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TRANSITION FROM PRODUCTS TO CYBERNIZED SERVICES

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ABSTRACT

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Manufacturing companies are increasingly trying to differentiate and gain sustainable competitive advantage through services. The role of technologies in services are growing and recent technological advancements have enabled cyber-physical systems to become more widespread. Novel research topic of cybernized services, the integrated solutions of products, services, and cyber-physical systems (advanced systems that are able to sense and actuate in their environment through computational and communicational capabilities), is increasingly gaining importance. The objective of this study was to gain better understanding how companies can advance towards cybernized services and what they can achieve by doing this. This study investigated servitization (transition from products to product-service systems) and cyber-physical systems literature, and connected these to the case study that aimed to obtain in-depth knowledge on cybernized services. This research was conducted as a qualitative single case study and empirical data was collected through semi-structured qualitative interviews. As a results, the case study revealed different drivers for the transition, different activities required for the transition, and various outcomes of the transition. Most of these different factors related to the cybernized services were supported by the existing literature. The scope of this study was quite extensive. Therefore, this study provided an overview of cybernized services. This research contributed to the emerging literature of cybernized services by describing the transition in more detail and provided valuable customer viewpoints to different aspects of cybernized services.

Keywords: cybernized services, smart service systems, cyber-physical systems, servitization, product-service systems, case study

TIIVISTELMÄ

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Valmistavat yritykset pyrkivät enemmissä määrin erilaistua ja saavuttaa kestävää kilpailuetua palveluiden avulla. Teknologioiden rooli palveluissa kasvaa ja viimeaikaiset teknologiset kehitysaskeleet ovat mahdollistaneet kyberfyysisten järjestelmien yleistymisen. Uusi tutkimusaihe kybernisoidut palvelut, eli tuotteiden, palveluiden ja kyberfyysisten järjestelmien (kehittyneet järjestelmät, jotka pystyvät aistimaan ja vaikuttamaan ympäristöönsä laskennallisten ja yhteydenpito kyvykkyyksien kautta) integroitu ratkaisu on enemmissä määrin tärkeä. Tämän tutkimuksen tavoitteena oli saavuttaa parempi ymmärrys siihen, että miten yritykset voivat edetä kohti kybernisoituja palveluja ja mitä ne voivat saavuttaa näiden avulla. Tämä tutkimus tarkasteli palvelullistumisen (muutos tuotteesta tuotepalvelu järjestelmäksi) ja kyberfyysisten järjestelmien kirjallisuutta ja yhdisti nämä tapaustutkimukseen, jonka tavoitteena oli kerätä syvällistä tietoa kybernisoiduista palveluista. Tämä tutkimus suoritettiin kvalitatiivisena yksittäistapaustutkimuksena ja empiirinen tieto kerättiin puolistrukturoitujen kvalitatiivisten haastatteluiden avulla. Tuloksina tapaustutkimus toi esiin erilaisia syitä muutokselle, erilaisia muutoksen aktiviteetteja ja erilaisia muutoksen tuloksia. Kirjallisuus tukee suurinta osaa näistä kybernisoitujen palveluiden erilaisista tekijöistä. Tämän tutkimuksen laajuus oli melko kattava. Siitä johtuen tämä tutkimus tarjosi yleisemmän katsauksen kybernisoiduista palveluista. Tämä tutkimus tuotti tietoa uudelle kybernisoitujen palveluiden kirjallisuudelle kuvaten muutosta tarkemmin ja tarjoten arvokkaita asiakasnäkökulmia erilaisiin kybernisoitujen palveluiden näkökohtiin.

Asiasanat: kybernisoidut palvelut, älykkäät palvelujärjestelmät, kyberfyysiset järjestelmät, palvelullistuminen, tuotepalvelu järjestelmät, tapaustutkimus

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1 INTRODUCTION

Technological advancements are transforming many aspects of the environment where people interact as the physical and cyber environments are continuously closing each other. The physical environment is effected increasingly by computing and communication technologies, such as smartphones, which are collecting data, sensing their environment, and possibly impacting to their environment through actuators (Conti et al., 2012). This progress has been enabled by the regularly decreasing price of different technologies, faster and more reliable communication and computational capabilities, and the trend to add computing in various physical products (Broy, Cengarle & Geisberger, 2012). "The ability to interact with, and expand the capabilities of, the physical world through computation, communication, and control is a key enabler for future technology developments" (Baheti & Gill, 2011, p. 161). The emergence of cyber-physical capabilities enables novel products and services (Conti et al., 2012) and cyber-physical systems are essential for designing and developing future engineering systems (Baheti & Gill, 2011).

