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# **EMPLOYING THE BUSINESS MODEL CONCEPT TO STUDY A PRODUCT-SERVICE SYSTEM**

An explorative single case study from Finland

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**ABSTRACT:**

**Aim:** The thesis aims to study the barriers in the shift to use-oriented Product-Service System (PSS) by employing a business model (BM) concept. Another goal is to generate more in-depth knowledge about PSSs through a unique case.

**Framework:** This study combines Product-Service System (PSS) literature and business model (BM) literature. The PSS section focuses on telling the history and defining the concept, describing the known benefits and barriers of PSSs, and presenting different PSS models. Also, BM as a concept is defined, it is described which components form a BM, and then different BM frameworks are presented. The BM concept is used as a lens when the case is being studied and analyzed.

**Methodology:** The empirical part of the thesis consists of an explorative single case study. The case company is a servitized industrial company that operates in a niche industry and focuses on serving one major customer. The primary data for the empirical study was collected by conducting semi-structured interviews with managers strongly involved in the case from the customer organization and the case company. Besides the semi-structured interviews, one workshop with case company executives was arranged. Also, observation was utilized, and notes were taken during the interviews and utilized in the data analysis phase.

**Findings and contribution:** The BM concept provided a fruitful approach to studying PSS. The BM concept gives the researcher an easy-to-understand framework, making it more convenient to place barriers in different BM components, which helps to recognize which parts of the current BM are the source of the barriers. In this case, the recognized barriers in the shift to use-oriented PSS were categorized to value proposition, revenue streams, key resources, and customer segments barriers. Overall, the findings present a unique case setting but simultaneously illustrate how the BM concept is utilized in the empirical study. Other contributions of the study are explanations of the case company's servitization journey, what problems its offering solves and what type of value it creates with the current BM.

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**KEYWORDS:** Product-Service Systems; PSS; Business model; servitization; barriers; industrial companies

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# 1 INTRODUCTION

Competition is intensifying across a wide range of industries and, to deliver better customer value, companies must be prepared to change how they operate if necessary. Only companies that have managed to build a so-called sustained competitive advantage will be successful in the long-term perspective. Hence, companies should continuously consider new ways to improve their businesses. One way of seeking new business opportunities has been deploying new business models (BM). Designing new BMs, also known as business model innovation (BMI), has been considered a chance to create a sustainable competitive advantage (Teece, 2010). For instance, even traditional industrial companies have attached service components to their offerings and introduced so-called Product-Service Systems (PSS), which is usually viewed as a particular kind of BM (Annarelli et al., 2016).

## 1.1 Motivation for the study

Employing new BMs is done for several reasons. It is realized that companies that have been successful for a while might have the risk to fail if they are continually doing the same activities that used to be suitable for too long without adapting their BM to the changes that are occurring in the competitive environment (Doz & Kosonen, 2010). For instance, PSSs have been introduced by industrial companies to offer better value to customers or even to exit the commoditization trap in a mature market. It is argued that a PSS can benefit not just the company itself but also customers, the environment, and society (Beuren et al., 2013; O. K. Mont, 2002). The opportunities of PSSs are intriguing.

The motivation behind the study has been an assignment from a case company that constantly explores new ways to improve its competitiveness and deliver better value for its customer. The company operates currently with a particular type of PSS model but has

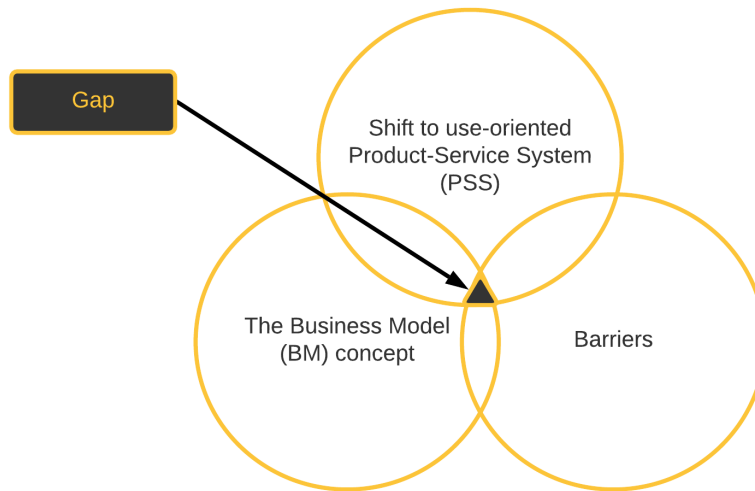
considered different ways to make changes to its BM to capture more value and create more value for its customers. Different choices lead to different results, and it is fascinating to analyze the unique case and reveal what kind of barriers there could arise with alternative business logic.

## 1.2 Research gap

Scholars have studied several topics related to PSS such as benefits (Mont, 2002; Sakao et al., 2013), barriers (Mont, 2002; Vezzoli et al., 2015), and described different types of PSSs (Huikkola & Kohtamäki, 2018; Kohtamäki, Parida, et al., 2019; Reim et al., 2015; Tukker, 2004). When designing a particular type of PSS, one of the distinguished challenges is recognising what kind of configuration their BMs require (Barquet et al., 2013). Furthermore, it has been recognized that PSS research is closely connected to BM research (Reim et al., 2015). However, studying a PSS incorporating the BM concept has been stated as a future research opportunity in the field of PSS research (Annarelli et al., 2016).

BM research has been in solid growth during the past decades (Belussi et al., 2019; Zott et al., 2011), and the BM concept is widely used in everyday life by academics and different practitioners (Spieth et al., 2014). The BM concept can be used for various purposes, such as explaining a business, running a business, or developing a business. Growing a business is an important aspect, for instance, developing a business towards a PSS model. PSS literature provides different examples of real-life PSS applications, but how PSSs can be studied utilizing BM and BMI concepts remains relatively unclear. The field especially needs more in-depth information about how PSSs could be studied utilizing the BM concept for different purposes.

This thesis takes an explorative perspective to study these issues through a single case study. The research gap that the study is aiming to fulfil is illustrated in **Figure 1**.



**Figure 1.** The research gap demonstrated that the thesis is fulfilling.

### **1.3 Research problem and theoretical contribution**

The primary reason this study was set out is that the case company has considered alternative strategic options to deliver value to its client, which should also help the case company create and capture more value. The company has considered different strategic opportunities, but these opportunities have not been researched in-depth due to limited resources. For instance, adding more services has been considered an exciting approach to develop the business and generate additional customer value. For instance, product leasing has been considered strategic alternatives, but there have not been any clearances regarding the matter yet. This study aims to help solve this problem and shed light on possible barriers the company could face if they chose to implement and use-oriented PSS. Thus, the research question for the study is set as follows:



*What barriers are faced if the case company shifts to use-oriented PSS?*

To aid in answering the presented research question and clearly define the area of research, the following research objectives are set:

1. Describe what is the BM concept and how it is defined.
2. Describe which components build a BM and which kind of process it is to develop a new BM.
3. Describe PSS research and servitization literature
4. Describe different generic types of PSSs.
5. Describe the benefits and barriers of PSSs.

The thesis' contribution is twofold. The study's theoretical contribution is to build further knowledge about PSS barriers by incorporating the BM concept. The study primarily provides in-depth knowledge about PSS barriers in a narrow and sophisticated industry through a unique case. The case company's current BM is also analyzed utilizing the BM concept. Furthermore, there will be in-depth knowledge of servitization in the case, such as how the industrial services are established, what factors affect this, what problems are solved, and how value is created.

The study's practical managerial contribution provides theoretical knowledge about PSSs and BM to the case organization. Also, the current BM's value proposition is analyzed to recognize what customer problems the BM solves and what type of value it creates for the customer. Also, exploring the barriers in the shift to use-oriented PSS according to the findings will give valuable case-specific knowledge for managerial purposes.

## 1.4 Thesis structure

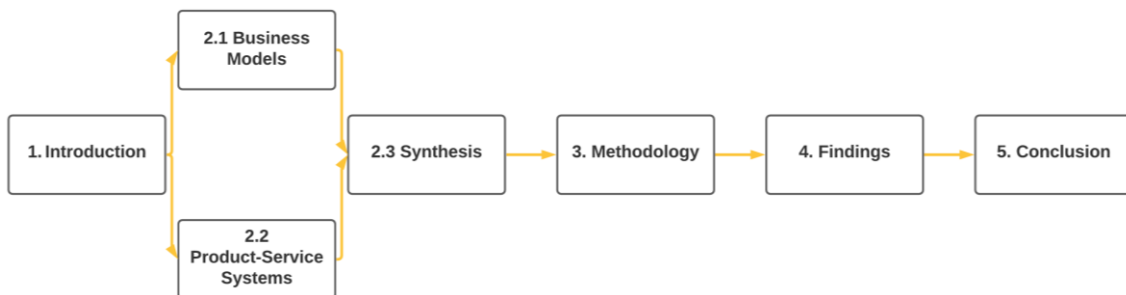
After this introductory chapter, the thesis continues to a literature review which consists of three different sections. The literature review begins with a section where the BM literature is reviewed in detail. A BM is defined, and BM research is analyzed. Then the literature review presents how a BM can be assembled and which components it involves. Different BM components are illustrated and described. For instance, the extensively used BM framework known as Business Model Canvas (BMC) is presented. The first part of the literature review ends with a brief description of BMI and the generic process of designing new BMs.

In the second part of the theoretical section, the literature review focuses on PSSs and servitization. PSS is defined, and the background of PSS research will be introduced. Then, the organization change process from offering tangible products to offering intangible services is described, and the most common industrial service types are presented. After this, the literature review moves to cover the known benefits and barriers of introducing a PSS. Then, different types of PSS are presented and described in detail. Ideal types of servitized BMs are shortly explained, and then generic PSS models are characterized with famous Tukker's (2004) model. Finally, each generic model's value creation, value delivery, and value capturing process are described. The literature review culminates with synthesizing the two previously described research fields – PSS and BM concept. The synthesis subchapter functions predominantly as a summary of the two separate research fields and gives a strong base for the empirical study of the thesis.

After the literature review chapter, the thesis moves to chapter 3, where the methodological background is described. The section explains the case selection process in more detail and briefly represents the case company. Furthermore, this chapter discusses the research strategy and method and explains how the research data is collected and analyzed. In addition, at the end of the methodology chapter, the reliability and validity of the empirical study are critically discussed.

The fourth chapter is the findings section. This chapter introduces the findings of the empirical research. First of all, the case context is analyzed detailly, which includes the analysis of servitization in the case, describes the case services, and looks at the customer value proposition by analyzing the case company's value creation. This is to provide more evidence about unique PSS and better understand the case context. Then, the barriers in the transition to a use-oriented PSS model are presented and discussed. At the end of the findings chapter, the empirical part of the thesis is shortly summarized.

Finally, the theoretical and managerial contributions generated by the thesis are discussed in the last chapter of the thesis, and opportunities for further research are also suggested. Also, the limitations of the research are discussed. The thesis' structure is simplistically demonstrated in **Figure 2**.



**Figure 2.** Thesis structure in a simplified manner.

## **2 LITERATURE REVIEW**

The thesis' literature review begins with business model (BM) literature. In this section, BMs are defined, and the main building blocks of BMs are described. The BM concept is discussed to understand better Product-Service Systems (PSS), which is viewed as a particular type of servitized BM. PSS is one of the research areas of comprehensive servitization research. In the PSS section, PSS is defined, benefits and barriers are presented, and different types of PSS are discussed. The literature review ends with synthesising these two literature streams combined and summarized.

### **2.1 Business models**

The business model (BM) concept is essential when a new business idea is designed or implemented. Whenever a new company is established, or a new business idea of an existing enterprise is put into use, a particular BM is explicitly or implicitly employed (Teece, 2010). Simply put, it can be stated that a BM describes various critical business success factors and dependency relationships between them. A BM concept can also be used to analyze the business of different companies in a simple, easy-to-understand framework. Therefore, it means that the BM concept can be employed to design different and new business opportunities or describe and analyze operating businesses.

BM research has been a rapidly rising research area, and it has been widely used in countless distinct types of research and corporate practice. This section of the literature review goes through the purpose of BM research and presents some standard definitions for the BM concept. After this, different BM components and frameworks are presented. Finally, BM development is discussed in the context of business model innovation (BMI).

### 2.1.1 Business model research

The BM concept has received tremendous attention among academics and business practitioners during recent decades. According to Zott et al. (2011, p. 1019), from 1995 to 2011, more than a thousand articles were published in different peer-reviewed academic journals that address BMs, and the number of publications has dramatically increased this day (Belussi et al., 2019). The *business model* concept is becoming more common, and it is applied by different practitioners, such as business managers, consultants, and business commentators, in various kinds of organizations (Baden-Fuller & Morgan, 2010). Belussi et al. (2019) revealed peaks in BM publications during 2015, 2016, and 2017, most likely triggered by the lately grown interest among different practitioners.

During its emergence, the BM concept was first strictly attached to e-business, but later on, the BM concept has also spread to encompass other business areas with researchers and practitioners (Amit & Zott, 2001; Belussi et al., 2019; Mason & Spring, 2011; Morris et al., 2005). Generically speaking, BMs have been chiefly employed to address three different phenomena in the literature: 1) *“e-business and the use of information technology in organizations”*; 2) *“strategic issues like competitive advantage, company performance, and value creation”*; and 3) *“innovation and technology management”* (Foss & Saebi, 2016; Zott et al., 2011, p. 1023). It is also identified that the three principal roles of BM research are: 1) *“explaining the business”*, 2) *“running the business”*, and 3) *“developing the business”* (Spieth et al., 2014, p. 238). These three different categories are targeted for different target audiences that are demonstrated in **Table 1**.

**Table 1.** Business model research categories (Spieth et al., 2014).

<b>BM Research category</b>	<b>Target audience</b>	<b>Paper examples</b>
Explaining the business	External stakeholders, such as investors, partners, customers, internal employees, and media.	(Baden-Fuller & Morgan, 2010; Magretta, 2002; Morris et al., 2005)
Running the business	Employees, managers, external partners.	(Zott & Amit, 2010)
Developing the business	Corporate management	(Baden-Fuller & Morgan, 2010; Osterwalder & Pigneur, 2010; Teece, 2010)

It has already been established at an early stage that a BM defines the customers and what they value (Magretta, 2002). The core of the BM concept is to describe how a company delivers the customer value to its clients, by what means it draws customers to pay for the generated value, and how payments are converted to profits, in other words, how the business works (Osterwalder et al., 2005). Therefore, it reflects a vision of a company's executives about what customers need and want, how they want it, and the best way for a company to organize to meet the needs and generate profit (Belussi et al., 2019; Teece, 2010, p. 172). According to Hedman and Kalling (2003), a BM's purpose is to define all the critical components and interactions needed to succeed. Specific BMs integrate firm-integral factors and resources into offering to market through different activities (Hedman & Kalling, 2003, p. 53; Osterwalder & Pigneur, 2010).

The BM concept has varying definitions among different authors, and there is no exact consensus on the definition. An interesting finding is that BMs are often studied without defining the concept (Belussi et al., 2019). However, most researchers argue that BM answers especially questions such as: "*How to create value?*" and "*How to make customers pay for the value?*" (Bankvall et al., 2017; Casadesus-Masanell & Ricart, 2010). This is evident as many scholars have put customer value proposition into a central place in their BM definitions (Johnson et al., 2008; Osterwalder & Pigneur, 2010; Teece, 2010). BMs are also described in many different terms, and the concept is often described, for instance, as description, representation, architecture, conceptual tool or a model,

framework, pattern, set, stories, or a structural template (Bankvall et al., 2017, p. 197; Spieth et al., 2014; Zott et al., 2011, p. 1022). Some of the common definitions of the BM concept are presented in **Table 2**.

**Table 2.** Definitions of a business model.

Author(s)	Definition
(Teece, 2010, p. 173)	<i>“A business model articulates the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value.”</i>
(Zott & Amit, 2010, p. 222)	<i>“A template of how a company conducts business, how it delivers value to stakeholders (e.g., the focal firms, customers, partners, etc.), and how it links factors and product markets.”</i>
(Osterwalder & Pigneur, 2010, p. 14)	<i>“A business model describes the rationale of how an organization creates, delivers, and captures value.”</i>
(Mason & Spring, 2011, p. 1033)	<i>“A business model is a frame for action.”</i>
(Casadesus-Masanell & Ricart, 2010, p. 204)	<i>“A business model is a reflection of a firm’s realized strategy.”</i>
(Magretta, 2002, p. 86)	<i>“Business models are stories that explain how enterprises work. A good business model answers: Who is the customer? And what does the customer value?”</i>
(Baden-Fuller & Morgan, 2010, p. 157)	<i>“The role of business models is to provide a set of generic level descriptors of how a firm organizes itself to create and distribute value in a profitable manner.”</i>
(Johnson et al., 2008, p. 52)	<i>“Business models consist of four interlocking elements, that, taken together, create, and deliver value.”</i>
(Chesbrough, 2007, p. 22)	<i>“A business model performs two functions: it creates value, and it captures a portion of that value.”</i>
(Morris et al., 2005, p. 727)	<i>“A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets.”</i>

Literature suggests that a functional BM can produce value for customers and collect a portion of the value for the party that implements the BM (Belussi et al., 2019; Teece, 2010, p. 179). It has been acknowledged that value creation refers to all the benefits that a company creates for its customers, and the added customer value will correspond with customers' willingness to pay for the offering, including offered products and provided services (Matzler et al., 2013, p. 30). As a concept, a BM implies to the business logic of how a corporation produces value and how the company captures part of the value, but to be a principal source of competitive advantage, the BM needs to be considerably more than just a rational way of making business (Belussi et al., 2019; Teece, 2010).

Although BM outlines the business logic required to generate profits, it is not the same matter as a strategy (Magretta, 2002; Teece, 2010, p. 173). A Firm's BM and strategy are frequently mixed by mistake. Strategy defines how a corporation will do better than its competitors, and by definition, it means being different (Magretta, 2002). Teece (2010, p. 183) states that a BM is somewhat more generic than a company's strategy as a concept. This claim is supported in the BM literature, and a company's BM is also described as a "reflection of its realized strategy" (Casadesus-Masanell & Ricart, 2010, p. 205). Hence, a BM can be used to describe or design a company's business operations, that is, how a strategy could be applied at a practical level. It is stated that combining strategy analysis and BM analysis is needed to defend competitive advantage and implement new BMs. Having a BM that is hard to imitate will most likely lead to a competitive advantage over a BM, which is easy to replicate. (Teece, 2010, pp. 179–180)

BM's have been studied in many different contexts. For instance, in an industrial context, two main BM categories are identified in the BM literature: *firm-centric* and *network-embedded* (Bankvall et al., 2017). Firm-centric BM's are seen as more "traditional" BM's that focus on customer value creation and charge customers for the products or services. Besides, numerous presented BM types in BM literature refer to network-embedded type. Embeddedness has been frequently used in theoretical assumptions in studying business relationships and industrial networks. Hence, network-embedded BM's cover a



network of companies that are part of the supply chain or the business exchange that can be only understood on a network level. (Bankvall et al., 2017, p. 199). For instance, Zott and Amit (2010, p. 216) view the BM concept as a “*system of interdependent activities that transcends the focal firm*”.

