåpen från tillverkarna inom de intäktsramar som finns idag?
- Regelverket uppdateras vart fjärde år. Finns det några tydliga trender i vilken riktning regelverket går? Till exempel, att de blir striktare eller mindre

striktare i hur elnätsföretagen får sätta sina avgifter och ger mer utrymme för marknaden att experimentera.

- Finns det något annat ni kan komma på att vi bör tänka på inom vår uppsats, med tanke på de regleringar och ramverk som påverkar elnätsföretagen?

*Email correspondence — Translated*

- In your opinion, is there room for the utility companies to lease or otherwise rent the CDCs from the manufacturers within the revenue framework that exists today?
- The framework is reviewed every four years. Are there any distinct trends in the direction that it is heading? For example, is the framework getting more or less strict in how the utility companies can formulate their fees and give more room for the market to experiment?
- Is there anything else you can think of that we should keep in mind when writing our thesis, in regards to the regulations and frameworks that affect the utility companies?