It is predicted that the fourth industrial revolution begins in the near future, and it will be a continuation for the previous revolutions of mechanization, electrification, and digitalization (Drath & Horch, 2014). Tuunanen, Kazan, Salo, Leskelä and Gupta (2019) suggest that after digitalization emerges cybernization that utilizes advanced technologies, such as internet of things, sensor-based big data and analytics, and artificial intelligence to enhance value creation. Cyber-physical systems (CPS) are an advanced representation of information and communications technologies, and computer science (Monostori et al., 2016). Cyber-physical systems are referred as new generation systems and new class of engineered systems (Baheti & Gill, 2011; Khaitan & McCalley, 2014). In addition, Khaitan and McCalley (2014) refer cyber-physical systems as a system of systems. Cyber-physical systems can be defined as "systems with integrated computational and physical capabilities", which can interact with the physical world and expand the capabilities of the physical world "through computation, communication, and control" (Baheti & Gill, 2011, p. 161). Building these new cyber-physical systems have become an influential trend within different industries (Beverungen et al., 2019). This trend can be seen in the manufacturing industry as well. If

manufacturing companies want to successfully transition their conventional products into cyber-physical systems, they must approach the development through user centricity and discover new processes for innovation and development (Broy & Schmidt, 2014). Cyber-physical systems are expected to revolutionize the manufacturing industries, and these systems have been linked to fourth industrial revolution as a vital enabling component (Broy & Scmidt, 2014). This will lead to new business models, services, and products which can be individualized (Drath & Horch, 2014). Because cyber-physical systems can impact on every sphere of life and change how different actors can control the physical environment as well as interact with it, these systems probably will be quite common and might even be equally revolutionary as the internet has been (Broy et al., 2012). New technologies are not the only factor that changes manufacturing industries.

Manufacturing companies are forced to make changes because of new technologies, but also because of changing markets as increased product commoditization reduce competitive advantage (Baines, Lightfoot, Benedettini & Kay, 2009a), global competition decreases the product prices and margins (Kinnunen & Turunen, 2012), matured markets decrease product sales (Cusumano, Kahl & Suarez, 2015), customer needs are more complex and specific (Adrodegari, Pashou & Saccani, 2017), and servitization and digitalization impacts on every aspect of markets (Lerch & Gotsch, 2015). Servitization can be defined as "the innovation of an organisations capabilities and processes to better create mutual value through a shift from selling product to selling PSS" (Baines et al., 2009a, p. 555), and Product-service systems (PSS) can be defined as integrated solutions of products and services that produce value in-use (Baines et al., 2009a). Market changes have forced many manufacturing companies to shift from product and sales orientation to service orientation through changing their business models to support product-service systems (Chowdhury et al., 2018), so that companies could increase their revenues and compete in the markets (Adrodegari & Saccani, 2017). When companies start shift towards services, market dynamics can change dramatically (Kinnunen & Turunen, 2012). The change in market dynamics can be even greater when global companies decide to shift towards services. Product and service combinations that deliver solutions for customers are emphasized especially by global enterprises (Barile & Polese, 2010). When companies are pursuing the change from products to services, many aspects are about to change. Adrodegari and Saccani (2017) refers to earlier studies that states transition as a fundamental change in a company that requires many organizational and strategical changes, such as structure, culture, competencies, delivery of customer value, and relationships with customers and other stakeholders. As the importance towards service orientation grows and simultaneously technologies are advancing, the shift from products to product-service systems or the shift from products to cyber-physical systems might not be the change that companies should consider.

For manufacturing companies to succeed in the markets and to deliver customer needs, companies must improve their value proposition by improving

products and services through new and emerging technologies (Wiesner et al., 2017). The new and emerging technology cyber-physical systems can enable "services and functionalities far beyond the scope of the capabilities of present-day networked embedded systems" (Broy et al., 2012, p. 3). In the near future, services and advanced technologies will be integrated to form smart service systems (Medina-Borja, 2015). These services can impact on different economies with the emergence of novel markets, and value creation and delivery methods (Lerch & Gotsch, 2015). When developing complex advanced services consisting of people, organizations, technologies, and shared information, companies should utilize novel innovation approaches for successful outcomes (Rajala, Gallouj & Toivonen, 2016). These new approaches are important because technologies can substitute some parts of service systems. More advance services, such as smart service systems, replace people with technologies as these services are functioning autonomously (Peters et al., 2016). In different research disciplines, many different concepts describe the same services that utilize advanced technologies, such as cyber-physical systems. Tuunanen et al. (2019) have coined the term cybernized services and they describe these services as "the application of cyber-physical systems to develop, design, and provide context-aware and interactive services" (p. 84).