Current progress in the development BM concept gives insight that BMs require to adjust over time if companies aim to achieve sustained value creation (Achtenhagen et al., 2013, p. 427). It has been realized that companies that have been successful for a while might have the risk to fail if they are continually doing the same activities that used to be suitable for a prolonged time without adjusting the BM to the fluctuations in the competitive environment (Doz & Kosonen, 2010). Knowing this, companies and managers have begun to think about ways to improve or change a BM by certain parts of a BM that affect the entity (Spieth et al., 2014).

### **2.1.2 Business model components**

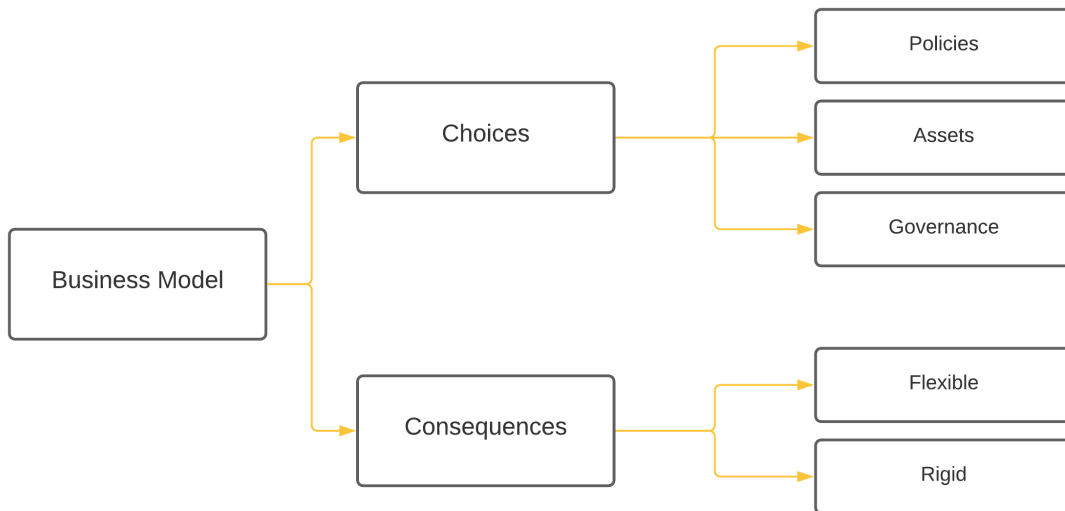
As previously stated, BMs illustrate how a firm operates the business and delivers the customer value proposition to customers. BMs are often graphically visualized to make the concept more effortless to absorb. Numerous studies have suggested different components or elements that should compose a BM (Barquet et al., 2013). Generally speaking, BM literature discusses that BMs consist of components or elements that typically mean the same thing, but they are of different magnitude. The BM research field lacks consensus about which components a BM concept should be established on (Morris et al., 2005). According to Aziz et al. (2008), fifty-four different components can be found, suggesting that BMs can be assembled using various pieces. Several of these existing components overlap, meaning that different scholars often mean the same matters but have named the components differently (Aziz et al., 2008; Osterwalder et al., 2005; Richardson, 2008, p. 137).

**Table 3.** Business model components.

Author(s)	Number of components	Specific components
(Matzler et al., 2013)	4	Product and service logic, value creation logic, profit formula, and marketing and sales logic.
(Hedman & Kalling, 2003)	7	Customers, competitors, offering, activities and organization, resources, a supply of factor and production inputs, and longitudinal process component.
(Osterwalder & Pigneur, 2010)	9	Customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, cost structure.
(Johnson et al., 2008)	4	Customer value proposition, profit formula, key resources, key processes.
(Chesbrough, 2010)	7	Value proposition, market segment, the structure of the value chain, revenue mechanism, cost structure and profit potential, the position of the firm in the value network, competitive strategy.
(Richardson, 2008)	3	The value proposition, the value creation and delivery system, and value capture.
(Morris et al., 2005)	6	Factors related to the offering, market factors, internal capability factors, competitive strategy factors, economic factors, personal/investor factors.

As **Table 3** shows, BMs can be assembled differently, but the components have many similarities. Morris (2005) argues that primarily used components are connected to a company's value offering, economic model, customers, partners, target markets, and internal architecture. However, BM components have causal relationships (Casadesus-Masanell & Ricart, 2010; Hedman & Kalling, 2003). For example, Casadesus-Masanell and Ricart (2010, p. 198) contended that a BM comprises two separate main series of components: 1) *"the concrete choices that management makes about how the company operates"*, and 2) *"the consequences of the choices"*. In other words, companies are

making decisions that have direct effects; for instance, pricing policy (choice) impacts sales volumes (consequence). A BM that ignores one or more of the components and their dependency relations will suffer in terms of comprehensiveness (Morris et al., 2005). The interconnection of the components is presented in **Figure 3**.

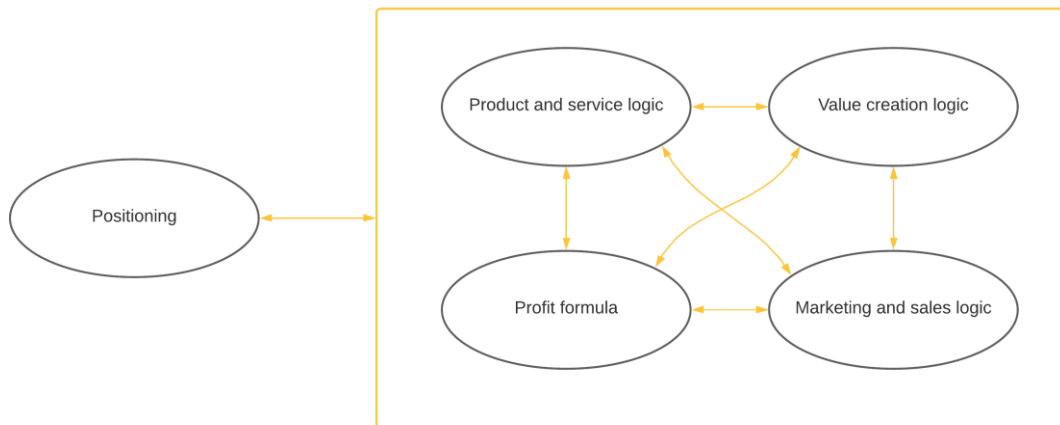


**Figure 3.** A BM consists of choices and consequences (adapted from Casadesus-Masanell & Ricart, 2010).

In order to achieve a more robust understanding of a particular BM, one needs to understand the BM's components and their relations with each other since they impact the effectiveness of the BM (Berends et al., 2016; Casadesus-Masanell & Ricart, 2010). Understanding BM components support coherent thinking in the process of developing and changing BMs (Achtenhagen et al., 2013). Changing or modifying a single part can directly impact other components (Johnson et al., 2008). For instance, it is generally thought that a company's revenue logic is interchangeable, but it is just one part of the entity (Johnson et al., 2008; Teece, 2010).

One of the most focal BM components is known as the customer value proposition. As the various BM definitions illustrate, customer value and value creation logic play a

considerable role in BM definitions and visual conceptualizations (Amit & Zott, 2001, 2012; Johnson et al., 2008; Osterwalder et al., 2005). Osterwalder and Pigneur (2010, p. 22) describe a customer value proposition consisting *“of a selected bundle of products and/or services that solves a customer problem and satisfies a customer need of a specific customer segment”*. For instance, in the BM conceptualization of Matzler et al. (2013), the essence of the BM is the value creation logic. This BM conceptualization is presented in **Figure 4**.

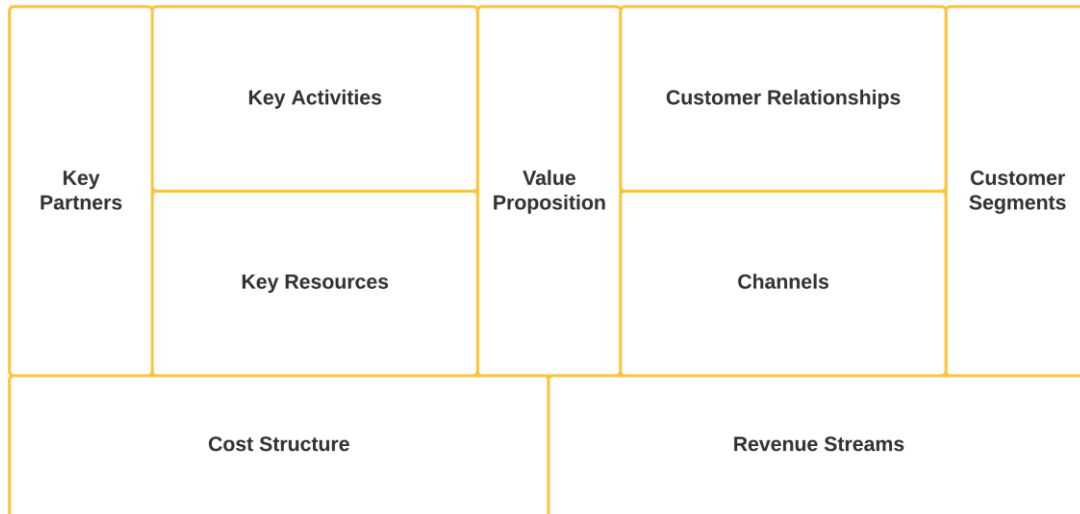


**Figure 4.** Visualization of business model components (adapted from Matzler et al., 2013).

The value creation logic is the component that enables the functionality of other parts of the BM. Value creation logic can be specified by answering a question such as: *“How value is created for customers?”*, *“How can the value be monetized?”* and *“How does the value creation system work?”*. All four components are affected by the positioning of the firm. A company’s positioning directly affects what is being offered to who, which affects the value creation logic and thus also to all other components. (Foss & Saebi, 2016; Matzler et al., 2013). This interaction of BM components makes the BM design more complex (Berends et al., 2016).

One of the most commonly known and used BM visualizations is Osterwalder's and Pigneur's framework, known as Business Model Canvas (BMC), extensively employed in corporate and academic practice (Cosenz & Noto, 2018; Spieth et al., 2014). The framework represents a consensus of a larger group of BM experts and academics, which was developed through massive examination (Barquet et al., 2013; Osterwalder & Pigneur, 2010). BMC is defined as *"shared language for describing, visualizing, assessing, and changing business models"*, and it consists of nine different components that are briefly presented below (Osterwalder & Pigneur, 2010, pp. 12, 16–42):

- **Customer segments:** contains individual customers and customer groups that the company is targeting to create value for.
- **Value proposition:** the company's actual offering (including products and services) that solve customers segments' problems and satisfy their needs.
- **Channels:** different distribution and sales channels via the value proposition is delivered to the customers.
- **Customer relationships:** the relationships the company established and maintains with its customers.
- **Revenue streams:** various streams of sales revenues that are generated from each customer segment, which is a result of a successfully offered value proposition.
- **Key resources:** includes the assets that are necessary to perform all previously presented components.
- **Key activities:** all the various activities that are necessary for the company to offer and deliver all previously presented components.
- **Key partnerships:** refers to the network consisting of different suppliers and partners that help execute the BM.
- **Cost structure:** all the costs that occur in the operation of the BM.



**Figure 5.** Business Model Canvas (adapted from Osterwalder & Pigneur, 2010).

BMC is extensively used in academic articles, educational literature, and also commercial practice (e.g. Barquet et al., 2013; Cosenz & Noto, 2018; Spieth et al., 2014). Thus, it is very natural to utilize it as a tool in the empirical study of the thesis. BMC is usually presented in a table format as in **Figure 5**.

### 2.1.3 Business model innovation

Business model innovation (BMI) is a term that often comes up when developing or preparing new BMs are discussed or studied. A while ago, it was stated that BMs could be considered a subject of innovation (Zott et al., 2011). However, BMI is a reasonably recent research topic, and the academic attention towards BMI has proliferated during the past decade (Foss & Saebi, 2016; Frankenberger et al., 2013; Spieth et al., 2014). Whereas a BM refers to the system or the architecture of how an enterprise creates, delivers, and captures value, BMI can be viewed as the journey of finding new business logic to create, deliver and capture value. BMI can be defined as changing the BM

components and reconfiguring the architecture of a BM (Foss & Saebi, 2016, p. 213; Frankenberger et al., 2013; Teece, 2010). Therefore, BMI can be viewed as a process where a BM is deliberately configured. However, BMI studies have taken different approaches and focuses. Besides the process view, BMI can be also be examined as an outcome. Separate BMI research streams are presented in **Table 4**.

**Table 4.** BMI research streams

Research stream	Focus and purpose	Paper examples
Concepting the BMI	The phenomenon. This stream offers definitions and conceptualizations.	(Amit & Zott, 2012; Teece, 2010)
BMI – organizational change process	Change process of an organization. Illustrate different phases in the BMI process, identify distinct organizational capabilities and functions.	(Doz & Kosonen, 2010; Frankenberger et al., 2013)
Outcome view of BMI	Concentrates on different outcomes of the organizational change process, for instance, by providing examples of BMs in specific industries or a particular type of BMs.	(Matzler et al., 2013; Schneider & Spieth, 2013; Teece, 2010)
Consequence view of BMI	Concentrates on the different BM's consequences on a firm's performance. Linking processes to outcomes.	(Casadesus-Masanell & Ricart, 2010; Zott & Amit, 2007, 2008)

Although BMI is often seen as an organizational change journey, other approaches, such as outcome- and consequence-view, are essential to study BMI comprehensively. For instance, if the same business idea is commercialized in two separate ways, the different BM configurations will most likely lead to different results (Chesbrough, 2010). Therefore, BMI can have significant impacts on the outcome and eventually on the business performance. This argument is supported by the classification of BM components (choices and consequences) made by Casadesus-Masanell and Ricart (2010). As discussed previously, different options during the BMI process will lead to different results. The outcome can

be considered a consequence since sometimes it is hard to predict how BM components interact (Berends et al., 2016).

There is an expanding consensus among BM scholars that BMI is a critical source of competitive advantage and essential to the firm's success (Baden-Fuller & Morgan, 2010; Chesbrough, 2007; Zott et al., 2011). Companies can derive as much value from innovating BMs as they might derive from revolutionary new products or technologies (Chesbrough, 2010; Frankenberger et al., 2013). It has even been noted that most BMs require sharpening or even abandoning them when time goes past and that successful companies usually adapt their BMs to respond to the variations in the operational environment (Johnson et al., 2008; Teece, 2010).

However, it should be noted that the new BM does not make sense to develop and implement unless the customer value proposition is fully identified. A BMI process should not start from a willingness to change a current BM, but recognizing the change drivers by taking customer perspective into account, for instance, recognizing customers' "job to be done" (Johnson et al., 2008; Osterwalder & Pigneur, 2010). Not identifying customer value proposition clear enough has been listed as one of the main obstacles for BMI. Johnson et al. (2008) suggest that an excellent approach to defining an accurate customer value proposition is considering some of the most frequent obstacles to having "a job done": lacking wealth, access, skill, or time. Designing new BMs requires creativity, insight, and proper competitor and supplier intelligence (Teece, 2010). However, the development of new a BM requires also patience.

**A generic BMI process** can be structured into four phases. It has been argued that BMI is not just a simple two-step conceptualization and execution process (Berends et al., 2016). 4I-framework built by Frankenberger et al. (2013) is a relatively good and simplified process model to illustrate the complex process. The framework represents the BMI process structure and comprehensively covers the key challenges that commonly occur during the different process phases. The process phases that are described in the



framework are: 1) initiation, 2) ideation, 3) integration, and 4) implementation. Before the development of the framework, the research stream lacked a process view of BMI. The framework works as a practical guideline on how BMI can be handled. (Frankenberger et al., 2013, pp. 260–270)

**Table 5.** Generic BMI process (Frankenberger et al., 2013).

Phase	Description of the focus	Challenges
1. Initiation	Includes actions that concentrate on understanding and monitoring the ecosystem around a company that is developing the BM	<ol style="list-style-type: none"> <li>1. Understanding the players' needs, which is the starting point of BMI.</li> <li>2. The identification of change drivers that can be a trigger of BMI.</li> </ol>
2. Ideation	Generating new ideas for new BMs from the opportunities recognized in the first phase	<ol style="list-style-type: none"> <li>1. Overcoming the business logic of the current model.</li> <li>2. Thinking in "business models."</li> <li>3. No methodical frameworks or tools to develop innovative BM ideas.</li> </ol>
3. Integration	Ideas from the previous phase are converted into a complete BM.	<ol style="list-style-type: none"> <li>1. Integrating the parts of the new BM.</li> <li>2. Involving and managing all different partners.</li> </ol>
4. Implementation	When a new BM is fully designed and integrated, it can be implemented. This phase is critical, and depending on the business's nature, it may include investments and risks.	<ol style="list-style-type: none"> <li>1. Overcoming the internal resistance.</li> <li>2. Managing the chosen implementation approach (such as pilots, trial-and-error, and experimentation).</li> </ol>

The process moves from analyzing the ecosystem to generating new ideas. Change drivers are recognized and then based on them; new ideas are formed. By trying to overcome a current business logic, new ideas are shaped into a new BM. The first three phases are strongly linked with a BM design, whereas the last phase can be considered as a realization phase. A conceptual BM is put into action in this phase through a selected approach. Even though the framework presents the generic BMI process simplified, it should be considered that the BMI process is complex in practice where action and cognition

connect (Berends et al., 2016). The trial-and-error approach characterizes the BMI process as an organizational learning process (Berends et al., 2016; Frankenberger et al., 2013; Teece, 2010).

## **2.2 Servitization and Product-Service Systems**

Companies are continually striving to create better value for their customers. One of the development trends among industrial companies has been that companies have implemented business models that emphasize more customized offerings than traditional mass production. Eventually, the share of services has increased within the manufacturing industry (Kowalkowski et al., 2017; Parida et al., 2014; Visnjic Kastalli & Van Looy, 2013), and it has been recognized that in value creation, services' role is more critical than ever (Mont, 2002; Tukker & Tischner, 2006). This is evident especially within the context of larger firms in developed economies (Neely, 2008).

Previously, in the manufacturing industry, the value was derived from the manufacturing processes where the raw material is transformed into final products, whereas now the added value is created more and more by fulfilling client's needs with services and other non-material aspects (Manzini & Vezzoli, 2003; Mont, 2002).

In general, this phenomenon where industrial product-focused companies are shifting from offering products to services is commonly called servitization, which is seen as the process of adding complementary services besides traditional physical products (Martinez et al., 2017; Neely, 2008). Due to the characteristics of the process, it is often seen in the BMI context (Parida et al., 2014). Furthermore, it has been argued that servitization is a continuum from traditional product-oriented services towards more customized and customer-specific services or so-called solutions (Oliva & Kallenberg, 2003). These discussed tailored solutions bundle products and services are to enhance value creation and customer satisfaction. These solutions are commonly called "*Product-*

*Service Systems” (PSS)* (Morelli, 2006). In PSS, tangible products and intangible services are blended into a bundled offering. A system is a compilation of aspects that can be both material and immaterial (Goedkoop et al., 1999). A PSS can provide excellent tangible and intangible value by offering more customized solutions to customers than offering just products (Tukker & Tischner, 2006).

Even though the popularity of servitization research has increased significantly from the mid-1990s to the 21st century, its roots have been tracked to the 1960s (Baines et al., 2007; Goedkoop et al., 1999; Lightfoot et al., 2013). Later on, PSS literature has advanced into a separate research stream (Annarelli et al., 2016). There are some strongly related research concepts with PSS in the literature, such as *integrated solutions*, *servitization*, and *service-dominant logic*. Despite the different names, these terms have the same core idea: moving from just selling tangible products to providing different combinations of products and services. This thesis incorporates various articles from different servitization-related research categories but focuses more dominantly on the PSS literature.

### **2.2.1 Background of PSS research**

Servitization-related literature has increased its popularity after recognizing that traditional manufacturing companies started offering services to their customers. PSS research is a relatively modern research field since the literature regarding PSS began to appear at the end of the 90s after Goedkoop et al. (1999) published their famous work (Annarelli et al., 2016). After this publication, more PSS literature started to emerge. During past years, academic and business attention have risen considerably towards PSS (Annarelli et al., 2016; Beuren et al., 2013). PSS research community has attracted significant popularity, especially in Nordic European countries, where researchers have addressed the ability of PSS to improve social, economic, environmental, and also industrial sustainability (Baines et al., 2007; Lightfoot et al., 2013).

PSS is considered a specific value proposition and competitive proposal intended to satisfy demand and fulfil clients' needs (Beuren et al., 2013; Tukker, 2004; Tukker & Tischner, 2006). Some scholars claim that PSS satisfies customer demand and provides sustainability by balancing economic, environmental, and social concerns (Baines et al., 2007; Maxwell et al., 2006). Many PSS-related articles are issued in the "*Journal of Cleaner Production*", implying that PSS has been identified and believed to have positive effects and potential for environmentally friendly production and sustainable development. (Annarelli et al., 2016; Beuren et al., 2013)

According to Beuren et al. (2013), the PSS definitions are moderately consolidated in the literature. As a concept, a PSS refers to an integrated offering concept where physical products and immaterial services are mixed to fulfil particular customer needs and also extend the functionality of a physical product (Annarelli et al., 2016; Baines et al., 2007). It has been recognized that one of the earliest formal definitions of PSS was given by Goedkoop et al. (1999, p. 18), who defined the PSS concept as "*a marketable set of products and services capable of jointly fulfilling a user's need*". Later on, Mont (2002) added that PSS is a *business model* with lower environmental impacts than traditional BMs. There are several definitions of PSS, but those early definitions given by authors such as Goedkoop et al. (1999) and Mont (2002) are frequently cited in the PSS literature.

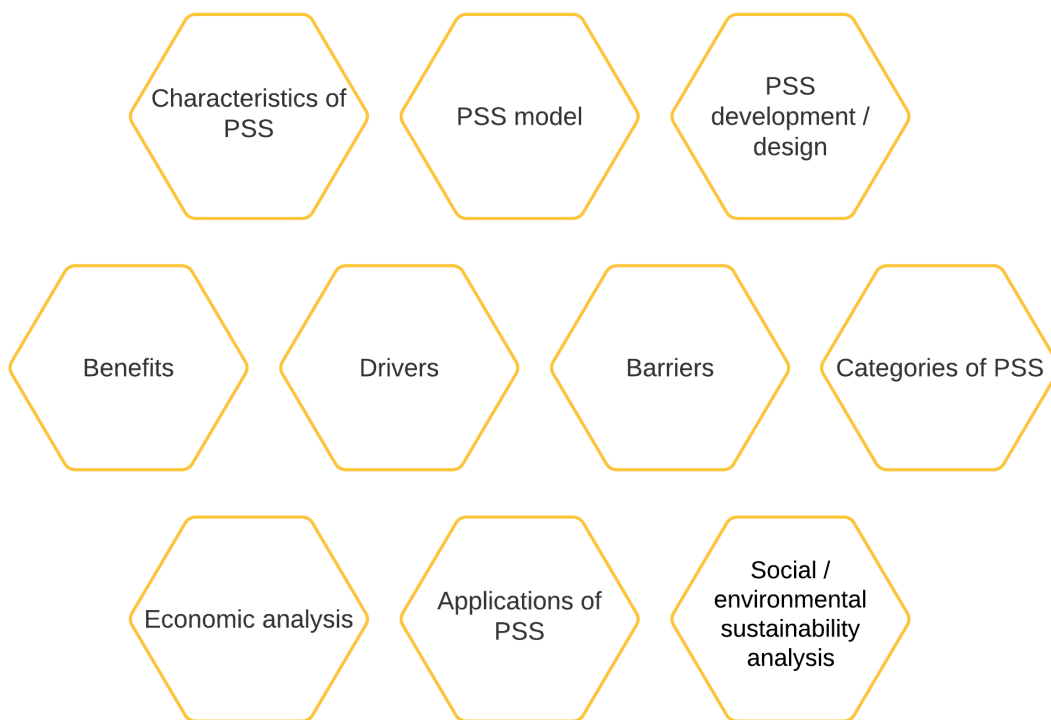
Many of the PSS definitions emphasize bundling products and services together but also highlight different aspects. These other aspects imply that even though PSS literature was heavily connected to environmental issues and sustainability, it is not anymore the most prominent research aspect in the research stream (Annarelli et al., 2016). Some of the common PSS definitions from different scholars are presented in **Table 6**.

**Table 6.** PSS definitions.

<b>Author(s)</b>	<b>Definition</b>
(Goedkoop et al., 1999, p. 18)	<i>"A product service system is a marketable set of products and services capable of jointly fulfilling a user's need. The PSS is provided either by a single company or by an alliance of companies."</i>
(Mont, 2002, p. 239)	<i>"A system of products, services, supporting networks, and infrastructure that is designed to be: competitive, satisfy customer needs, and have a lower environmental impact than traditional business models."</i>
(Manzini & Vezzoli, 2003, p. 851)	<i>"An innovation strategy, shifting the business focus from designing (and selling) physical products only, to designing (and selling) a system of products and services which are jointly capable of fulfilling specific client demands".</i>
(Tukker, 2004, p. 246)	<i>"A system consisting of tangible products and intangible services designed and combined so that they jointly are capable of fulfilling specific customer needs."</i>
(Morelli, 2006, p. 1496)	<i>"A social construction, based on attraction forces (such as goals, expected results, and problem-solving criteria) which catalyze the participation of several partners. PSS is a result of the value co-production process within such a partnership. Its effectiveness is based on a shared vision of possible and desirable scenarios."</i>
(Baines et al., 2007, p. 1543)	<i>"A market proposition that extends the traditional functionality of a product by incorporating additional services."</i>
(Boehm & Thomas, 2013, p. 252)	<i>"A Product-Service system (PSS) is an integrated bundle of products and service which aims at creating customer utility and generating value."</i>
(Annarelli et al., 2016, p. 1017)	<i>"PSS is a business model focused toward the provision of a marketable set of products and services, designed to be economically, socially, and environmentally sustainable, with the final aim of fulfilling customer's needs."</i>

As mentioned, sustainability was the primary topic in the initial phases of PSS research progress, but recently it has started to lose its central research role in the research field (Annarelli et al., 2016; Mont, 2002). Scholars have studied several PSS topics, and, for instance, PSS applications, characteristics of PSS, and PSS development are the topics

with the highest number of contributions. Furthermore, benefits, barriers, and PSS models have attracted great interest among researchers. BMs and collaborative consumption has been recognized as emerging research streams in the PSS research field (Annarelli et al., 2016; Piscicelli et al., 2015; Reim et al., 2015). Central PSS research topics are shown in **Figure 6**.



**Figure 6.** Central topics in PSS research.

### 2.2.2 From products to services

Servitization is commonly understood as a movement forward in the value chain (Storbacka et al., 2013). This shift from a product-oriented company to a service-oriented one is not a simple process and will likely not happen without obstacles. Implementing a service-centric BM requires configurations in the BM, and variations in outcomes are inevitable (Parida et al., 2014). Hence, PSS is commonly considered to be a strategic driver for BMI (Storbacka et al., 2013; Velamuri et al., 2013).

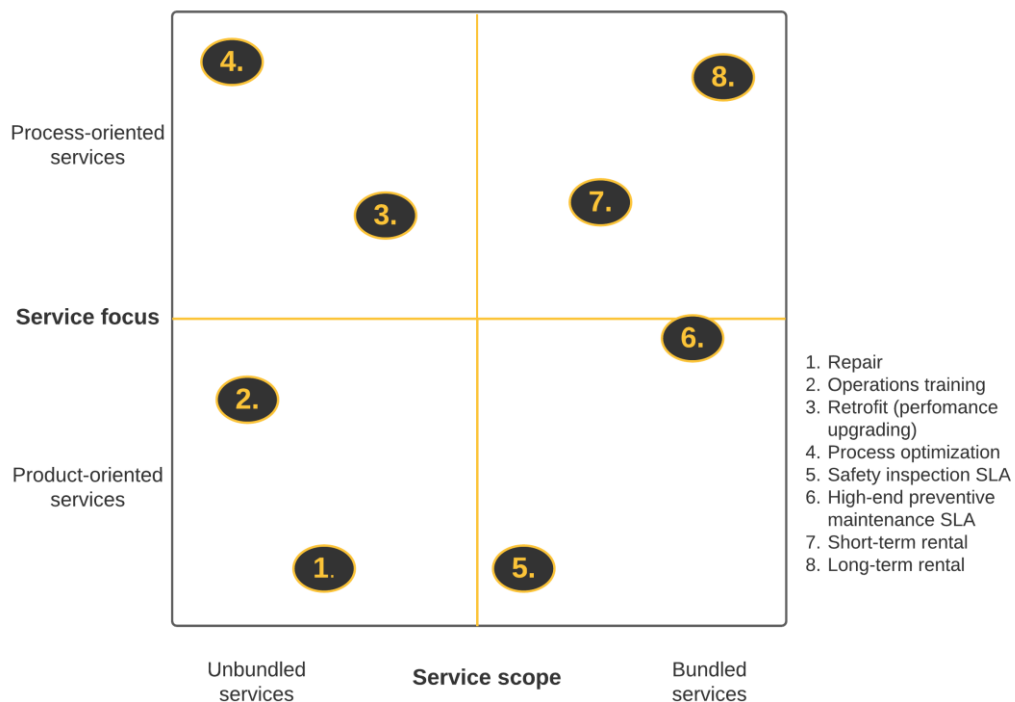
Since the transition to service business is a complex process, many companies have started adding different product-related services to their offering (Oliva & Kallenberg, 2003; Parida et al., 2014). These product-related services are added since they are most likely the most convenient choice and close to its core competence. Besides, scholars suggest that adding services to the BM should follow a meaningful logic, such as focusing on services based on the company's existing professional knowledge and core competencies (Velamuri et al., 2013). Adding services to the offering is also argued to strengthen the physical product's attractiveness (Parida et al., 2014). Therefore, the addition of services complements but also supports existing product offerings.

This shift from products to services is commonly described as a "journey" since it is instead a continuous change than an individual event (Martinez et al., 2017). Literature suggests that most firms do not make a comprehensive transformation, but companies might have activities that focus on the solution business and are commonly built on the existing product business. Many companies end up having parallel BMs, although developing new BMs is highlighted in the literature (Storbacka, 2011).

Parida et al. (2014) highlight that designing an attractive PSS and shifting from having product-centric BM to operating with a service-centric BM depends on understanding the customer challenges and value proposition that meet the needs of the customer.

This argument is supported in the BM literature presented in the previous section (e.g. Johnson et al., 2008; Osterwalder & Pigneur, 2010; Teece, 2010)

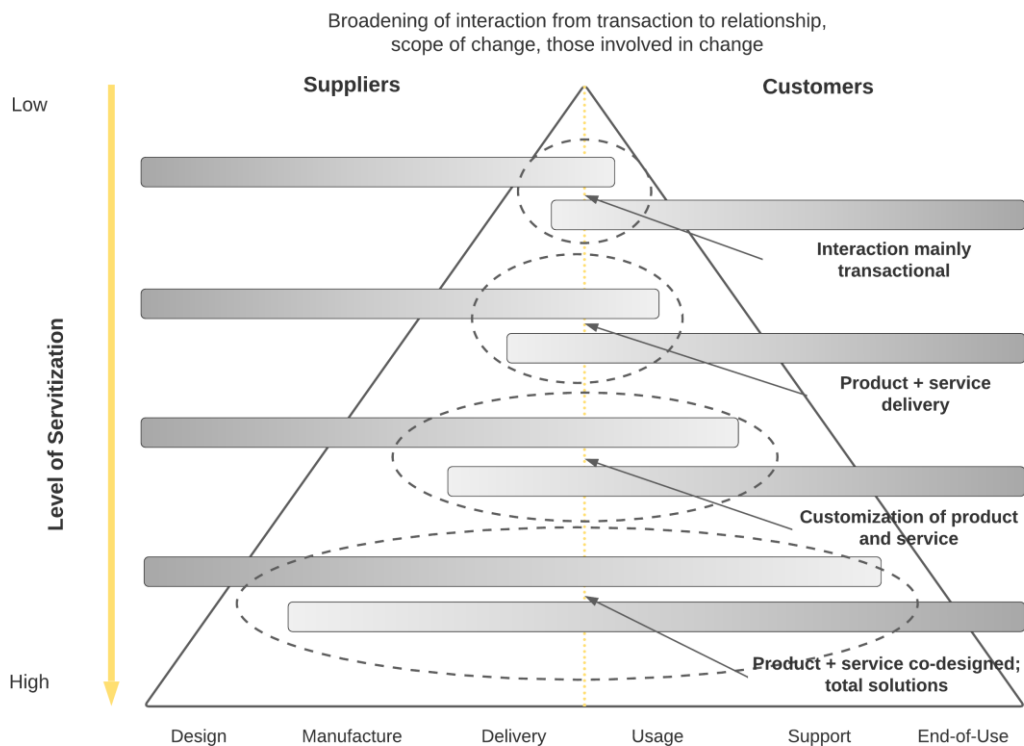
Studies that focus on the service types that manufacturing companies provide focus mainly on more prominent companies in developed countries. Industrial companies' most commonly offered services are customer consulting and customer support (Parida et al., 2014). Kowalkowski et al. (2011) provided a generic categorization for industrial service offering gives an excellent overview on the industrial service offering, conceptualizing them by the service category's focus and scope. In this scheme, most unbundled and product-related service types are repair and operations training. Long- and short-term rentals are on the other end as more process-oriented and bundled services. The classification scheme is represented in **Figure 7**.



**Figure 7.** A categorization of generic industrial service offerings (adapted from Kowalkowski et al., 2011).



Oliva and Kallenberg (2003) have introduced a popular product service continuum model, where companies move on the continuum towards more advanced services. While driving on the continuum, the company must develop new competencies that allow providing the new offering. It has been indicated by Martinetz et al. (2010, p. 461) that different internal and external barriers inhibit a company's journey to higher levels of servitization. Martinetz et al. (2010, p. 451) have examined the servitization continuum from the view of the customer-supplier interface as presented in **Figure 8**.



**Figure 8.** Customer-supplier perspective on servitization continuum (adapted from Martinetz et al., 2010).

In the servitization literature, servitized organizations are usually compared and analyzed on different levels of servitization. These servitization levels assess the meaning of services compared to traditional products (Oliva & Kallenberg, 2003). The higher the level of servitization is, the higher the significance of the services. In lower servitization levels, the value is generated more from transaction-based and asset ownership. In higher

servitization levels, the value basis activity is more relationship-based, the role of the asset is more connected to the utilization of the assets, and the offering is more customized to respond to the exact needs of each customer. For instance, Kowalkowski et al. (2011) concluded that to be on the list of preferred suppliers, multinational customers increasingly need the suppliers' capability to offer services also globally.

## **BENEFITS**

Understanding the benefits of implementing PSS is essential for understanding why a manufacturing company has moved or intends to move away from the traditional BM. According to Annarelli et al. (2016), scholars have agreed with the significant benefits that PSS implementation could provide. Mont (2002) has been one of the main contributors to clarifying the benefits of PSS implementation. Many authors have recognized that PSSs can benefit different stakeholders, such as companies (PSS providers), customers, service providers, the environment, and society (Beuren et al., 2013; Mont, 2002).

Several benefits recognized for the PSS providers might be the primary reason for designing and implementing a PSS. The main advantages of introducing a PSS are related to continuous **business improvement** and **increasing customer satisfaction** (Aurich et al., 2010; Beuren et al., 2013). It is argued that a PSS can provide **strategic market opportunities** and aid **growth in a mature industry** (Baines et al., 2007; Mont, 2002). Introducing a PSS can provide **higher profit margins** with a **more stable income** (Parida et al., 2014). It has been recognized that particularly smaller servitized firms tend to have higher profit margins when compared to same-sized pure manufacturing companies (Neely, 2008).

Customizing the offering to match specific customer needs improves the generated total customer value (Mont, 2002). Adding a service component to a BM can help attach additional value to a product and improve the customer relationship since cooperation and

information flow is enhanced (Baines et al., 2007; Manzini et al., 2001). Besides, customization of the offering and improved customer satisfaction will most likely strengthen customer loyalty, increasing the switching barriers. This so-called “**locking customers in**” has been recognized as a benefit in the PSS literature. Nevertheless, it is not just about locking customers in - having great relationships with customers help also **lock competitors out**. (Annarelli et al., 2016; Wise & Baumgartner, 2000) Also, closer cooperation with customers can help companies see new strategic market opportunities, trends, and other developments (Goedkoop et al., 1999; Mont, 2002, p. 240).

The service component of a PSS, flexibility, is suggested to help deliver superior functionality by fulfilling customer needs better (Baines et al., 2007; Cook et al., 2006). For instance, this means eliminating administrative or monitoring tasks away from the customer’s responsibilities and moving them to the service provider’s responsibilities, who certainly have the most know-how about a product. There is a vast potential in utilizing their know-how to deliver better in-use value for the customer (Baines et al., 2007). However, industrial companies should note that the outcomes for the PSS provider are greatly dependent on the effects that are experienced by a customer (Kohtamäki et al., 2019).

PSS has various benefits also to the customer side. As previously presented, customized offering **enhances captured value** on the customer side, responding better to changing needs. It is argued that customized offerings tend to have **higher quality** (Mont, 2002). For customers, PSSs allows different schemes for product ownerships and financing methods that best suit their purposes. For instance, in some cases, it can be a relief for a customer that a product stays in the ownership of a PSS provider. Therefore, for example, recycling a product can retain the PSS providers’ responsibility. One significant benefit is consumption efficiency (Annarelli et al., 2016; Cook et al., 2006).

Furthermore, BM literature has listed society-related benefits of PSS. Mont (2002, p. 240) argued that added services and product-service schemes could positively impact

**creating new jobs** since a functional economy can be extra labour-intensive than traditional mass production. Added services, such as repair and refurbishment, can have labour-intensive nature. However, it has also been stated that increased PSS sales can lead to a deficit of jobs in traditional manufacturing businesses (Baines et al., 2007). Also, the public benefits from the positive effects that PSS has on the environment.