The research field that concerns cybernized services is relatively young. Existing literature have introduced concepts and examples of these services, but the literature lacks more profound understanding on different aspects of cybernized services. As discussed earlier, cyber-physical systems are in the heart of cybernized services. This poses a challenge as Peters et al., (2016) state that it is unclear how service orientation (service-dominant logic) could be applied to cyber-physical systems. Despite the challenge, this is something that should be studied because cyber-physical systems require services to achieve the full potential these systems possess (Wiesner et al., 2017). Another challenge relates to the novelty of the cyber-physical systems research. The research on cyber-physical systems is still quite young as a decade ago it was referred as a research in its infancy (Baheti & Gill, 2011). After this notion, the research of cyber-physical systems has become a key area of research (Khaitan & McCalley, 2014).

Besides the challenge to combine services with cyber-physical systems, service orientation is seen as a challenge in manufacturing industries as well. The understanding on services with products and manufacturing companies is still developing. Although, the servitization of manufacturing companies have been studied widely, some researchers emphasize that some aspects should be studied more. Kinnunen & Turunen (2012) state that research on assessment and implementation of services to the offerings of manufacturing companies is scarce. Because technologies are advancing and changing industries, more research is needed to better understand how manufacturing companies can servitize their offering with advanced technologies. Servitization and digitalization in regard to manufacturing industries should be researched more (Lerch & Gotsch, 2015). It is apparent that the integration of services and complex technologies need more research.

The rapid advancement of the technology and the research of cyber-physical systems can pose a challenge when considering the integration with services that come from different discipline. Technologies are shaping existing services and creating new services as new information communication technologies, digitalization, smart devices, and sensors pave the way for smart service systems that increasingly integrate new technologies to service systems (Watanabe & Mochimaru, 2017). The transition to cybernized services withholds tremendous challenges that must be thoroughly considered for companies to be successful in the transition. Previously, some of the biggest companies have failed when transitioning their products from analog to digital, for example, Kodak did not succeed in this transition (O'Reilly & Tushman, 2004).

Cyber-physical systems are referred as smart products and researchers have acknowledged the potential that cyber-physical systems have for the largest economic sector, the service sector. Beverungen et al. (2019) argue that smart products will transform service systems into smart service systems. These future expectations increases the importance towards the research on cybernized services. Researchers have recognized the growing importance of cybernized services, and specified some key areas that should be studied. Tuunanen et al. (2019) argue that services enabled by cyber-physical systems should be studied to gain an understanding how these advanced technological services can create value and how users experience these new services. Also, unified concepts and consensus are needed to clarify the research field as currently cybernized services has many other concepts used by other researchers. Digitalized product-service systems (i.e., cybernized services or smart service systems) should be studied to gain better understanding how these systems impact on industrial change, and what kind of technical and economic effects these systems have on the market (Lerch & Gotsch, 2015). As earlier discussed, these new products and services are expected to have dramatical changes to many aspects in the market and the lives of people. Therefore, it is important to understand how companies can make the transition towards cybernized services.

This study aims to contribute to the research of cybernized services by forming a better understanding on the process of transitioning products and cyber-physical systems to cybernized services. This transition is not well studied, so there is a research gap that this study intends to complement with new knowledge. The objective is to study more deeply the phenomenon of the transition from products to cybernized services to understand how the transition can be performed and why manufacturing companies should perform this transition. This knowledge can have important practical implications for manufacturing companies who are trying to maintain as a competitive business in the changing markets.

This research is focused on the transition from products to cybernized services. To understand this transition, it is essential to identify different factors that are related to the transition. These factors might have enabling or preventing effects for the transition. Products and services are central concepts in this study and they are the starting and the ending point for the transition. The objective of

this study is to understand how the transition occurs and what is essential related to the transition. The main research question is the following:

> How can products be transitioned into cybernized services?

Additionally, it is important to understand what leads to the transition, what are the reasons for the transition, and what kind of outcomes are enabled or produced through the transition. The secondary research questions are the following:

> 1. Why are products transitioned into cybernized services?
>
> 2. What are the results and outcomes of the transition from products to cybernized services?

To achieve a better understanding on the studied phenomenon and answer the research questions, qualitative case study method is used as a research method in this study. The case study method is appropriate for seeking answers to questions of how and why. This case study is a single case study, and the selected company is studied through qualitative interviews. Interviews are common and significant data collection method for case studies. The objective of these interviews is to obtain in-depth knowledge on the studied phenomenon and reveal different viewpoints. The interview data is analyzed using thematic analysis method to identify recurring themes. The data collection is conducted through interviewing case company personnel and customers. The interviews include three key personnel from the case company and 11 customers. The key personnel can offer extensive information and the viewpoint of a manufacturer and service provider, whereas different customers can offer a variety of customer and user related viewpoints. These interviews are semi-structured to enable flexibility and the chance to gain in-depth information. This research increases understanding on the transition from products to cybernized services through a case study that carefully inspects the different transition and cybernized service related factors of the case. Also, this study contributes to the emerging literature of cybernized services.

The next two chapters discuss on the literature of transition from products to services and cyber-physical systems. The third chapter draws a research framework from the literature. The research methodology chapter introduces how this study is conducted and the findings chapter presents the results of this study. In the discussion chapter, the research problems of this study are answered, the most significant findings are reflected with the literature, and the practical implications are discussed. The last chapter concludes this study, discusses on the limitations of this study, and presents future research topics.

2 TRANSITION FROM PRODUCTS TO SERVICES

The focus from products and manufacturing has been changing towards service-orientation for over a half century now, which have resulted the insight that customers need services instead of goods to fulfill their needs (Vargo & Lusch, 2004). Many researchers have noted that the service sector has become dominant in many markets around the world (e.g., Kayastha, 2011; Penttinen, 2007; Karmarkar, 2015). As economies mature and level of living standards climbs, people start to demand personal services that leads to the growth of service sectors (Barrett et al., 2015). Besides the growth of service sectors, services have become a part of business activities in the age of globalization that has enabled economical, technological, and social connections around the world. (Barile & Polese, 2010). Due to the complex and demanding internal services of companies, companies have started to outsource their internal services, which have been facilitated by globalization (Barrett et al., 2015). Market changes and the growing importance of services have continuously shifted the focus from products towards services.

The conception of products and services have been evolving for a long time. The world revolved around tangible resources for centuries. Natural resources have been the source of wealth that many individuals, organizations, and nations pursued (Vargo & Lusch, 2004). All of this changed when technological advancements enabled industrial manufacturing and mass production. The use of knowledge and manufacturing enabled multiplying the value of resources by converting resources into products, so goods-dominant logic came into existence (Vargo & Lusch, 2004). The focus on manufactured products led into neglecting the role of services that were merely additional or complementing to products (Golinelli et al., 2012). Significance of services in the economy was noted in previous decades, and now services form the biggest sector in the developed economies (Suarez, Cusumano & Kahl, 2013).

The product emphasis started a counter reaction that shifted the focus towards services, initiated reappraisal of differences between goods and services, and finally led to an insight that goods and services are intertwined (Golinelli et al., 2012). This integration is described by Penttinen (2007) as he states that products and services are linked together forming a continuum from pure product to pure service. This description depicts the freedom of products and services to

exist as pure products, pure services, or a product-service combination which is the most probable choice if considering the concept of continuum.

The integration of products and services have been discussed by many authors. Service-dominant logic can define and describe market exchanges in a more realistic way by merging goods and services, and emphasizing service systems (Golinelli et al., 2012). Barrett, Davidson, Prabhu and Vargo (2015) suggests that products and services forms a functional connection where products need at least self-service, and services need products in some form. Essentially this means that someone must use products to achieve either utilitarian or hedonic benefits, and services are impossible to render without any resources. If considering services in its purest form, such as consulting someone only with a verbal advice, there is still one resource at least that takes part with the service exchange. A verbal advice requires knowledge of the person who gives the advice, and knowledge is an operant resource according to service-dominant logic (Vargo & Lusch, 2004).

The integration of products and services seem to move close to being just services. Researchers in the manufacturing field are moving toward service-orientated view on products, in which products are merely add-ons for services (Penttinen, 2007). This means that offerings are moving more towards services on the product-service continuum. Products have more significant role than this shift suggests. Because the integration of products and services have become more complex, the balance between products and services have changed to more equal. Manufacturing companies have utilized the servitization strategies where companies offer combinations of products and services called product-service systems instead of selling products (Barrett et al., 2015). Even though the role of services have grown more significant, products still have a major role in producing services as information-intensive services have risen into a significant role in major economies (Karmarkar, 2015). Products can include technologies which can support these information-intensive services.

This chapter explains why the transition from products to services occurs and how it can be performed. To understand this transition, it is important to understand what the terms product and service means, how these can be characterized, what are the differences between them, and how these terms are connected. The following chapters will describe products, services, and the product-service transition.