PSS has been demonstrated to **lower the environmental impact**, which has been one of the most frequently recognized benefits (Annarelli et al., 2016; Baines et al., 2007; Williams, 2006). Although the strategic benefits of PSS have grown academic and business interest in PSS research, eco-friendliness retains its important position, especially now in current times when consumers and B2B-customers are increasingly becoming aware and more sustainability-demanding when it comes to environmental and sustainability aspects of business operations. Sustainability and eco-friendliness are also essential aspects and have an impact on the company's image. These have been identified as one of the benefits as they provide an opportunity to improve the corporate image (Wagner et al., 2013).

Also, the environment benefits since PSS can potentially change production and consumption towards a **more sustainable** way (Mont, 2002). PSS benefits the environment because it can decrease the overall amount of products and required raw material which is used to manufacture the products (Mont, 2002). This is called **dematerialization**. It often comes up in PSS literature and refers to an opportunity where PSS can decrease the amount of required material needed in the value creation process for the customer (Baines et al., 2007). Dematerialization is commonly associated with asset ownership structure change. Dematerialization can be explained by alternative product usages, such as renting, leasing, or sharing, which means that the customers do not pay for a tangible product but an intangible service. Changing customer attitudes towards service orientation, buying the ability to use a physical product instead of the product ownership, and switching towards "leasing-society", make PSS more beneficial. (Mont, 2002)

## BARRIERS

Besides the numerous potential benefits that PSS implementation could provide, various barriers are recognized in the PSS literature. For example, Mont (2002) has been one of the authors listing barriers in introducing a PSS. Barriers can appear in a design phase or an implementation phase. The most recognized barriers in the PSS literature are **customer acceptance** and **change resistance of companies** (Annarelli et al., 2016; Goedkoop et al., 1999; Manzini et al., 2001; Mont, 2002; Sakao et al., 2013). Thus, the significant barriers to implementing a PSS are found on both sides of the dyad (Baines et al., 2007, p. 7).

**Customer resistance** might appear since they are accustomed to acquiring products (consumption habits), not the new bundled product-service offering that a PSS provides (Rexfelt & Hiort Af Ornäs, 2009). For instance, there is a probability that customers are not willing to move to ownerless consumption, which is a feature of a use-oriented PSS (Mont, 2002). Therefore, **shifting mindsets** is a significant barrier to introducing a PSS (Neely, 2008). It is also presented that some customers might experience continuous payments (e.g. monthly payments for use-oriented PSS) as a negative financial obligation (Rexfelt & Hiort Af Ornäs, 2009). Hence, customer acceptance is considered a high potential barrier. Also, a long-term relationship between the PSS provider and the customer is usually a prerequisite to providing customized solutions (Rexfelt & Hiort Af Ornäs, 2009, p. 687). Long-term customer relationships require commitment from both parties. Customer resistance is a very high barrier for PSS implementation since it is usually considered that the starting point for a PSS is delivering a superior customer value for the customer.

Internal barriers can be an obstacle to adopting a PSS. The reorientation from a product manufacturing company to a PSS provider requires a fundamental shift in corporate culture and creates corporate challenges (Annarelli et al., 2016; Baines et al., 2007; Beuren et al., 2013; Mont, 2002). **Internal resistance** is a relatively common barrier that

organizations are facing (Barquet et al., 2013; Martinez et al., 2010). Employees might be afraid to change the current BM that is functioning well. Besides the fear of change, companies might face BM related corporate challenges. These include **lack of technology-related expertise, no experience in service designing, and lack of competent employees in service development** (Barquet et al., 2013; Kastalli et al., 2013; Neely, 2008; Visnjic Kastalli & Van Looy, 2013). Service design and development are related barriers primarily due to companies' history as manufacturing companies focused on product-selling. Hence, creating a service culture inside a manufacturing company can be challenging (Neely, 2008). For instance, Mont (2002, p. 243) argues that a social system or infrastructure should be found or created that supports the PSS scenario. Indeed, education and training are needed in an organization for PSS adoption. Reorientation, as an organization, requires a considerable amount of time and other resources (Mont, 2002).

Also, when a company starts providing a PSS, its responsibilities will most likely increase. For instance, in use-oriented PSSs, the ownership-related rights of a tangible product do not transfer to the customer. Hence the PSS provider will be responsible for the physical product for a longer time (Beuren et al., 2013; Tukker, 2004). Companies might be resistant to **extending the involvement** with a product's life cycle, which means the responsibility of disposal of the product (Mont, 2002). Depending on the PSS type, the PSS provider's **revenue model** can change significantly, potentially preventing companies from implementing a PSS because they have limited experience pricing the new kind of offering (Baines et al., 2007).

**Acceptance from stakeholders** is also one of the most recognized barriers in PSS literature. Annarelli et al. (2016) argue that approval is also required from the companies involved in the PSS provider's supply chain since their support is fundamental for PSS success. Also, implementing a PSS commonly affects different stakeholders. Thus it needs to be carefully designed (Beuren et al., 2013; Mont, 2002). The previously mentioned PSS-supporting social system or infrastructure is also necessary to manage different stakeholders. Therefore, a PSS requires close cooperation between PSS providers,

suppliers, and customers to create a “win-win-win” situation where all companies benefit (Annarelli et al., 2016; Mont, 2002).

Introducing a PSS also raises economic concerns. Filling the previously mentioned gaps can generate higher costs that occur from, for example, hiring new skilled people (Annarelli et al., 2016). Therefore, occurred **higher costs** than predicted can be one barrier to continuing implementation of a PSS. It is recognized that large servitized companies tend to have higher sales revenues but **lower profit margins** due to higher average costs of labour, net assets, and working capital than same sized pure manufacturing companies (Neely, 2008, p. 114). In addition, it is commonly assumed that customers are interested more in using an asset rather than asset ownership. However, customer demand and purchasing behaviour can be more complicated than generally supposed (Mont, 2002). Hence, **lack of profitability/market** has been listed as one of the barriers to implementing a PSS (Annarelli et al., 2016; Wise & Baumgartner, 2000). Thus, the customer value proposition should be known in-depth to provide a PSS successfully.

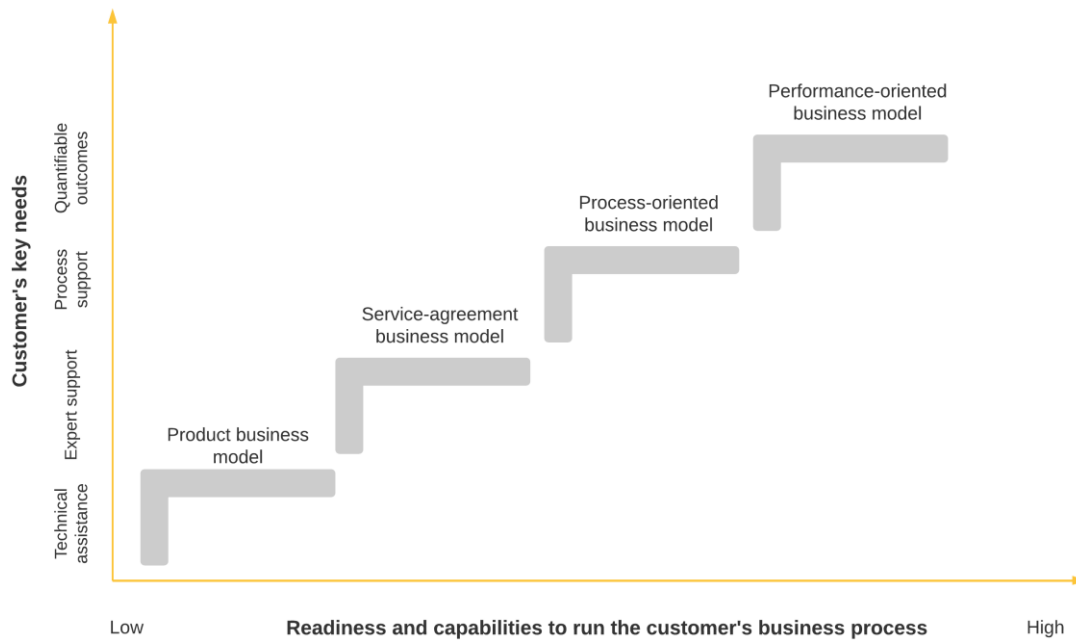
### 2.2.3 Different types of PSS

Different types of servitized BMs presented in the literature differ from each other by their characteristics. As the PSS definitions showed, PSS is understood as a BM, and often different types of PSS are considered as separate BMs (Aurich et al., 2010; Reim et al., 2015). For instance, Aurich et al. (2010) explain that new BMs must be developed for utilizing new potentials of offering a PSS. Studies have emphasized that selecting and designing BMs is central to successfully implementing a PSS (Mont et al., 2006; Reim et al., 2015; Wise & Baumgartner, 2000), but it is suggested that there is not only one correct strategy to decide to be successful (Kohtamäki, Henneberg, et al., 2019). Literature has highlighted that it is challenging to comprehend servitized BMs and that they depend heavily on the context (Huikkola & Kohtamäki, 2018, p. 62).

Literature offers different servitization-related BM classifications to help business managers to consider different BM configurations. For instance, Kohtamäki and Huikkola (2018, pp. 64–72) classified four distinct ideal servitized BMs types for manufacturers, which are: 1) *“the product business model”*, 2) *“the service-agreement business model”*, 3) *“the process-oriented business model”*, and 4) *“the performance-oriented business model”*. This classification is relatively new and represents a modern-day simplification of servitization BMs.

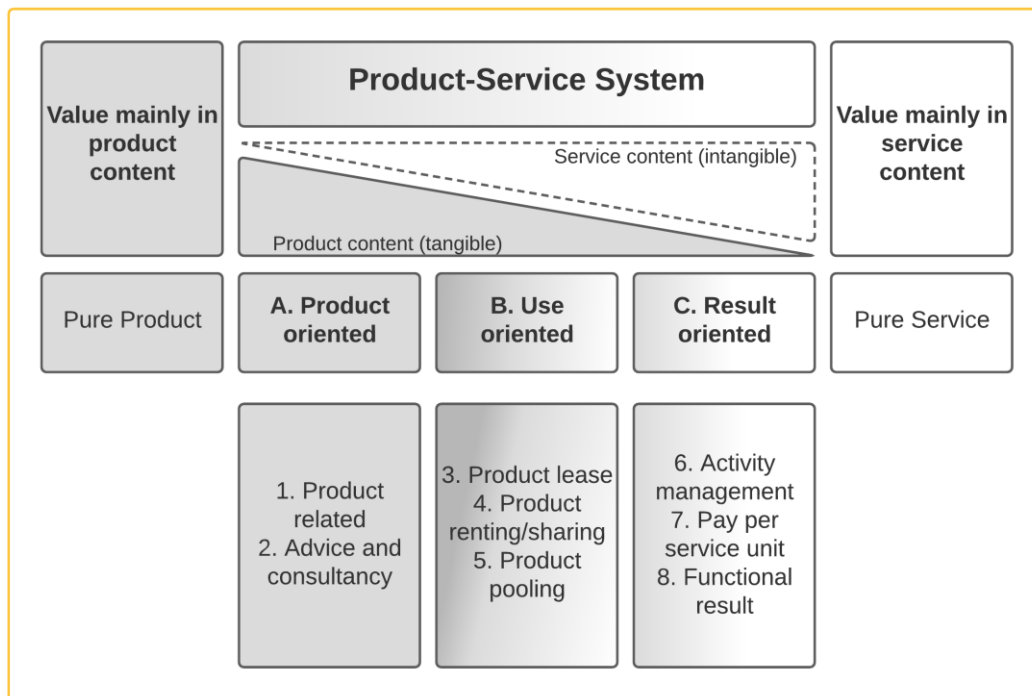
The first category, **product-oriented** BMs, present most likely the most commonly utilized servitized BM, where the emphasis is still on the selling and delivering of manufactured products, but some add-on services are included in the offering. **Service-agreement** models serve B2B customers and support the use of the equipment, product availability, and functionality. In **process-oriented** BMs, the logic is to decrease customers overall costs by outsourcing different services. In the last category, **performance-oriented** BMs, customers buy solutions to acquire competencies or release resources to allocate the capital elsewhere. (Huikkola & Kohtamäki, 2018) These servitized BM categories are assessed by the customer’s essential needs and providers readiness and capability to run the customer's operations in **Figure 9**.





**Figure 9.** Ideal types of servitized business models (adapted from Huikkola & Kohtamäki, 2018).

However, Annarelli et al. (2016) have argued that PSS literature has reached a shared consensus on different generic PSS categories and that the classification presented by Tukker (2004) is extensively employed in the PSS literature. The following three generic PSS categories are shown in PSS literature: 1) *“product-oriented”*, 2) *“use-oriented”*, and 3) *“result-oriented”* (Tukker, 2004, pp. 248–250). The upside of the model is that it is commonly used in the literature, it is straightforward to understand, and it is easy to get an overview of different PSSs. On the other hand, the model's downside is undoubtedly generic and published long ago. Since using the model is prevalent, it is presented in this literary review with more detail. The main and subcategories of PSS are shown in **Figure 10**.



**Figure 10.** Main and subcategories of generic PSS models (adapted from Tukker, 2004).

**Product-oriented PSS:** Traditional product holds a vital role in this PSS category. The provider manufactures tangible products and sells the products but includes supplementary services (Baines et al., 2007). Hence, in this category, the customer purchases a tangible product from the PSS provider and receives asset ownership and uses the provider’s services to add value to the product (Beuren et al., 2013). Tukker (2004, p. 248) divides the first category into “*product-related service*” and “*advice and consultancy*”. Product-related services can include but are not limited to financing, maintenance contracts, repair, re-use, and recycling. Advice and consultancy can consist of services, for instance, that advise the customer in the effective utilization of the physical product. Commonly, the provided services in this category aim to ensure product functionality. However, products are manufactured to satisfy individual customer demands, and the whole offering can be customizable to include services. (Baines et al., 2007; Barquet et al., 2013; Tukker, 2004)

**Use-oriented PSS:** This category emphasizes selling the product's use or availability rather than the product ownership. The product has still a central role, but the BM does not concentrate on product-selling in the traditional way (Tukker, 2004, p. 248). Therefore, in this case, the asset remains in the PSS provider's ownership, responsible for the asset's control, maintenance, repair, and disposal. The PSS provider's extended responsibility can sustain developing the product's durability and offer services that keep the asset in an excellent working condition. Therefore, it can maximize product usage by extending the life cycle. The provider's liability and interest in products increase because maintenance and repair costs also are their liability. Examples in this category are *leasing, renting, and sharing (pooling)*. (Baines et al., 2007; Barquet et al., 2013; Tukker, 2004)

**Result-oriented PSS:** In this category, a customer buys a result, a capability, or a competency instead of a tangible product or intangible service, and the PSS provider agrees to provide the result to the customer (Baines et al., 2007; Beuren et al., 2013; Reim et al., 2015). In result-oriented PSS, an asset's rights shall stay with the PSS provider, and the customer agrees to pay according to the agreed results of the customized mix of a product and additional services. Subcategories in the result-oriented PSS category are "*activity management/outsourcing*", "*pay-per-service unit*", and the "*functional result*" (Tukker, 2004, p. 249). In an "activity management/outsourcing", an activity is outsourced to an external party (e.g. cleaning without specifying a particular product). A customer does not buy a product in a pay-per-service unit but only output that the provides promises. In "functional result" models, the PSS provider agrees to deliver a specific result in rather abstract terms (e.g. delivering a pleasant climate rather than a climate machine). (Baines et al., 2007; Tukker, 2004)

From product-oriented to use-oriented generic PSS models, the product's reliance on the value creation process decreases (Tukker, 2004, p. 249). However, all different PSS categories seek to fulfil customer needs by offering a mixture of products and services structured to provide the desired function (Baines et al., 2007, p. 5). Industrial companies that intend to move toward a servitized BM usually need to move away from

standardized products to advanced services more and customized solutions (Kohtamäki, Henneberg, et al., 2019). When examining different PSS models, value creation, value delivery, and value capture perspectives can be examined. The main differences in these phases among the different PSS models are described in **Table 7**.

**Table 7.** Comparison of generic PSS categories (adapted from Reim et al., 2015).

	The orientation of the PSS model		
	Product	Use	Result
<b>Creating value</b>	The service provider takes responsibility for the contracted services.	The service provider is accountable for the functionality and usability of the product and the related services.	The PSS provider is responsible for delivering results for its customers.
<b>Delivering value</b>	The PSS provider sells a tangible product and offers product-related add-on services.	The PSS provider ensures the functionality and usability of the physical product alongside the service.	The PSS provider delivers promised results to customers.
<b>Capturing value</b>	The customer is paying for tangible products and the performed services that are product-related.	The customer makes periodically occurring continuous payments.	The customer pays for the results delivered by the provider. Payments are outcome-based.

Literature suggests that different business units within a single firm may have distinct strategies and, therefore, follow their separate BM (Kohtamäki, Parida, et al., 2019). It has been recognized that companies frequently struggle in the reconfiguration of a BM when moving from traditional BM to PSS model (Adrodegari et al., 2017). Therefore, literature has provided different frameworks for aid to shift to PSS BM. For instance, Adrodegari et al. (2017, pp. 1255–1257) developed a framework to support industrial companies, especially SME companies, design future BMs. The framework includes all the relevant variables that should be considered to shift from products to solutions. Also, Barquet et al. (Barquet et al., 2013) developed a framework that supports PSS adaptation by employing the BM concept. Utilizing the BM concept, for instance, the BMC

framework (Osterwalder & Pigneur, 2010), has been suggested to provide fruitful approaches on future PSS studies (Barquet et al., 2013; Kohtamäki, Henneberg, et al., 2019).

### **2.3 Synthesis**

This literature review section blends the two research fields presented in the literature review – business models (BM) and product-service systems (PSS). This section summarises the research areas, which will work as a solid theoretical base for the empirical study of the thesis.

First of all, the literature review on BM literature focused on describing BMs and different definitions, illustrating various BM components that explain where BMs consisted, describing BMI's meaning, and illustrating the generic BMI process. For instance, it was suggested that the BM concept helps solve strategic issues like competitive advantage, company performance, and value creation which are the essential part of the empirical study (Foss & Saebi, 2016; Zott et al., 2011). Furthermore, scholars have recognized that firms should adapt their BM according to changes in their competitive environment (Achtenhagen et al., 2013; Doz & Kosonen, 2010). Therefore, a deeper understanding of the BM concept helps recognize and analyze these issues. Also, the BM concept helps explain and develop business (Spieth et al., 2014). In this thesis, the BM concept is used for two different purposes. These are to explain the business of the case company to the researcher and provide information to the case company's management to help develop their business.

The second part of the literature review first explained the PSS research background and presented some standard definitions for PSSs. Then the literature review moved to handle servitization as a phenomenon briefly, presented some of the most common industrial services, and presented some of the well-known benefits and PSS adaptation barriers. Then, ideal servitized BMs and different generic types of PSSs were introduced. Definitions were presented to understand the concept of PSS better, and servitization was

introduced to understand the phenomena better. Describing different PSS models was done to recognize the differences in each model and the main acknowledged benefits of the models. Understanding the generic PSS models will be helpful when analyzing the barriers in the shift to use-oriented PSS.