2.1 Products and services

Products and services are familiar to most people. Even if these terms are unknown, something that have been created from resources or activities performed for someone, should be something that everyone has experienced. Products are commonly known as matters that are manufactured and tangible. Services are usually considered as actions performed on behalf of a customer. These two concepts seem to be quite straightforward. This might have been the case during the

age when everything was much simpler than today, and market consisted only of basic commodities and obvious services.

2.1.1 Products

The term product is quite common and known to many people. Most people have a notion what products are because modern world surrounds humans with various products. Traditional definition of a product is probably predominant conception that many people have. Traditional view of products, according to Goods-dominant logic, is that products are manufactured using tangible resources and producer determines the value, and customer purchases a product and receives value in exchange (Vargo & Lusch, 2004). Goods as a term is widely used for products in the marketing research field. Goods-dominant logic of marketing and emphasis towards manufacturing have been major drivers for research during the several past decades (Golinelli et al., 2012). Traditional definition for product originates from marketing and goods-dominant logic defining products as a tangible manufactured goods that can be stored, and which value and utility is created during production that is standardized and done away from the market (Vargo & Lusch, 2004). Product is thought to be something tangible, which is controversial according to Penttinen (2007) who questions the tangibility of electricity which is categorized as a product.

Usually, products have been defined how they differ from services. Products can be thought of something that are not services. Kayastha (2011) suggests that products are non-service exchanges executed in zero time-duration compared to services that are exchanges executed over a period of time. Basically, this means that if something is exchanged and the exchange happens in a moment, it can be thought as a product. He notes that this applies only to commercial exchanges. This distinction is easy to understand and apply in practice. Products are commercially acquired through one-time exchange, which does not form any kind of contract between a buyer and seller.

Vargo's and Lusch's (2004) service dominant logic has started to change the way that products are seen today. As they state that essentially everything can be seen as a service and products are merely enablers for service offerings. The emphasis on services have impacted on how products are characterized lately. Products are solely mediums to fulfill customer needs (Golinelli et al., 2012). This thought represents well how the perspective is changing.

2.1.2 From product-orientated to service-orientated world

Perspective started to shift gradually from production orientation to market and customers, relationships, and eventually to interaction and emergence of service-dominant logic (Golinelli et al., 2012). Service-dominant logic addresses fundamental topics related to services and has been implied as a base for service science (Alter, 2012a). Many articles compare different viewpoints to the service-dominant logic, and this logic seems to appear in many service sciences articles. The

original paper from Vargo & Lusch (2004), who introduced the service-dominant logic has been cited quite diligently. Other researchers have commented the service-dominant logic in different ways. Barrett et al. (2015) claims that revolutionary thoughts of service-dominant logic are more of a realization that exchanges have always based on services. Also, service-dominant logic have been criticized as too theoretical. Service-dominant logic is highly abstract and therefore troublesome to use operationally in reality (Alter, 2012a).

The growing importance towards services, rapidly changing markets, and technological advancements have accelerated the analyzation of services and how to define services in a way that definition is suitable for current and perhaps future environments. Alter (2012a) uses act-based service definition to dispel the dichotomy between goods and services by claiming that producing tangible products can be regarded as services. This is consistent with three of the foundational premises of service-dominant logic: the application of specialized skills and knowledge is the fundamental unit of exchange, goods are distribution mechanisms for service provision, and all economies are services economies (Vargo & Lusch, 2004). Alter (2012a) also suggests that every economic activity is essentially performed to benefit others and therefore these activities are services.

2.1.3 Services

So far, many definitions for services have been made, but none of them have stood out to be the ultimate truth. Services have been defined for a long time without producing any widely accepted definitions, but merely dissatisfactory definitions that define services narrowly (Kayastha, 2011). For example, service science does not have a unified and every service situation applicable definition for services (Alter, 2012a). The problem with many of the existing definitions is that they are not suitable for numerous common services, and many of these definitions state that every economic activity is a service (Alter, 2012b). This points to the problem in the research field that it is hard to capture the full essence or scope of services with a singular definition.

Kayastha (2011) suggests that without a clear and unified definition of services, it is hard to determine accurately the size of service sector and to measure the growth of services. It is important to understand what can be regarded as services. Not only for analyzing different markets and its share of services, but to understand what are considered as services in regard to legal aspects. This is a relevant issue when something is classified as a product or a service, for example, taxation is different with services and retail products (Kayastha, 2011). Recently, there has been news of aggressive corporate tax planning. Product or service choice could be a subject to this kind of thinking. This could lead into designing offerings that are legally services, but the service component is useless for customers. According to Alter (2012b), services should be defined in a way that the essence of service is emphasized, the scope of service connects to reality, distinction between product and service is realistic without restrictions that are unnecessary, and capturing every various type of services that are usually considered

as services. This is quite clear assumption how services should be defined, but there are many aspects that good definition should hold within. It is possible that defining service this way could create needlessly complex and incomprehensible definition for service.