The literature review showed how complementary the two research fields are. The BM research field seeks to provide knowledge about the BMs, from which components they consist, and the type of process of developing new BMs (BMI process), whereas the PSS research field studies particular types of BMs where tangible products and intangible services are bundled into a single offering. For instance, it was argued that servitization is commonly seen in a BMI context, which means deliberately developing a BM and changing the value creation logic (Parida et al., 2014). It has been highlighted that to offer an attractive PSS or any other well-functioning BM, customer problems must be well known and the customer value proposition well understood (Johnson et al., 2008; Osterwalder & Pigneur, 2010; Parida et al., 2014; Teece, 2010). Therefore, utilization of different BM tools and frameworks might offer fruitful approaches to studying PSS from different viewpoints (Adrodegari et al., 2017; Barquet et al., 2013; Kohtamäki, Henneberg, et al., 2019).

Studying the potential barriers in the shift to use-oriented PSS utilizing the BM concept from a smaller supplier's perspective in a unique single case study can provide valuable in-depth knowledge and possibly support existing understanding of the research field. It can be considered as a fundamental approach since, during the literature review, it was also recognized that many of the PSS studies focus on large enterprises (e.g. Parida et al., 2014). Having a smaller company as a case company in the study enables generating knowledge from a different perspective.

However, when considering alternative business logic and BM, it is very feasible that different challenges occur. As Martinetz et al. (2010, p. 461) have presented, various internal and external barriers inhibit a company's journey to higher levels of servitization.

Therefore, it can be assumed that different barriers are faced when planning the shift to use-oriented PSS. In addition, Storbacka et al. (2013) argue that examining solution businesses applying a BM lens is vital for two primary reasons. Firstly, it underlines the challenges related to the transformation toward a servitized BM, and secondly, it enables comparison in different business contexts (Storbacka et al., 2013). These arguments support the utilization of the BM concept to recognize different barriers.

It has been recognized that successful PSS implementation requires more insights and understanding of a customer value proposition and the challenges they face (Parida et al., 2014). Thus, when making BM configurations, the customer's jobs must be recognized and guide the process (Johnson et al., 2008; Osterwalder & Pigneur, 2010). Since it has been recommended in the existing literature, the customer perspective is included in the study. The BM concept enables a closer examination of customer problems that the current BM can solve and see the value-generating factors—in other words, seeing the correct customer value proposition. For instance, the literature review showed that customers are commonly assumed to be more interested in using an asset rather than asset ownership, implying that use-oriented PSS might not always be the right fit (Mont, 2002). This study intends to investigate these issues in a new light using a unique case. Subsequently, the empirical study of the thesis investigates potential PSS barriers employing the BM concept.

### **3 METHODOLOGY**

The thesis' methodological choices and the case utilized in the empirical part of the thesis are introduced in this chapter. First, the chapter will present the case company briefly and describe why it is chosen for this study. Then the chapter explains the research strategy and research method of the empirical study. Furthermore, the chapter introduces and discusses data selection, the different methods for data collection and data analysis techniques.

#### **3.1 Case selection process**

The study has been an assignment given by the case company. Therefore, case selection has been evident. The involved case company is a Finnish family-owned industrial company. The case company operates in a narrow and sophisticated industry and manufactures equipment that their customer utilizes in their manufacturing process. The case company has one major customer, which covers most of the case company's sales revenue. There are also some other minor customers, but the business focuses on its most prominent customer, whose business has been in solid growth during past decades, and this way also opened up new opportunities for the case company. For the sake of a non-disclosure agreement, no more specific information about the company or its client, such as company names, or product names, are not provided.

The case company is continuously seeking ways to enhance the value creation for its customer. Currently, the case company has applied a BM where they offer the core product and product-related services. Now, the case company is exploring alternatives for improving value creation and value capture. For instance, leasing the equipment (e.g. use-oriented PSS) is one of the alternatives that has been considered.



The literature review pointed out that servitization studies focus on large firms measured by sales revenue and employees (Neely, 2008). Therefore, studying a smaller servitized company in-depth is essential to give different perspectives and fruitful insights on the phenomena. Since most companies are SME companies, this case study can provide a more profound knowledge of the phenomena. Hence, this study represents a unique case study and views the issue from the supplier perspective.

### **3.2 Research strategy and method**

When choosing a research strategy, the most important thing is to answer the specific questions that the researcher wants from the research to achieve a particular objective (Saunders et al., 2007; Yin, 2009). Business researchers choose case studies as a research strategy because it is flexible and suits many purposes. Because of the diversity, case studies are often characterized as a research strategy or approach instead of a research methodology or method (Eriksson & Koistinen, 2005, p. 4). However, case studies are the desired research strategy when research questions “how”, “what”, or “why” are asked, the researcher does not have significant control over the events, and the phenomenon is contemporary (Saunders et al., 2007; Yin, 2009). The strength of case studies is the possibility of combining different evidence sources (e.g. archival data, interview, observation).

In general, case studies can be categorized into three main groups: 1) exploratory, 2) explanatory, and 3) descriptive, and a case study can either contain a single case or consist of multiple cases (Yin, 2009, p. 8). A single case study concentrates on a single unit of analysis (e.g. a company), whereas multiple case studies focus on many different analysis units. One justification for conducting a single case study is when something unique or extreme is being studied, or a well-formulated theory is tested (Maylor & Blackmon, 2005, p. 246; Yin, 2009). Besides, a single case study is helpful if a researcher wants to

study a specific organization or have limited time for conducting the research (Maylor & Blackmon, 2005).

The conducted research is an exploratory single case study since it in-depth studies a specific unique organization, and the researcher has barely any control over the events. An exploratory case study helps determine what is happening around phenomena, pursue new insights, and raise questions to consider a phenomenon in a new light (Saunders et al., 2007). Furthermore, it is a suitable research strategy since the researcher has limited time for the study. Business and management researchers usually prefer case studies as a research strategy for various practical and theoretical reasons. For instance, a case study allows a researcher to retain a real-life event's holistic and meaningful characteristics. Scholars have applied case studies because the method's flexibility suits studying complex, evolving relationships and interactions in industrial markets. Also, it could be that the time spent on an exploratory case study can point out that the research is not worthy of pursuing further (Saunders et al., 2007).

One commonly recognised weakness of case studies is that the results are rarely generalizable (Eriksson & Koistinen, 2005; Yin, 2009). Ungeneralizability is a result of that a case study studies a contemporary phenomenon in-depth. However, generalizing the findings is not a common purpose of conducting case studies but producing detailed and specifying information on the subject studied. On the other hand, case studies' flexibility allows the researcher to modify the research if some circumstances change (Farquhar, 2014). One of the recognised case studies' strengths is the flexibility to change the study's direction due to new research data that appear and new insights that occur.

### **3.3 Data collection**

There are two distinct methods for collecting and analyzing data: quantitative and qualitative. The main difference is that quantitative data can be measured or counted,

whereas qualitative data is more descriptive and conceptual. Generally, research data is divided into primary data (the researcher collects for the study) and secondary data (already existing, collected by someone other). This study utilizes qualitative methods, more precisely semi-structured interviews, to gather primary data.

This single case study utilizes both primary and secondary data. The primary data for the study was collected using semi-structured interviews, observations, and workshops. Therefore, the primary data used in this study is divided into interview transcripts and observation notes. The secondary data utilized in the case was different written documents such as company presentations. Semi-structured interviews were chosen as the primary data collection method because of the best suitability for this single case study. The significant advantage of semi-structured interviews is that they are more flexible and allow an interviewee to answer more freely on the interview questions, and the interviewer can come up with follow-up questions to specify the answers. Thus, the interviewer can collect more rich data compared to a very structured interview. (Eriksson & Kovalainen, 2015)

Individuals from the case company organization and their customer organizations were included in the interviews to deliver a holistic picture of the case. The literature review (e.g. Osterwalder & Pigneur, 2010; Teece, 2010) suggested that customer perspective (e.g. challenges and desires) should also be integrated into the BM analysis, which was one of the reasons to have interviewees also from the customer side in the case context. The interviewees were selected according to their relevance and involvement in the case context to improve the study's quality. The interviewees were contacted with the help of the case company group president.

The interviews were conducted during March and April 2021. Because of the unfortunate COVID-19 setting, only one face-to-face interview was conducted. Different applications, such as Zoom meetings and Microsoft Teams, were utilized to arrange and record the sessions and workshops. Eight interviews were held during one month from

23.3.2021 to 22.4.2021. Finnish was a natural choice of the interview language since it was the native language of all interview participants. The total length of the interviews was 440 minutes. The data were collected under a strict non-disclosure agreement; hence, no more detailed description will not be provided than one presented in **Table 8**.

**Table 8.** Interviewees.

Inter- viewee	Organization	Title	Years in the organization	Date	Length	Channel
1.	Case company	Business Controller	5	23.3.2021	62:12	Face-to- face
2.	Case company	Group President & CEO	25	24.3.2021	80:12	Video meeting
3.	Customer	Global Category Manager	20	13.4.2021	52:18	Video meeting
4.	Customer	Production Man- ager	4	16.4.2021	55:56	Video meeting
5.	Case company	Service Manager	20	16.4.2021	41:05	Video meeting
6.	Customer	Product Develop- ment Engineering Manager	12	16.4.2021	42:35	Video meeting
7.	Case company	Head of product design	12	21.4.2021	50:38	Video meeting
8.	Case company	General Manager, services	9	22.4.2021	55:35	Video meeting

The interviews roughly followed a predetermined semi-structured set of interview questions, which are demonstrated with different examples in **Appendix 1**. Predetermined questions were done to ensure that all the relevant topics would be discussed, but the predetermined questions involved minor changes depending job position of the interviewee. Semi-structured interviews allowed interviewees to express their thoughts more freely and enabled the interviewer to ask follow-up questions to the issues interviewees mentioned, giving more insight and fruitful data.

### **3.4 Data analysis**

This study utilized an inductive analysis approach and used content analysis as a data analysis method. The single case was used as an analysis unit because the interviews were conducted in the case context. It is suggested that the qualitative data analysis should start immediately after the primary data is collected (Farquhar, 2014). Hence, the researcher reflected on what the interviews said and not said during the interviews. For instance, observation notes were written down during the interviews, including notes on, for example, interviewees' body language. After a single interview was conducted, the data analysis continued with transcribing process. All interview recordings were transcribed to text format instantly after the interviews were held. The interview transcripts consisted of a total of 59 Microsoft Word document pages.

Because data utilized in case studies usually consists of data from different sources, it is suggested that findings of these data set are put together to enable a holistic evaluation of data (Farquhar, 2014). Hence, observation notes taken from the interviews were combined with interviewing transcripts during the transcribing process. After the transcripts were completed, data were coded and categorized. The data analysis phase sought emergent theoretical constructs or insights from the interview data by recognizing shared ideas or themes that emerged during the interviews. After the data were categorized and unitised, relationships between different categories were uncovered, and finally, theories were developed to reach conclusions (Saunders et al., 2007).

### **3.5 Reliability and validity**

Reliability and validity are essential matters that must be discussed to ensure the quality of the research. First of all, the reliability of the study refers to the study's repeatability,

to the extent to which data collection or data analysis techniques lead to consistent findings. The research should be repeatable, and another researcher should receive similar results with the same research methodology. Nevertheless, it has been stated that semi-structured interviews are not meant to be repeatable as a data collection technique because the primary data present the time when it was being collected (Saunders et al., 2007). Therefore, time most likely will affect reliability, leading to different results. Making precise data collection and analysis descriptions can increase the study's reliability, but a more extended time between studies would likely impact the results.

Validity concerns whether the findings are really about what they seem to be (Saunders et al., 2007). Thus, validity indicates how well the research methods used in the study measure precisely the characteristics of the phenomenon being studied, which is intended to be measured. Using clarifying questions in the interviews already strengthens the validity of the study's findings. Furthermore, external validity is also referred to as generalizability, which means that the results are generalizable in other settings, such as in other companies (Saunders et al., 2007). Because this thesis studies a unique case through an exploratory single case study, the results are not generalizable to other settings. In these cases, the purpose is not to produce a generalizable theory but fruitful insight from the particular research setting.

## 4 FINDINGS

The fourth chapter presents the findings of the empirical part of the thesis. These findings are presented in a structured manner. First, the chapter will present the case context, and the case company's BM is generally being discussed, and it is also being described what industrial services are offered, how the services have been established in the case context and what factors affect this. Secondly, customer problems and value creation factors are analyzed to clarify the customer value proposition. Third, the potential barriers to moving to use-oriented PSS are presented and discussed based on the collected primary data. Finally, a summary of the findings is presented. Provided interview quotes are examples to illustrate the issue presented in the text but do not include all the quotes that are related to the issue.

### 4.1 Case context

Since understanding service-oriented BMs has been stated to be complex and context-dependent (Huikkola & Kohtamäki, 2018), the case company's BM and the servitization journey in the case was analyzed to understand the context better. The purpose is to give more insight into a PSS model from this unique case, which complements the PSS research.

The case is unique because the case company operates in a narrow industry, focusing on serving only one customer. The case company has been manufacturing and selling its products to the primary customer, utilising them in the manufacturing process. Hence, the products of the case company are a critical part of its customer's manufacturing process and the whole business. As mentioned, the industry is extraordinarily narrow and requires a considerable amount of industry-specific know-how. There are relatively few competitors globally. The case company had provided its products since its

establishment 30 years ago, and during its early phases, it provided just basic product-related services such as modification and repair services. However, coming to this day, it has begun to widen the service offering to serve the customer better and enhance the value creation. Eventually, the case company has divided its product manufacturing and services into different business units.

*“We help them (the customer) make world-class products. We are one part of it. That is our main idea, and we are trying to develop our activities in our area. By developing our manufacturing technology, as well as our potential new services.”*  
(Interviewee 2)

Eventually, the customer relationship has become extremely close and intensive. The customer relationship has developed into a strategic partnership between the companies during the past decades. The data suggest that the purpose is that the partnership must serve and create value for both sides of the dyad. One interesting revealed fact was that the case company managers said they had many customers despite these actually being different executives inside the same organization. In other words, they have segmented their offering to different teams or divisions (i.g. production, R&D, product design) within the same corporation.

*“We have different customer segments inside the company. For instance, production and product development departments.”* (Interviewee 1)

*“Although it is the company to which we sell the products, we have many individual customers within the company in different positions.”* (Interviewee 2)

The case company's current BM was analyzed through a BM workshop with its executive team to receive a good overall picture of the current status and operations. Some board members also have an operational role in the organization, which gives a more comprehensive picture of the present status. The workshop gave an excellent overall picture of the company and the sophisticated niche market it is operating in currently. In addition, the one-on-one interviews shed light on different aspects of the PSS model. For instance, how the offered services have been born and which factors have impacted the



establishment of the services. Besides, the value proposition of the current PSS offering and the challenges of the current model were analyzed.

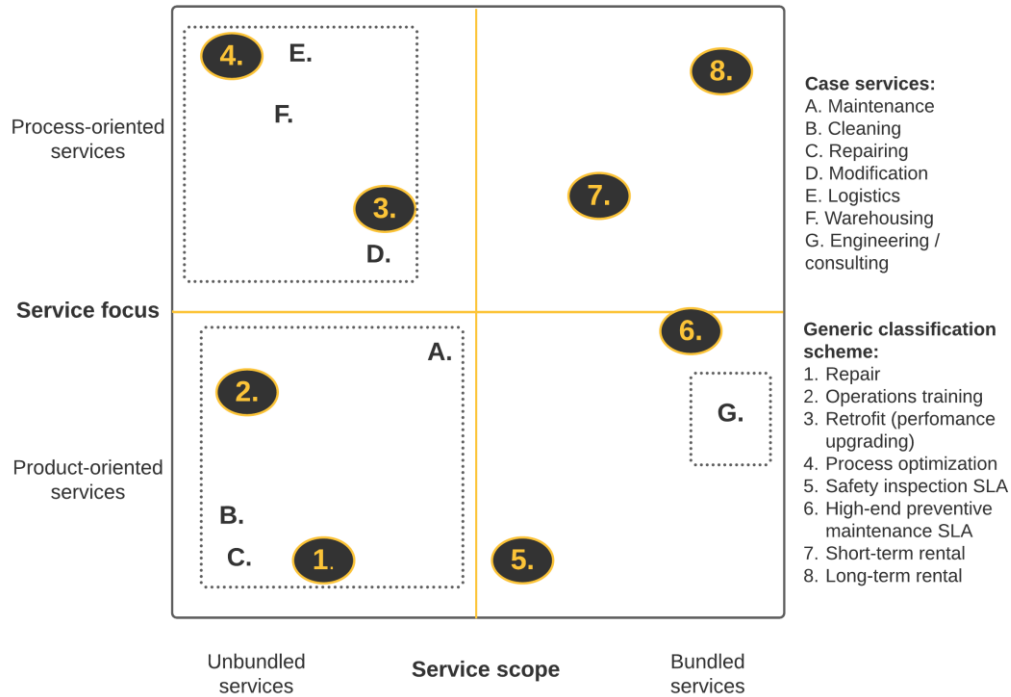
#### **4.1.1 Servitization in the case**

Previous studies have indicated that manufacturing companies usually start with essential add-on product-related services and eventually move towards more advanced services and high-value-adding (Martinez et al., 2010; Oliva & Kallenberg, 2003; Parida et al., 2014). The collected primary data also showed evidence for these theories of servitization continuum in this single case study. For instance, if the case context is analyzed through Martinez et al. (2010) model of servitization continuum from the perspective of the customer-supplier interface, the model and its different levels are reasonably descriptive and functional, and it illustrates well different stages that the case company, for example, has gone through. Therefore, the case company's servitization journey can also be illustrated with the model.

Initially, the case firm has offered more basic, strongly product-related services where interaction have been primarily transactional. These services have been mostly related to cleaning, repairing, and maintaining the sold products. Afterwards, the company has added more services to its offering to enhance its business and move towards more process-oriented services. These have included services such as assembling, engineering services, logistics management, and warehousing services. Besides, the most common industrial services (Parida et al., 2014), such as customer support and consulting, are also found in this case.

The company's servitization journey has progressively moved to higher levels of servitization, where the products and services are customized based on the specific customer desires and needs. Despite the relatively small size of the case company, it has continuously moved towards servitization levels where the products and services are designed

for specific customer requirements or even co-designed with the customer. The case services are illustrated on the classification scheme chart in **Figure 11**.



**Figure 11.** Case services (adapted from Kowalkowski et al., 2011).

Reinforcing the service offering has required both new competencies and resources from the case organization. Interviewees described that these had been acquired by purchasing machines that have enabled the offering of the new services or completing business acquisitions from other companies. An interesting finding was that some of the case company's services were acquired from their primary customer, which has outsourced its equipment maintenance activities. These subdivisions have subsequently grown into an essential part of the whole business of the case company. The justification for outsourcing functions is that these functions have not been the core competence or activities of the customer organization, and thus it is not reasonable to spend too many different resources on it. As the case company is an expert in the narrow field, it was considered to perform the task as efficiently as possible in different terms, such as quality,

cost and time. Efficient working in terms of quality, cost, and time generate considerable value for both sides of the dyad.