Initially services were defined how they differ from goods, and what kind of distinct characters services have (Golinelli et al., 2012). Today, the comparison between products and services is not so relevant anymore. Services have become a part of almost every market offer, which changes the market into a service economy that leads into a situation where differentiation of goods and services becomes useless (Barile & Polese, 2010). Despite of this, products and services probably still have differences when thinking about the value creation. As previously discussed, value for products was traditionally determined by the manufacturer, but the shift towards service-dominant logic has changed how value is created. Vargo, Maglio and Akaka (2008) describes the value creation in service-dominant logic as they depict that companies make value propositions, value is co-created with customers, and value is determined by the customers through value in-use. Many recent articles use the service-dominant logic view on the value creation especially when considering services (e.g., Kinnunen & Turunen, 2012; Zhang & Banerji, 2017; Beverungen et al., 2019; Tuunanen et al., 2019).

Services can be defined through their characteristics. Penttinen and Saarinen (2005) discuss that services have been defined as intangibles, variables and perishables in the traditional marketing literature. The model example of characteristics-based definition is often seen as IHIP (intangibility, heterogeneity, inseparability, perishability), which is thought to be inaccurate, misleading, flawed, confusing, and outdated among several researchers (Kayastha, 2011). Penttinen (2007) challenges traditional definitions of services by discussing controversies in heterogeneity, perishability, and inseparability of production and consumption. According to Penttinen, traditional characteristics are only useful for describing most of the services, but not to define what service is. Lusch, Vargo and Wessels (2008) remarks that these differentiating characteristics are remnants of goods-dominant logic, in which services are considered as products.

Services have been often referred as acts for the benefit to other. According to Kayastha (2011), many researchers, and authors of textbooks, legislation, and even some dictionaries use act-based definition (acts, deeds, performances, efforts, processes) for services in which acts are considered physical. He claims that act-based definitions cannot classify some commonly known services as services, such as leasing, insurance, and loans, because these services do not include any physical acts. In this viewpoint, these services are activities where providers grant access to matters that can be leased, compensations when something breaks, and money that is eventually returned. Vargo and Lusch (2004, p. 2) define services as "the application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself". Penttinen (2007, p. 8) depicts services similarly, but in much simpler way as he describes services as "work done for someone else".

Ownership-based definition classifies services as an exchange without transferring any ownership (Kayastha, 2011). Kayastha finds this problematic because physical environment and technology can influence the setting, and intangible goods are always considered as services despite that services are sold or licensed. He gives an example of a book that is a retail product when it is in a physical form, but if this book is in the form of e-book, then it can be regarded as a service because ownership of e-book does not transfer to customers as they only get access to use it. Act-based and ownership-based definitions have been tried to integrate in attempts to create one universal definition for services. Alter (2012b) and Kayastha (2011) discuss the definition made by Kotler et al. (2009), and they criticize this definition that integrates both act and ownership-based definitions as too strict and excluding.

Some of the service definitions are vague in a way that services cannot be explained unambiguously, for example using phrases "more or less" and "normally, but not necessarily" in a definition, or definitions use exclusion, such as something that is not a product (Kayastha, 2011). Alter (2012a) remarks that service definition should comprise services of every type. A simple definition of service that tries to include all different service types, is Alter's (2012a, p. 220) definition: "services are acts performed for other entities including the provision of resources that other entities will use". Alter (2012a) claims that this definition is suitable even for self-service and automated services. And according to him, this definition is mostly coherent to the definition by Vargo and Lusch (2004), but Alter's definition demands that service is performed for others. Definition from Vargo and Lusch (2004) indicates that every action done for itself can be regarded as a service. This is somewhat misleading, even though it includes self-service in this way. If a person repairs something that is broken, without any outside resources such as spare parts, repair kit, advice, or assistance, can this kind of action regard as a service? Alter (2012a) describes self-service as a combination of the resources of service providers and the self-service activities of customers.

2.1.4 Towards service orientation

Different service definitions have different focuses. Some of the recent service concepts focus on value-enhancement, solution finding, competitive advantage, resources valorization, provider and user interaction, and co-creation in network of systems (Barile & Polese, 2010). Some of these concepts can be found in the service systems. Service systems produce services that provides solutions and solutions are transformed into value (Barile & Polese, 2010). Peters et al. (2016) and Grenha Teixeira et al. (2017) discuss what are the service systems as they bring up that these systems consisting of people, technologies, organizations, information, and other resources create mutual value for all stakeholders. Peters et al. (2016) emphasizes the importance of people, and they remind that value is always determined by the people in the service system. They also note that interactive value co-creation is possible for these complex socio-technical systems as service systems can be in a collaboration with other services systems. Beverungen,

Müller, Matzner, Mendling and Vom Brocke (2019) describes service systems as an organizational setting that utilizes service co-creation, in which value in-use is created by service provider and customers.

Another area of interest is service innovation. Researchers have started to use service-dominant logic for understanding service innovation (Barrett et al., 2015). According to Barrett et al., customer demands and search for new market niches are primary drivers for service innovation that has become a medium for growth and competitive advantage especially within large companies. Service orientation can lead into discovering new forms of service. Information systems can be considered as information services (Barrett et al., 2015). The use of technology and especially ICT-technology with various services opens up a whole new set of possibilities. Traditionally ICT has been seen merely as an enabler for service delivery, but ICT offers potential for improving services, service innovations, and creating new services (Barrett et al., 2015). As companies start to shift towards services, service innovation becomes essential (Gremyr et al., 2010).

2.2 Transition from product orientation to service orientation

The role of services has dramatically increased within many industries and especially in the manufacturing industry because services can offer something that the products alone cannot offer. Cusumano et al. (2015) discuss that services have potential to boost the growth of developing new markets, reorganize dominant structures of markets, and disrupt matured markets. Services have a tremendous power to change many aspects of businesses. Therefore, companies are pursuing the service enabled benefits through the service and customer orientation to maintain in more and more competitive markets (Ulaga & Reinartz, 2011). Baines and Lightfoot (2014) discuss that modern manufacturing companies are increasingly moving towards services as product-service business models have become essential for companies to be successful in today's markets because services can increase competitiveness, enhance customer relationships, create new streams of revenue, and build barriers for competitors. Other benefits can be higher margins and profits, increased revenues, better customer satisfaction and loyalty, better brand equity, and increased growth (Kowalkowski et al., 2017a). As companies have started to value more services, researchers are also emphasizing services as critical means for success in today and especially in the future. Researchers have started to emphasize the importance of service growth in manufacturing companies because services can benefit greatly companies that are struggling with different product-orientated market issues, so therefore this topic has been one of the most discussed topics in the service research (Kowalkowski et al., 2017a). Among researchers, there is a wide consensus of the benefits that services can produce for manufacturing companies, and many large companies have had tremendous success when they have shifted from products to services (Huikkola et al., 2016). Researchers also see these benefits received by large companies as very convincing (Baines & Lightfoot, 2014).

A transition is a change from one thing to another. When considering transition from products to services, it is seldom a simple change. Transition from products to services means the shift of focus from products to services (Penttinen, 2007, pp. 11-12). This transition does not mean that all the focus changes into services making products obsolete. Products are still an important part of the core business, but the role of products changes when service aspect is implemented into the offerings of companies. The transition can also be a simple and straightforward change, at least in the eyes of customers, as some software providers have shifted from selling software licenses to offering software as a service (Barrett et al., 2015). This is an example from software business, but other industries have also made transitions from products to services. Barrett et al. (2015) describe a case where airline engine manufacturer started to offer the service of engine flight hours instead of engines as products.

The transition from products to services has been referred with many different terms and concepts, for example, hybrid offerings, service infusion, integrated solutions, systems selling, product-service systems (PSS), and servitization (Kowalkowski et al., 2017a). Although many different terms have been introduced, servitization is one of the most commonly used term. Many researchers in the fields of service, marketing, and operations have been using the term servitization, which was introduced in 1988, when discussing the product-service transition in manufacturing (Lightfoot et al., 2013). The literature of servitization have concentrated on motives and benefits, and especially how servitization can produce competitive advantage (Smith et al., 2014). These research fields that have dealt with servitization are not the only disciplines that address the transition from products to services. The transition has been addressed within many different disciplines, for example, services, marketing, operations, engineering, management, and innovation (Kowalkowski et al., 2017a). Even though the transition from products to services has been widely studied, there exist many research gaps. Researchers have pointed out that more empirical studies are needed (Gebauer, 2008), shift along the product-service continuum should be clarified (Salonen, 2011), the initiation of the transition process should be clearly defined (Kinnunen & Turunen, 2012), and the effects of challenges on benefits and sustainable competitive success should be studied (Zhang & Banerji, 2017).