*“Services and competencies have been acquired, for example, through business acquisitions.” (Interviewee 1)*

*“They can accomplish these required tasks much more efficiently. We do not have the competence or resources. They are the experts in the field.” (Interviewee 4)*

The interview data suggested that the development of the industrial services, in this case, has focused mainly on different technical solutions to bring more efficiency or cost savings to operations. Several interviews revealed that the deployment of newer technology had been a significant factor in the emergence of new services and the development of existing ones. It appears that in a small industrial organization, the developing existing service offering by utilizing the latest technology has been easier to justify to the own organization and customer organization from the perspective of increasing cost efficiency. Thus, service development has contributed more to the technology-driven development rather than deliberately developing the BM. Observation notes demonstrated that some executives were uncertain about the deliberate BM development when it was discussed how services are developed in BM terms.

*“Yes, it is almost more in the daily conversation (\*ponders a bit about whether the business model is actually being developed\*). But perhaps it is more about developing certain aspects of it.” (Interviewee 2)*

*“Perhaps we are fundamentally focused on such possible new technical solutions.” (Interviewee 4)*

*“I believe that in the future, it will be more about getting some device, like a robot, that uses artificial intelligence to learn to perform these time-consuming tasks more efficiently. For example, in these equipment cleaning services.” (Interviewee 8).*

Interviews indicated that often the service is established or developed based on the customer's pure need. This cluster was the most distinguishable among the primary data.

The interviews revealed that the enhanced communication in the partnership has helped improve the quality of services and the value experienced by the customer. Improved communication has helped to co-design the offering to create value for both parties.

*Well, those services have evolved through communication, so that the more things are done together and in cooperation, the more it helps to take both parties forward. (Interviewee 6)*

*“Our services are established out of pure needs of the customer. Sometimes, it can also be emergent. For example, during processes, it is noticed that something is needed or could be done in another way or with different machines. Then this idea is started to be worked on. Nevertheless, the biggest reason is perhaps the pure customer need.” (Interviewee 1)*

*“Our objective is to help them by developing manufacturing technology and potential new services. Everything always starts with the customer's need. We need to justify to them all that what they are buying and at what price.” (Interviewee 2)*

Interviews with the case company managers and the secondary data prove that moving towards more advanced services has positively impacted the case company's revenues. This finding supports previous knowledge since Parida et al. (2014), for example, have also concluded that simple add-on services have only a limited impact on revenues versus more advanced services. The service offering in the case has gradually widened also to offer process-oriented services with service agreements. With the services agreements, the company has succeeded in stabilizing the fluctuations in sales revenues, but the sales revenue is still highly dependent on the sales of the new equipment.

*“It is developing the value creation. That is largely the case at the moment. There are currently no revolutionary new services coming up. As technology evolves, at the same time, we must be involved in it in order to enable higher-quality, more efficient, more cost-effective services for customers. That is, improving service quality which is perhaps the number one priority.” (Interviewee 1)*

Improving the customer value was experienced as the most crucial thing in establishing new services and developing existing ones. Many of the interviewees acknowledged it as the base for providing any services for the customer. Especially in this kind of partnership where the supplier has only one primary customer, everything is done based on the specific customer needs.

**Table 9.** Factors affecting the creation of new services and service development.

Factor	Example quote(s)
Pure customer need	<p><i>“Well, the customer has had a need. For example, that we should make various amendments. Since then, we have begun to consider how we could do it in a given time frame. That is how it is formed – then this service starts to develop deliberately.”</i> (Interviewee 8)</p> <p><i>“If our customer needs something, we say yes by 99% probability. If they want something, then we have to start to think about how we could offer this to them.”</i> (Interviewee 1)</p>
Development of technology	<p><i>“Machinery and equipment, of course. In addition, a certain kind of automation. Our services have had to develop tremendously. That development is continuous and daily. How could we perform the services faster, better and cheaper.”</i> (Interviewee 2)</p> <p><i>“Technology has advanced, and our products have become even more complex. Based on this, we have also had to develop our services and own processes to be able to offer customers what they need.”</i> (Interviewee 1)</p>
Emergent from the processes	<p><i>“Some services can also be emergent. Meaning that it has been recognized and understood during a process that something is needed or could be done in another way. Then this idea is started to be worked on.”</i> (Interviewee 1)</p>

The data analysis phase found three dominant factors that affect creating new industrial services or developing the currently offered ones in this case. These factors, with example quotes, are presented in **Table 9**.

#### 4.1.2 The case business model

BMC framework was a beneficial tool for simplifying the complex servitized BM during the analysis phase. Analyzing the business through the BMC lens helped recognize essential characteristics of the case company's BM. Also, the case company executives that participated in the BM workshop found it a valuable tool to analyze the different aspects of the business. Comparing the case BM to the generic PSS model categories and placing the BM in the correct category was not effortless because of the case model's multiplicity and uniqueness.

First, as proposed in the literature, Tukker's (2004) model of PSS models is quite generic, making it difficult to place the case PSS on a specific category. The case company's BM has different characteristics from various categories and subcategories. Analysed through this lens, the BM is closest to the product-oriented PSS category since the customer buys a tangible product and receives ownership of the product. In addition, the customer utilizes the provider's services to add value to the product.

The model also includes some characteristics found from the result-oriented PSS category. It involves activity management services (maintenance, logistics, and warehousing), and at the same time, the customer buys a capability and functional result with the services it has outsourced. However, the more recent PSS model presented by Huikkola and Kohtamäki (2018) was a better model to recognize the optimal generic PSS model. This model is more likely to be up to date and respond to the generic classification of different PSS models. In this classification, the case company's BM is closest to the process-oriented model since their service agreements aim to decrease the customer's overall costs since they can perform specific tasks much more cost-effectively as a specialised organisation.

Furthermore, previous research has discovered that designing a functional and customer-centric PSS requires more effective understanding and effective communication of a value proposition that meets customer needs (Parida et al., 2014); therefore, the BM concept was utilized simplistically to describe and explain an organisation's business (Baden-Fuller & Morgan, 2010; Morris et al., 2005). The analysis presents the logic of how a company creates value for itself and to its customers (Osterwalder & Pigneur, 2010; Teece, 2010). Therefore, the value proposition canvas, which is a central part of the BMC, was used to analyze the value creators of the current PSS model and what customer problems the offering solves. Understanding the customer pains and the principal value generators plays a central role in making a deliberate change of the PSS model. Acknowledging the customer pains and gains makes it easier to recognize different barriers that could prevent the shift to use-oriented PSS.

### **CUSTOMER PROBLEMS (PAINS)**

The primary data suggest that PSS offering can be crucial for customers' business operations. The interviewees from the customer organization described that the provided combination offering of products and services is a highly critical part of their business and help them to create value for their customers. Analyzing the primary data derived from the interviews with the managers of the customer organization proposed that the PSS offering solves customer problems, or so-called customer pains, which are mainly related to **key resources** and **key activities** BM components. These themes were discovered in the data analysis phase when individual issues were put together viewing through the BM concept lens analysis.

*“If we did not have this offering, we would not be able to fulfil our made customer promises. We would not be able to deliver our orders. Yes, it is quite a critical entity for us.” (Interviewee 4)*

The customer organization experienced PSS offering a critical entity to being able to provide their made customer promises. Outsourcing activities and buying services from

external service providers has been a customer's strategic decision. Leaving certain activities in the service provider's responsibility has been considered a reasonable decision as, as experts in the field, they perform certain activities more efficiently and at a much lower cost. These include, for instance, equipment cleaning and maintenance. Since the activities have been outsourced, the service agreements solve key activity-related problems, which are also highly connected to key resources. These resources are related to, for example, time and expertise.

*"I believe that the problems are resource and resource management related. These jobs that they help us to complete are not our core competencies. It is always possible to do it yourself, but it is more convenient that somebody can help us - and we can focus on our core business. Focusing on the core business is the thing." (Interviewee 3)*

Customer interviewees emphasized that some of the processes they could perform by themselves, but viewed comprehensively, it was not considered very rational. During the interviews, it was often brought up that they do not have as high a level of expertise as the PSS provider has. Since the case company produces a large share of the equipment bought and used by the case organization, they know best all the product features, which improves the quality of provided services, such as maintenance, modification, and cleaning services. Also, they get insights about the equipment manufactured by competitors since they maintain them. The lack of expertise was experienced as a problem that the offering can solve. Offering valuable expertise and knowledge and taking care of specific activities aids the customer to focus on their core business.

*"They can provide us competencies that we do not have." (Interviewee 4)*

*"They solve different resource and capacity issues. Without their services, we are not able to produce our products. Also, because of the close physical location, the delivery times for both products and services are short." (Interviewee 6)*

In addition, the product side of the PSS offering provides them with the additional capacity that the customer needs for equipment their procurement. There is only a limited number of equipment manufacturers in this product category, and the customer must



rely on multiple equipment suppliers for safety reasons to ensure the availability of the equipment. Therefore, the case organization helps to solve capacity of equipment related problems by offering tailored equipment and engineering services. Guaranteeing the availability of the products and offering short delivery times from the design stage to the finished product has been considered necessary.

Summing up the customer pains, the PSS solves customer's problems that are connected to key activities, including but not limited to production support and problem-solving activities, which require key resources that are mainly human-related (e.g. intellectual property, industry-specific knowledge) and physical such as various machines and robots that are enabling different services.

### **VALUE CREATORS (GAINS)**

There were distinctions in the study's primary data as to which side was experienced more significant in the value creation process, the manufactured products or the provided services. Especially interviewees from the customer organization found the matter difficult because they felt that the products and services are strongly intertwined as an offering. It was concluded that the customer views the products and services as a combined offering rather than small individual activities and tangible products when considering the value creation process. Interviewees from the case organization had separate opinions, mainly based on their position.

However, interviews gave a remarkable insight into how the provided industrial services' role is seen in the case company. Some executives described that their customer does not need the physical product precisely, but the results it can create. Furthermore, an interesting perspective was that the product was described as an enabler, which currently is enabling the service offering. In this case, it would not be possible to provide all the services without the product.

*“In my opinion, the value generated by the products is greater if we want to be the customer's largest product supplier and Europe's largest manufacturing company in this industry. The most important thing for the customer is that they receive our products on time with high quality. There is not much expertise available that we can offer.”* (Interviewee 1)

*“In a way, our services are more important in value creation. Of course, the product is important, but we are trying to develop the added value that we could attach to the product. After all, they do not need the products, but they need the products' results. The product is an enabler. We should delve deeper into that idea.”* (Interviewee 2)

*“Generated customer value... it is a multi-stage entity.”* (Interviewee 7)

The generated primary data was analyzed in the case context to illustrate the value-creating factors (gains) to give a more profound understanding of what the customer truly values and which aspects of the PSS create value. As mentioned by the interviewees, customer value is a problematic term since it is experienced differently among different persons, and it depends on the perspective that the different manners are being viewed. Therefore, interviewees' job positions, experience and education can impact how they view the received value.

The data showed that perceived customer value does not consist of just one factor but many different entities. Collected primary data included various individual value creators, but in the data analysis phase, these were combined into four distinct value clusters: **offering quality, expertise, delivery reliability, and strategic partnership**. These are summarized and briefly explained in **Table 10**.

**Table 10.** Value creators (gains).

Value cluster	Dimensions	Description	Example quote(s)
Offering quality	<ol style="list-style-type: none"> <li>1. Products</li> <li>2. Services</li> </ol>	All produced products and provided services must be of high quality.	<i>"If you consider the quality aspect, it is critical that the products are high quality when they are handed to us because they add value to our customers in the end."</i> (Interviewee 4)
Expertise	<ol style="list-style-type: none"> <li>1. Industry-specific know-how</li> <li>2. Cost-effectiveness</li> </ol>	Expertise in the field generates not just intangible value but also cost-effectiveness in the service activities.	<p><i>"We want just what we have ordered, and they know how to do it with the best skills possible"</i> (Interviewee 3)</p> <p><i>"The value that their services offer us — it is perhaps somehow, from our point of view, cost-effectiveness and the convenience of production."</i> (Interviewee 3)</p>
Delivery reliability	<ol style="list-style-type: none"> <li>1. Product delivery</li> <li>2. Service delivery</li> </ol>	Receive purchased high-quality PSS offering on promised time.	<p><i>"We receive high-quality products and services in agreed schedule. This way the whole process works. Without these, it would not work as smoothly."</i> (Interviewee 4)</p> <p><i>"We will give some schedule to them, and they will deliver those agreed services within that specific time."</i> (Interviewee 3)</p>
Strategic partnership	<ol style="list-style-type: none"> <li>1. Trustworthiness</li> <li>2. Language</li> <li>3. Culture</li> <li>4. Location</li> </ol>	The long-term strategic partnership creates value from multiple dimensions.	<i>"In addition, reliability is also an important value. The fact that business secrets do not leak anywhere."</i> (Interviewee 3)

The quality of the offering was one of the matters that frequently arose in conversations about the offering. This value creator is strongly associated with both sides of the offering: products and services. Interviewees from the customer organization felt that the quality of received products and services is one of the most significant value creators since it enables the production of high-quality products, which creates value for the customers of the customer organization. The clients were rigorous in the interviews when the matter was discussed, which implied an enormously influential factor. Also,

interviews with the PSS provider side implied that extremely high quality is a “must-have” feature in this type of offering and partnership. It was mentioned that without the quality, there would not be demand.

*“They generate us customer value especially in terms of the quality. In the end also for our customers.” (Interviewee 4)*

*“We receive high-quality products and services in agreed schedule. This way the whole process works. Without these, it would not work as smoothly.” (Interviewee 6)*

Besides the quality, matters connected to the PSS provider's industry-specific expertise were recognized as another value cluster. Many interviewees highlighted that the customer organization does not have the required know-how or resources to run the services. Even if they had, it was experienced a vital thing to be able to focus on the core business and let partners take care of different activities such as the production support processes. In addition, industry-specific proficiency enables the company to offer high-quality services closely associated with the sold equipment, such as repair, maintenance, and modification services. High-level expertise was found beneficial from the perspective of cost-effectiveness. Specialization to perform certain activities were noticed to feed the capability to cut the overall costs. The case company executives also recognized the role of expertise, who described it as the primary needed source of created value.

*“Perhaps it is that we can focus on the essential things that are important to us, and they will do the production supporting work.” (Interviewee 3)*

*“We, of course, manufacture products which combined with our services enable their (customer organization's) smooth production.” (Interviewee 7)*

*“That is where our generated value must come from. From the comprehensive total expertise in this area. Covering products and services.” (Interviewee 2)*

The third cluster which was recognized from the primary data was delivery reliability. This value cluster is connected to both delivering the products and services. Being able

to rely on the PSS provider to provide the agreed products and services on the agreed timeframe was experienced as a significant source of value creation. PSS providers close physical location is one of the enablers in short delivery times. PSS provider has short access time to the customer site and is taking care of some of the processes on the customer site (e.g. equipment warehousing and logistics). However, a nearby location reduces delivery times, affecting delivery reliability. Also, the interviewees from the customer organization felt that utilizing bundled offering from a particular PSS provider increases the degree of reliability.

*“There is a certain degree of reliability behind for utilizing the combined offering.”*  
(Interviewee 6)

Discussion with managers from the customer organization brought up how much they value different aspects related to the strategic partnership that the PSS provider can offer. This cluster was predominantly related to knowledge-sharing and co-creation. For example, it was described that the case company actively communicates the aspects to avoid regarding the products to make the production more convenient and save costs from the customer. Other aspects were related to the trustworthiness of the supplier. The interviewees from the customer organization considered that the supplier's reliability was a critical factor since the PSS provider has access to highly confidential information, which could harm the customer organization in case of information leaks.

*In addition, we are reliable. For instance, in pilot production, business secrets must not leak. That is a significant added value.* (Interviewee 2)

*“We have wanted to let the customer know that certain things they wish from the products are going to raise the product's price. By describing the factors to avoid, it will make it much convenient for us, and then it will also be cheaper for the customer.”* (Interviewee 7)

The cluster also included other aspects like sharing the same language and culture and being closely located. Even though pricing is essential for the customer, it certainly is not the most critical factor affecting the received customer value. It was revealed that they

could get more products from the competitors with a lower price, but the entity or the so-called big-picture matters the most. A PSS provider located close and shares the same language and culture was experienced helpful from the customer side. Case organization's direct competitors are located far away in Asia from the perspective of the customer organization. Also, in this case, providing industrial services usually requires localness. Interview data highlights that poorly English-speaking suppliers are not the partners with whom it is easiest to collaborate in demanding cooperation. In addition, a company that manufactures the equipment was considered the best option to know how to repair and maintain them.

*"If we consider bought new products, they (the customer) would get for sure cheaper and more quantity from China. Nevertheless, one of the value generators certainly is that we are close and speak the same language in the big picture. That is a great added value."* (Interviewee 2)

*"It is usually more time consuming to communicate with other manufacturers. Since the things are complex, it takes time that you get your point clarified, and both parties see the manner in the same way."* (Interviewee 6)

*"With the flexible service-offering, we also aim to develop their activities."* (Interviewee 2)

The presented four value clusters were formed during the analysis phase from the most prominent manners that arose from the primary data. Individual ideas were combined to generally present the value proposition offered by the case company's current PSS model. As proposed by the primary data, the value proposition comprises multiple stages.

## **BUSINESS MODEL CHALLENGES**

Interview data also highlighted the challenges in the current PSS model. The case company operates in a very niche industry, and hence one of the main challenges is the limited number of customers in the operating country. Data implied that the PSS provider's

low number of customers was recognized as a considerable risk from both customer and the supplier side. The customer organization's strategic purchasing practices force it to purchase equipment from multiple suppliers. Also, on the other side, relying on one customer significantly influences the sales revenues, and the fluctuation is quite strong between solid and weak financial years. The revenue variation has been typical, especially on the product side of the PSS model. Service agreements have managed to stabilize the business, on the other hand.

*"Our fundamental idea is that we cannot depend only on one supplier. Meaning that we do not collapse if the only one supplier goes bankruptcy. We just try to reduce risks." (Interviewee 3)*

*"The most common challenge here is that our demand is fluctuating quite strongly. Since we have one customer, the demand can be very high and other times much lower. The variation in the demand can be high-level, and of course, we cannot adapt our costs and human resources so quickly." (Interviewee 5)*

*"We do not have any other customers that have factories in this country." (Interviewee 8)*

One of the main challenges the case company has faced in its products business is competing against companies from developing countries. Companies operating in these countries can offer their products at lower prices, which has led to a drop in the market price of products, attracting customers to buy large quantities of products from these companies. Lower market prices have made it even more difficult to attract other customers with the product offering. The customer organisation recognised all the product price-related issues, which executives described as a significant factor that will undoubtedly impact in the long run at some level.

*"But today's business world is ruthless - of course, price does not determine everything, but it determines a lot. It does not matter if the supplier with whom you cooperate locates very close to you if it is twice as expensive as the one in Asia. Then it will probably have some negative effects on the cooperation. Unfortunately, this is the cold world of listed companies." (Interviewee 4)*

*“They have to develop their thing to be able to compete. They are not the cheapest, but they are an important strategic partner for us. However, their prices cannot keep increasing.” (Interviewee 3)*

Offering services has had an extraordinary impact on stabilizing the revenue side with separate service-level agreements. However, the process-oriented business is attached to the processes that are happening on the customer sites. Therefore, widening the service customers base would require establishing service branches in other countries, where the customer has other factories, or where potential customers from the same industry are located. The collected primary data suggested that it was experienced as a too big or very challenging step to take for a relatively small company.

*“Our problem as a relatively small company is that we do not have the kind of personnel that we could send to other countries to establish a service site or factory.” (Interviewee 8)*

One of the challenges that arose from the interviews was the high cost of investments. The machines used to produce the equipment or perform the services are relatively costly for small and medium-sized enterprises (SMEs). The high cost of different machines and robots is an essential factor that challenges the service business. As mentioned earlier, services development has been rather strongly linked to technology development than BM development from the BM concept perspective.

*“In our service operations, different machines and equipment are always connected to being able to perform the services. The challenge here is the relatively high cost of investment. The machines are extremely costly.” (Interviewee 8)*

The primary data gave interesting insights on that the customer expects the PSS provider to perform different tasks for free based on the partnership. The case company managers described that many service tasks are “free-of-charge”, meaning that these activities are not separately charged as other services are. Customers demanding for free-of-charge services has also been previously recognized by various PSS scholars, for instance, by Parida et al. (2014), who described that these customer expectations for providing services for free or minimum cost might be a problem for commercialization certain



services since it is challenging to start pricing activities that are previously done free of charge.

In this case, this can result from having an extraordinary focus on a single customer that might be “over-served” without charging a price from it. Interviewees from the case company described that it could be challenging to start to price the activities that have been done previously for free. It is occasionally experienced as problematic, but the case company managers also explained that these free-of-charge services are the added value they aim to bring to the customer.

*“It is, in a certain way, a kind of added customer value. If they called somewhere else, they would be sure to have to pay this much, but if they call us, we can have a meeting for a couple of hours, and no one will take a price for it. I believe that it is that added value.”* (Interviewee 2)

*“The reason why we do not price them (activities) is a difficult question. We could price them, but maybe we perceive it so that it is essential to help them with those things, and yet it does not show up in that price.”* (Interviewee 1)

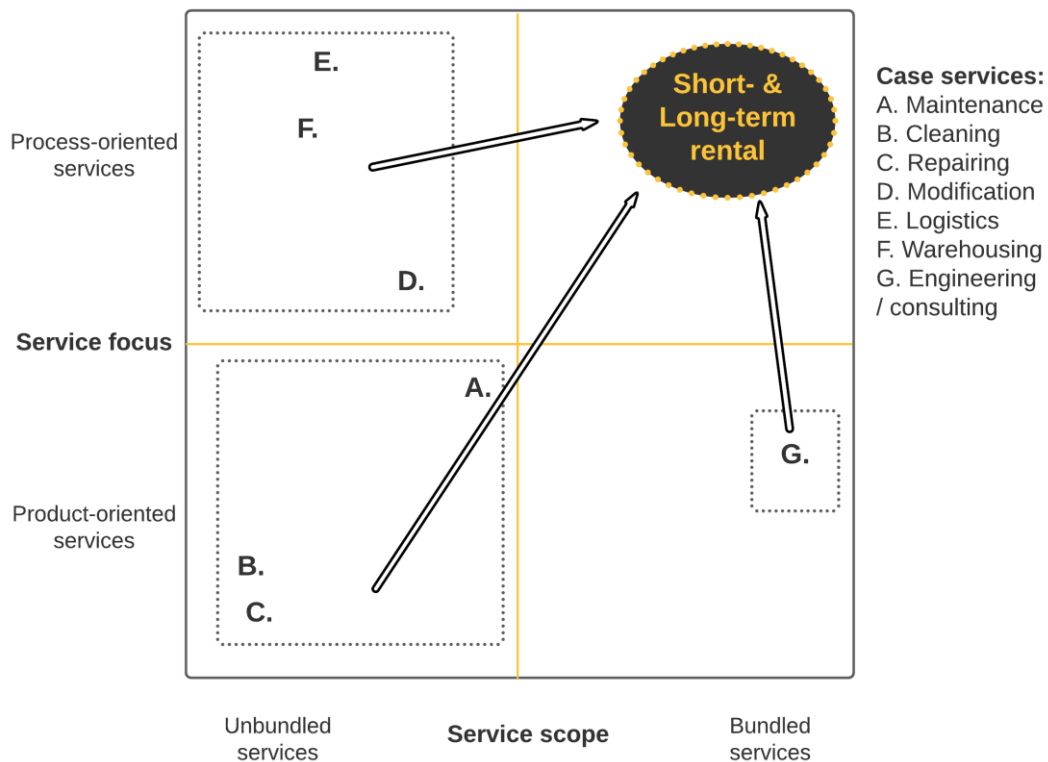
*“The profitable business will come when you are doing important things for customers good enough. And if the price is fair, it will take the service from you.”* (Interviewee 2)

The case company managers described that a more comprehensive service would most likely help the company secure its product-service offering to its customers in the future. They also described that it is more reasonable to view the business as a bigger picture instead of focusing on the profit margins of specific activities that are done free.

## 4.2 Barriers in shifting to use-oriented PSS

Because the case company's demand is highly dependent on its customer's demand, it has considered different alternatives to stabilize its sales revenues. The explained challenges shed light on why different alternatives have been considered. As previously mentioned, services and moving forward in the servitization continuum has improved the variation in the company's profitability. Now taking one step further and providing leasing or long-term renting of the tangible products have been one of the options that have been considered. Examined through Tukker's (2004) generic model, these alternatives belong to the use-oriented PSS category. The customer organization does not make money by owning the case company's products but utilizing them in their manufacturing operations. Therefore, the core idea in pondering a use-oriented PSS (e.g. a leasing model) is reasonable.

This type of offering includes bundling the equipment and other services into a bundled tailored total solution. At the moment, the products and services are tailored for the customer, but this shift would go one step further on the servitization continuum. The principal difference is that the total tailored solution would also include maintenance, financing, and other services alongside the equipment. Bundling products and services into a single offering included the opportunity to tackle some of the revealed main challenges of the current BM, such as unstable revenues and pricing the free-of-charge services. The shift to use-oriented PSS by bundling services is illustrated in **Figure 12**.



**Figure 12.** The shift to use-oriented PSS is illustrated with case services (adapted from Kowalkowski et al., 2011).

However, moving to use-oriented PSS from the current model would require considerable changes to the BM. It would force the company to make a significant organizational shift in the way of capturing and delivering value. Previous studies have demonstrated that long-term rental agreements, such as leasing, are significantly more problematic to manage and coordinate (Kowalkowski et al., 2011, p. 185) and that the change to use-oriented will not likely happen without significant challenges (Parida et al., 2014). Based on these theories, it is reasonable to assume that relevant challenges will occur to an organization making such a shift.

Many of the potential challenges are BM related, but many of the problems fall to the core of the BM: the value proposition. Knowing that barriers commonly are BM related on some level makes studying the issue through the BM lens much more reasonable. The value proposition should be based on *“a designated package of products and*

*services that will solve customer problems and satisfy customer needs*”, as Osterwalder and Pigneur (2010, p. 22) have clarified. Therefore, the relevant question is: would the use-oriented PSS model be the right fit for the value proposition?

Previous literature and different BM concepts were utilized to analyze the shift to use-oriented PSS. The essential generic added value creators of the use-oriented PSS model were cleared up, and these were analyzed in this case context (Adrodegari et al., 2017; Barquet et al., 2013). Interviews with the case company and client company representatives revealed latent opinions and biases concerning a leasing model. Conversations regarding these topics brought up a lot of different issues. Because of the scope of the thesis, the purpose is not to detailly describe each individual challenge but present the most dominant themes from the BM perspective. The data analysis phase divided these into four themes representing the potential barriers in shifting to the use-oriented PSS model. Looking through the BM lens, the themes are 1) **value proposition**, 2) **revenue streams**, 3) **key resources**, and 4) **customer segments barriers**. PSS scholars have previously recognised some of the barriers in the PSS literature. Hence, these findings support also the existing literature.

#### **4.2.1 Value proposition**

One of the most significant barrier themes that stood out from the interview data was customer preferences that are strongly connected to the customer value proposition of the BM. The interviews implied that the customer organization is accustomed to specific operations modes, making the transition to use-oriented PSS challenging. The case company managers also recognized and described some of the barriers. One of the significant value proposition barriers was **product ownership**, which has been recognized as one of the primary value creators in use-oriented PSSs in previous literature. Issues related to product ownership occurred multiple times during the interviews with the case and customer company.

The interviews discovered that the customer company is very familiar with leasing and renting concepts. When making high-cost equipment or machine acquisitions, the customer company has pondered whether to buy or lease the equipment or machines; and it has often inclined to the leasing model rather than owning. It has been discovered a more reasonable option from the perspective of a stock-listed company. Especially when acquiring high initial cost machines, the required capital can be invested somewhere else where it might have a better rate of return than tying capital to expensive equipment or devices.

*“If you think about a listed company, then, as a rule, it makes more sense not to own things.” (Interviewee 4)*

However, the tangible products that the customer company commonly leases have totally different **product characteristics** and features than the equipment sold by the case company. Usually, these are massive machines with high initial costs and potentially many diverse functionalities. The products provided by the case company are relatively small, have a much **lower acquisition price**, rather **short life cycle**, and **do not include many functionalities**. The focal issue is that the products are not considered expensive enough, so it would be reasonable to lease them if the customer can finance them. These characteristic differences with products arose concerns in the customer organization

*Then there is probably a big premise about what can be leased. Maybe it (the company’s product) could be leased too, but I do not see anyone taking it. Is this kind of product even possible to be leased? (Interviewee 3)*

The focal question that arose in the customer interviews was that could this type of product be leased. The customer company appeared to have a specific interpretation of what type of products could be leased and what could not. Furthermore, the interview data indicated that the managers are used to particular procurement models and strategies regarding this product category type, meaning that the customer company is

accustomed to buying these products to attain ownership. Apparent **customer resistance** was noticeable during the interviews.

*“It goes somehow – how should I put it... These products are bought, not leased. These are individual products. But then again, I understand that laptops and other things that you need to renew after certain periodic times are leased.”* (Interviewee 6).

Besides the fact that the customer is used to buying the products conventionally, the interview data also indicated that it is not just about procurement practices but also a corporate desire for these products. Interviewees described that acquiring the ownership of the equipment simplifies **controlling the products**. Interviewees thought it was more convenient and more straightforward for them to move the products between manufacturing plants and make modifications when they acquired ownership. It can therefore be concluded that, in this case, owning the product generates customer value.

*“These products are such a core part of the whole business — that they are in our own hands and we can move them around the world between factories, and we have no restrictions on that. We can modify them how desired and use them how desired.”* (Interviewee 3)

As claimed in the previous literature, it is usually assumed that customers do not value the product ownership but the utilization of the product in different processes (Baines et al., 2007). These findings suggest that this assumption is not always correct. It is concluded that corporations that employ ownerless asset utilization in certain circumstances can be reluctant to utilize it in particular processes. There are some key processes and equipment that are utilized in these processes that customers do not want others to control.

#### 4.2.2 Revenue streams

It is acknowledged that the transition to use-oriented PSS would require changes to the case company's current profit formula. Capturing value with the new model needs adjustments in the **revenue model** that reflects better the new value proposition. It has been recognized that capturing value requires an increased emphasis on pricing in a way that considers the generated value (Parida et al., 2014, p. 49). In use-oriented services, the pricing is usually connected to pay-per-use or subscriptions models or a combination of them both. Pricing in leasing models is traditionally associated with periodical payments that occur, for instance, monthly, quarterly, or annually. Therefore, leasing payments can also be perceived as **fixed costs** from the customer's perspective, as the literature review also described. The case company has applied cost-based pricing where the desired profit margin is added, and the revenue model has not changed during its history.

One significant factor that arose from the interview data was that the customer has accustomed to getting the products and services priced in a certain way. The case company managers described that their customer wants to have traditional and straightforward pricing mechanisms, which can make the switch of the pricing model, for instance, from transaction-based to usage-based, more challenging. In addition, it was believed that it might be challenging to start changing the pricing mechanism in solid customer relationships with a long history.

*"We have always asked how they want the pricing mechanism. They want the pricing mechanism as simple as possible. Therefore, we have as few as possible different prices. I think that a long customer relationship makes it more challenging to start making changes to the system."* (Interviewee 1)

The customer organization also requires **transparency of the pricing**. When they acquire products, they want to know how the pricing forms. A more straightforward pricing mechanism makes it easier to understand how the price of products and certain service activities consists. Besides, it was recognized during the interviews that interviewees

from the customer organization felt that it is essential to have a similar pricing model to other suppliers. Since the case company is not the only supplier in the equipment category, the interviewees shared that it is vital to compare different suppliers based on pricing in their **procurement practices**. The development related to the pricing was seen from their perspective by harmonizing the pricing of other suppliers, which would enhance the **comparability of pricing**. The interview data demonstrated that the customer organization could use bargaining power powerfully to its advantage.

*“But the premise is that the pricing would be fact-based so you can see which components and how the price consist. Of course, our conversations and cooperation have some value, but you need to understand what is being done, and if you pay more for something, you have to have justifications for it. Usually, for important strategic partners, unfortunately, you have to pay extra.”* (Interviewee 3).

*“After all, the development could be to harmonize the pricing policy, in a way, it would be clear between different suppliers.”* (Interviewee 6)

*“Maybe that comparability, and that those justifications for the prices would be the same regardless of who is the manufacturer. Then those prices would then be able to compare. Certain manufacturers have many different prices for many different components. That complicates the comparability, and you have to count more that you receive the comprehensive bigger picture.”* (Interviewee 6)

Primary data also suggest that changing the revenue mechanism in a long-term partnership is more challenging. Managers responsible for providing the services seemed to understand how the customer wants the pricing, which on the other hand, is the PSS provider’s revenue model. It was also noticeable that the customer has strong bargaining power, which challenges complete changes if they function well from their perspective. The data also implied that customers could be accustomed to specific operating models and not see other appropriate options. The idea of changing the current pricing mechanism also sparked doubts about value generation. Managers from the customer organization especially questioned that if the service provider manages to capture more value with the new alternative revenue model, is the value taken away from the other part in a financial manner.



*“I think when we start negotiating a new deal - I think they will want to buy again by the unit price. They do not suddenly want new costs.” (Interviewee 8)*

*“I do not see that there are any alternative pricing models. Such as monthly pricing and so on.” (Interviewee 6)*

*“To be able to do so (change revenues models), you have to have good trust and transparency in the customer relationship. Of course, there could be other possibilities in this case, but what is the added value? **If the other part captures more value than previously, is it taken from the other part?** It could be, but it is a bit difficult to say.” (Interviewee 4)*

One of the major obstacles to changing the profit formula was the customer’s concern about **rising costs**. Managers in the customer organization described that buying these types of bundled services is considered and viewed as **fixed costs** which were seen as a negative financial obligation at the company level. The overall approach to fixed-term pricing was negative since these are based on service agreements, which are more complicated to adjust if a business environment faces a problematic situation. This is connected primarily to the product offering, where the current pricing is based on unit pricing per product. Currently, the customer can buy fewer products if the demand changes significantly.

*“If you buy services, then they are fixed costs. Then, especially when you operate in a hectic business world, those fixed costs are a little toxic because you cannot cut them in the short run. However, with the variable costs, you can adjust that depending on the situation. If the business starts running poorly, you will be able to cut from variable costs. If you are doing great, then you can add more costs.” (Interviewee 4)*

Interviewees from the case organization described that essential to them minimize the number of fixed costs and allocate the costs more to variable costs. In this case, the data implied that fixed-term pricing was seen as a more suitable option for outsourced activities that did not include many changing variables such as cleaning office buildings and other facilities.

### 4.2.3 Key resources

Some of the barriers were strongly related to the company's key resources, such as human resources, which is a crucial component of any company's BM. Key resources were recognized as one of the most significant barrier themes when analyzing the primary data through the BM lens. Since the company's resources are owned or managed, these barriers can also be described as internal barriers. Previous literature has described that **internal resistance** is one of the most common barriers that industrial service companies have been faced (Barquet et al., 2013; Martinez et al., 2010).

The data analysis phase also revealed signs of internal resistance in this single case, thus supporting this claim given by earlier authors. Some of the case company executives described that internal resistance is a common barrier they must tackle when making changes in the BM, whether developing processes or adjusting the product/service offering. This has been previously recognized as the challenge of **shifting mindsets**. These barriers are related to one of the most important resources of the company; human resources. However, the case company president shared that with his experience, people are more willing to accept the changes if they are allowed to participate in making them.

*"We always have had internal resistance. Usually, it is because we have always done things like this way and so on. People are great at always finding out why something should not be changed. I never say no to anything because we have to think outside the box. But of course, to start actually changing things, you have to have justifications for it." (Interviewee 2)*

*"There has been internal resistance previously. That is usually the case if many ways of doing things are changed at once. But I feel that it is connected to the people despite the organization. If you start to change things, of course, there will always be questions about why you need to change this." (Interviewee 1)*

Some case company interviewees felt that bundling the product and all the services would significantly increase **business risks**. As literature proposes, in use-oriented PSSs, the product ownership does not transfer to the customer but is retained by the provider. Hence, the provider's involvement in the product life cycle extends, and the responsibility of the product increases. **Extended involvement in the product's life cycle** would tie much capital since the product is not bought in a traditional transactional way. Also, the provider of the use-oriented PSS would be responsible for maintaining the product outside the range of standard guarantee time. These recognized barriers are heavily related to the company's financial resources.

*"If I had to say one reason why we would not go one step further is the increasing risks. We do not want to go that far that we have too much responsibility. I do not exactly know where the line goes." (Interviewee 1)*

*"Well, the risks are growing. Are we be able to handle the risks? One of my concerns is that where the boundaries are drawn with the responsibilities of the products." (Interviewee 2)*

Another aspect that arose during interviews was the experienced inconvenience of changing the BM. The trickiness is likely to connect with the business development history, especially in the service business of the case company. As the previous parts of the findings section have pointed, the company focused on mainly new technological updates rather than deliberately developing the BM. Previous literature has discussed a **lack of experience in service design**, which can also be recognized in this case, but in this case, it is somewhat BM related design and development. The idea of a complete change of business logic was experienced very complicatedly as the company now has separated its product and service businesses into different companies. This suggests that smaller companies might not have the required resources to change the current BM significantly. Many interviews also described that finding talented and skilful employees in a narrow industry with reasonable prices is rather challenging.

*"Then again, if we are talking about leasing or renting or something like that, we would have to explore it more deeply. Of course, it is not excluded, but it might be*

*more complicated when different companies sell the products and provide the services. All these kinds of systems will affect. It is not excluded, but it would not be simple.” (Interviewee 5)*

*“We do not have that type of personnel. It is challenging to find them” (Interviewee 8)*

*“There are no people who have worked in this field or with such products. Because of that, all people need to be trained by us most of the time. Therefore, long-term skilled workers are a vital resource for us.” (Interviewee 2)*

To conclude the key resource barriers, it must be stated that the most significant key resource barriers were related to human resources. Internal resistance and mindset shiftings are common barriers presented in the literature and complicated to tackle. Also, heavily increasing different business risks are more likely to be a significant barrier for a smaller PSS provider to make such a shift.

#### **4.2.4 Customer segments**

Analysing the case through the BM concept also shed light on barriers related to the customer segments component, which is viewed as a critical theme in this case. Also, this component certainly has a significant direct impact on other BM components. Significant direct impact means that barriers that belong to other barrier themes are affected predominantly by the customer segment component. Indeed, it is customer-dependent how certain aspects are viewed and experienced. Having a different customer segment type could mean that other customers might see the issues totally in a different light. Therefore, barriers in the shift to use-oriented PSS can be connected to both sides of the dyad. These include aspects such as the dynamics and history of the customer relationship.

As previously discussed, it was described that the long history in the partnership between the companies was experienced as a factor that makes the complete change of a

BM more complicated. Previous literature has argued that a **long-term customer relationship** between the customer and the PSS provider is commonly noticed as a prerequisite to providing customized solutions (Annarelli et al., 2016; Rexfelt & Hiort Af Ornäs, 2009). This study found that a long-term relationship between the PSS provider and the customer can also be a significant barrier to radical changes in business logic. Issues related to the long-term customer relationship arose multiple times, especially in the interviews with the managers from the case company side.

*“I experience it relatively tricky. On the other hand, it could be convenient to start discussions since we have an excellent customer relationship. However, all variables considered, I think it would be much easier with an entirely new client.” (Interviewee 1)*

Furthermore, the primary data suggested that the customer has used to operate with specific models with its partners and suppliers in this case. Especially the **customer’s high bargaining power** seemed to be a factor that makes larger BM changes harder for the smaller PSS provider. The customer’s high bargaining power can make the smaller provider powerless in forcing radical BM developments. As pointed in previously in the findings section, the provided services have been established or developed for pure **customer need**, or the services have been established due to the development of new technology. It was experienced that it is more convenient to justify new services with newer technology utilized in processes that could save money or other resources. Also, it seemed that some managers had a rather **technology-oriented** approach to service development and BM development in general. However, the pure customer need was found as a prerequisite to justify why new services should be added to the offering.

*“I feel that in a long-term customer relationship, it is more difficult to start making significant changes. I believe that one reason for it is the justification that we have done certain things always like this.” (Interviewee 1)*

*“Usually, it is so that the customer has had a need, or we might tell based on our experience that some things are worth starting to consider. Rarely we can just tell them that buy or order this. Yes, we will discuss it and justify why it could be good.”*

*Then they start to consider it, and we find out what kind of cost it could be.” (Interviewee 8)*

It is concluded that even though a long term customer relationship might be a prerequisite for providing a PSS, it is not an applicable argument in every case. A long-term customer relationship, especially if the customer has a significant bargaining power, can be a big barrier to shift to new business logic, for instance, start providing a use-oriented PSS. Also, not having necessary customer demand among the chosen customer segment is a significant barrier.

### **4.3 Summary**

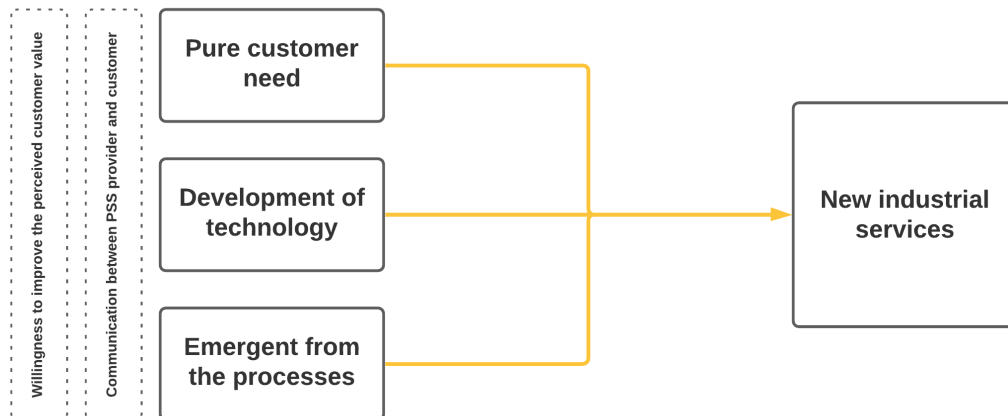
This single case study was done to produce more in-depth knowledge about PSS providers and BMs. This study took an exploratory single case approach to explore a unique case setting utilizing a theoretical base based on the two separate research areas. The choice was logical since it has been described in the previous literature that understanding servitized BMs is challenging and that the BMs are heavily dependent on the context. Furthermore, it was suggested that more research is needed, especially from the perspective of smaller industrial companies, which was one of the justifications for selecting the single case study and the case company. (Huikkola & Kohtamäki, 2018; Parida et al., 2014)

The theoretical section of the thesis gave an excellent base for the empirical study. As suggested, PSS research and BM research are certainly complementary research fields. The literature review pointed that, for instance, deliberately developing a BM has been recognized as a significant factor for business success (Baden-Fuller & Morgan, 2010; Zott et al., 2011). Changing the value creation logic and shifting the current BM towards use-oriented PSS has been considered one of the potential alternatives by the case company to solve some of its current challenges. As suggested by Frankenberger et al. (2013),

the initial phases in the BMI process should be understanding the needs of the different parties involved and the change drivers in the ecosystem when trying to overcome the current business logic. For this reason, the case context was also analyzed more in-depth.

#### 4.3.1 The case PSS

One of the empirical study's objectives was to generate more in-depth knowledge about unique case PSS. In order to do that, the case company's BM was analyzed, and its product-service offering and its servitization journey were shortly described to build a more comprehensive understanding of the case setting and create more knowledge about smaller PSS providers. Besides introducing the current industrial service offering, it was described how these services had been established and developed. The most critical factors for establishing new industrial services in the case were presented. These are simplistically illustrated in **Figure 13**.



**Figure 13.** Establishment of new services in the case.

Customer desires were investigated since many different authors have argued that BMI and PSS development should focus on customer jobs and customer needs as a starting point. This study found that the customer problems that the PSS provider's offering

solves are highly related to customers' key resources and key activities. The PSS providers take care of specific activities by putting in resources that the customer does not have. These resources are related to, for example, time and expertise. High-level industry-specific knowledge was considered an enabling factor that will lead to better quality activities at lower costs than otherwise. Besides the customer pains, the value creators were analyzed better to understand the customer value proposition in this case. It was concluded that the generated customer value is a multilevel entity consisting of different factors that can be divided into different themes such as offering quality, expertise, delivery reliability, and strategic partnership.

As the previous sections in the findings chapter pointed out, the PSS provider serving one primary customer in the niche industry can face strong revenue fluctuations and perform activities that are not separately charged but expected by the customer. The faced challenges make industrial service companies seek different strategic opportunities to enhance their business. The characteristics of the use-oriented PSS model suggest that it could be a great fit to tackle some of the challenges perceived in the case, but the shift is expected to bring up different challenges. One justification that makes the idea reasonable is that it has been proved that industrial customers do not always make a profit by acquiring tangible products but utilizing them as efficient as possible in the value creation process (Johnson et al., 2008, p. 54). Generally speaking, it is admittedly worth the effort to examine the propriety of the matter in this context.

#### **4.3.2 Barriers**

The BM concept was used as a theoretical lens to explore the case and discover different barriers. One justification for the choice was that it was stated in previous literature that BM lens analysis underlines the challenges related to the transformation toward a servitized BM (Storbacka et al., 2013). However, in this case, the BM lens analysis focused on moving further on the servitization continuum, shifting to more servitized BM. The

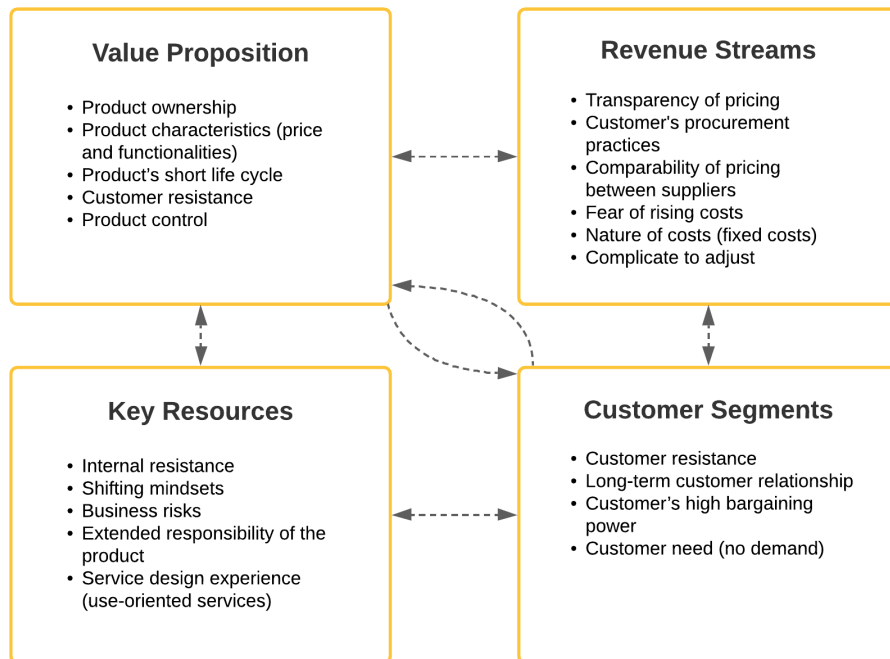


study's findings strengthen the idea given by Chesbrough (2010) that the same business idea offered through different BM will likely yield different results and bring up different challenges.

This study found utilizing the BM concept helpful to study a PSS in-depth. Different BM illustrations, such as BMC, give a great framework to comprehensively study the business of a PSS provider or certain aspects of it. For instance, this study used the BM lens to highlight the most prominent barriers connected to BM components that could prevent the organization from shifting to use-oriented PSS. Previous studies suggested that the BM concept can provide a fruitful approach to studying PSS. This single case study demonstrated in practice that different BM illustrations, such as BMC, give the researcher an easy-to-understand framework, making it more convenient to recognize and place barriers inside the different BM components, which helps to understand which parts of the current BM are the sources of the obstacles.

This study discovered different potential barriers preventing or challenging PSS providers' shift to use-oriented PSS. The empirical study supported existing knowledge about PSS barriers and gave new insights from the unique case. Many previous studies generally present barriers to moving from "traditional" product-central BM to the PSS model. This study examined the barriers in shifting from a particular PSS model to another one, hence shedding light on a more precise issue. This way, this study widens the knowledge about barriers in the field of PSS research among previous studies (e.g. Barquet et al., 2013; Mont, 2002; Neely, 2008; Rexfelt & Hiort Af Ornäs, 2009).

It has been stated that this movement to higher levels of servitization would most likely include different internal and external barriers (Martinez et al., 2010), which can be stated to be true also in this case. The most prominent barrier themes in the case were related to the **1) value proposition, 2) revenue streams, 3) key resources, and 4) customer segments** BM components. As mentioned previously, the purpose was not to detail every issue but rather the most dominant themes and demonstrate the usage of the BM lens in the PSS study. The barrier themes are presented in **Figure 14**.



**Figure 14.** The most dominant barriers in the shift to use-oriented PSS model.

The generic value-generating factors of the use-oriented PSS model were not fully perceived as value-adding factors by the customer. It was found out that customers are not always interested in ownerless asset utilization. The study also found that it can be connected to, for example, the product characteristics and life cycle, which impacts the customer's willingness not to acquire the product ownership. Having customer resistance or not having actual customer needs can prevent shifting to a more servitized model. The pricing of use-oriented PSS (e.g. leasing) awoke a lot of different concerns about rising costs, transparency of pricing, and the difficulties to adjust the fixed costs if needed. Also, tackling internal resistance and shifting mindsets when making changes in the BM are barriers that often prevent the smoother transformation. Increasing responsibility and business risks are also provider-related barriers that impact the decision to make such a shift.

It is concluded that the barriers are heavily dependent on the context. The barriers that the company faces are both internal and external. The BM lens analysis suggested that the most significant barriers are strongly connected to the most central BM components, such as customer segments and value proposition. Therefore, the company's positioning has also significantly impacted the outcomes. In this case, issues such as customer resistance, customer need, and customer's strong bargaining power are things that are connected to the customer segment component, but since BM components have causal relationships (Casadesus-Masanell & Ricart, 2010; Hedman & Kalling, 2003), it has direct and indirect impacts on other components as well. It can be assumed that the faced barriers and challenges are also, at some level, connected to made BM choices (Casadesus-Masanell & Ricart, 2010). For instance, the implementation of use-oriented PSS model includes concrete choices that impact specific BM components.

## 5 DISCUSSION

### 5.1 Theoretical contribution

The study's main objective was to determine which type of barriers can be faced if a PSS provider shifts to the use-oriented PSS model. Also, the purpose was to study a smaller PSS provider and utilize the BM concept, which was highlighted in previous literature as future research opportunities to provide fruitful approaches to PSS research.

This thesis started with a literature review that first described BM research as a research field and presented different BM definitions, different BM components and BM conceptualizations. Second, PSS was introduced as a research field, its main research streams were illustrated, and various PSS definitions were presented. After this, servitization as a phenomenon was shortly introduced, and some of the most common industrial services were presented, and known benefits and barriers moving toward service-oriented BM were described. Finally, different generic PSS models were presented. Based on the theoretical section, a synthesis was formed from the two research areas to establish a theoretical base for the empirical part of the thesis. The theoretical base was used in data analysis in the case context.

It was found out that small PSS providers can face significant barriers when planning to shift to the use-oriented PSS model. Viewing the shift to a more servitized model through the BM concept lens highlighted various barriers connected to different customer value propositions, revenue streams, key resources, and customer segments BM components. Because of the exploratory nature of the research, the empirical study does not specify all the small details found but instead aims to illustrate the most dominant themes. The thesis findings can be used as a base for further research.

This thesis extends the PSS research by incorporating the BM concept through a single case study. It was proved that different BM illustrations, such as BMC, give the researcher an easy-to-understand framework, which makes it more convenient to place, for example, barriers among BM components. The BM lens helps to understand which parts of the current BM are the source of the obstacles. As an exploratory case study, the thesis gives insight into studying PSSs utilizing the BM concept, especially from a smaller perspective of smaller PSS providers.

The theoretical contribution of the thesis is twofold. The central theoretical contribution of the empirical part of the thesis is uncovering factors making the shift to the use-oriented PSS model challenging. Many previous studies generally present barriers shifting from “traditional” BM to PSS. This study examined the barriers in shifting from a particular PSS to another one, hence shedding light on a precise issue. In addition, the study adds the knowledge about servitization and PSS providers in a unique case. Especially how the services are established, what problems the combined offering solves, and what the customer values. The findings support the existing PSS literature and give more insight through the unique case.

## **5.2 Managerial implications**

This single case study provided some practical implications that corporate managers can consider. The study illustrates the particular type of PSS model in which the PSS provider is a relatively small company, and the customer is a significantly larger stock-listed corporation. The study gives insight into the sources of customer value in the combined product-service offering.

First, the study's case context was analyzed through the BM concept to give valuable knowledge from a unique case. It was clarified what problems the PSS offering solve and what type of value it creates in this kind of partnership. The study found out that the customer values the most the features connected to the quality of the combined offering, the expertise of the PSS provider, reliability of product/service delivery, and the different dimensions of the strategic partnership with the supplier. With these aspects, the PSS provider can generate value for the customer and solve the specific customer problems, primarily resource and capacity-based.

Second, the study highlighted the factors that make the shift to a use-oriented PSS model more challenging. Managers should acknowledge that these internal and external barriers can be connected to various BM components and have causal relationships. In the central role of the findings was the value proposition BM component. In this case, the customer did not perceive additional value in the leasing model's traditional value creation mechanisms (customer value proposition), a key component in the BM. The customer felt that owning equipment was essential and part of the core of their business. In addition, the periodically occurring fixed costs were perceived as potentially harmful to business because they are more difficult to adjust if changes occur in the business environment. As the previous literature has suggested, the customer problems and value proposition should be examined in-depth, and customer value proposition should also be a starting point for service-oriented BMI. It should be noted that customer value is highly dependent on the context.

### **5.3 Suggestions for future research**

It has been previously recognized that there are countless opportunities to combine the two research fields the PSS research and BM research. This study identified how practical the BM concept and different BM illustrations could be as a theoretical framework or conceptual tool to study different PSS types.

Since this single case study provided more knowledge from a unique case study where the PSS provider is a smaller company and the customer is a larger corporation, the next step could be to study the same type of partnerships utilizing multiple case studies so the findings could be more generalizable. For instance, common barriers could be studied when companies shift to a use-oriented PSS model by comparing multiple cases from a smaller company perspective in a specific industry. It had been previously recognized that many of the PSS studies focus on big corporations; therefore, more research from a smaller supplier perspective is still needed.

#### **5.4 Limitations**

This single case study had a relatively broad scope utilizing the BM concept in the unique case. The broad scope in a single case impacts the findings of the empirical part of the thesis. Since the study seeks to gain deeper insights about servitized BMs and barriers in moving toward use-oriented PSS through the unique case study where the PSS provider is a relatively small company, the findings of the empirical section are not generalizable. However, this is usually not the meaning of single case studies. Single case studies seek to provide more profound knowledge rather than generalizable knowledge. A more detailed analysis would require another study, narrower scope, and a more extended time.

Furthermore, researcher bias should be taken into account since the findings may be affected by the subjective feeling of the researcher or the lack of research experience. Also, the reader should consider different factors that may impact the findings of the single case study. The study's results might be influenced by the time, cultural factors, and the interviewees' job positions and work experience.

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## **APPENDICES**

### **Appendix 1. Examples of the interview questions**

Here are some examples of the question types asked in the semi-structured interviews. The questions were formulated to cover different business model components. The case company and customer company managers had slightly different types of questions. The questions were asked to spark up a conversation which aided in asking more confirming in-depth questions.

#### **General**

Describe your work position and how long you have been in it.

What kind of role do you have in the case?

#### **For the customer organization**

Describe your customer relationship.

What kind of (case company's) services do you use? Why?

What is essential in the services you currently use?

What kind of value do the services create?

What kind of problems does the offering solve?

In general, how does it differ to you whether you own or lease products? What value does it bring to own/not to own products?

What is essential in the supplier's pricing mechanism? What kind of impact do alternative mechanisms have?

#### **For the case company**

Describe your customer relationship.

What customer problems do you solve? What value does the customer get?

What are the most difficult manners in providing industrial services?



How your service offering has developed during the past? How do you do the development?

Where do you see the service development could go?

Describe your revenue mechanism.

Strengths and weaknesses of the current business model? What obstacles/inconveniences have arisen?