The transition has been defined and described in many ways. Some researchers have referred the transition being a way to differentiate. Gebauer (2008) bring up the differentiation strategy that companies use to gain competitive advantage. Whereas some researchers link innovation to the transition. Baines et al. (2009a) describe the transition as "the innovation of an organizations capabilities and processes to better create mutual value through a shift from selling product to selling PSS" (p. 555). The transition is usually referred as a process. Kowalkowski et al. (2017b) describe the transition as a process that shifts business model from product centricity to service centricity, in which many aspects are changed, such as resources, capabilities, processes, and structures. Some researchers believes that this process is a natural evolvement of manufacturing companies. Cavalieri and Pezzotta (2012) describe the transition as an evolutionary path that

changes how manufacturing companies orientate themselves as companies gradually shift from product manufacturing to integrated product-service solutions due to the need to create new value sources as a respond to emerging customer needs or companies just trying to be proactive in seizing future success. This transformational path relates to the idea of different levels of the transition.

The transition have various levels that manifest the amount of product and service orientation. Baines et al. (2009a) suggest that there are different levels of servitization that appear on different locations on the product-service continuum. They specify that the transition can range from product-centric to customer-centric forms, i.e., services can range from being add-ons for products to delivering specific outcomes for customers. Product-centered services can be, for example, maintenance services or financial services, and customer-centered services can be, for example, turnkey solutions (Huikkola et al., 2016). Lerch and Gotsch (2015) describe these two orientations of services as well as they depict that product-centric services are usually maintenance, repair, and training services, whereas customer-centric services are more advanced and complex, for example, product-service systems or customized unique service solutions. Huikkola et al. (2016) discuss that the transition is a continuous process that begins with providing some services and end up with providing total solutions. They continue that in their study few of the case companies had continued their transition process for 50 years. Lerch and Gotsch (2015) discuss this transition process as a transformation path which has different stages that offer various differentiation opportunities. When the transition moves more towards services, the balance between products and services changes, and the level of the servitization changes as well (Baines & Lightfoot, 2014). They classify three different servitization levels: base, intermediate, and advanced. Some of these levels can be seen in the following example.

In Penttinen's and Palmer's (2007) research, one of the case companies transitioned gradually from products to services due to customer needs and declining product sales. In the first phase of the transition, the company started offering products with additional services to better satisfy customer needs, and in the second phase, they began offering a full-service concept. Before the transition, the company provided parts that were used in industrial machinery. After the transition, they offered the service of operability which consisted of products with sensors that monitored performance and wear to guarantee machine operability by changing worn out and ineffective products into new ones. The outcomes of this transition were steadier revenue stream, better profitability, and better customer retention. This transition required the implementation and use of new technologies and information systems as well as acquiring new competencies (Penttinen & Palmer, 2007). As in this example, steps towards services is quite natural way to start the transition.

Companies have various reasons for pursuing service orientation. These reasons may have emerged through different market pressures and the fear of not maintaining in competition. Different factors that effect on the competitiveness of companies can also lead to embracing services as companies aim to be

successful and many different paths can lead to success. When companies begin their journey on the path of transition from products to services, companies will face various challenges along the way. Companies are required to change almost every aspect in their business including strategies, mindsets, value propositions, value creation, capabilities, and organizational structures and cultures (Salonen, 2011). The next chapters will discuss what drives companies to choose the transition, how companies can perform the transition from products to services, and what are the outcomes of this transition.

2.2.1 Various reasons drive companies to pursuit services

There are various reasons why transition from products to services occur. Usually, companies are pursuing improvements in their business to gain competitive advantage and success. Companies might even struggle for their survival, and maintaining in competition can be the driving force to pursue changes. To maintain in competition, one possibility is to offer more complete offerings to customers (Penttinen, 2007). The more complete offering that Penttinen refers is an offer that is complemented with services. Services can differentiate company offerings, and a successful differentiation can facilitate competitiveness. Many manufacturing companies try to differentiate from their competitors by adding services to complement their products (Kinnunen & Turunen, 2012). Some companies differentiate more by transitioning to product-service systems instead of just adding product supporting services. Companies try to differentiate themselves in markets by utilizing product-service systems, and these systems also have positive impacts on the profitability of companies (Chowdhury et al., 2018). Profitability is also strongly related to companies' ability to maintain in competition.

To maintain in competition, companies must have competitiveness and must be able to manage financially. Profitability is important for every company and changed market situation can lead to innovating something new. Manufacturing companies are forced to innovate new services to enhance their product offering because global competition decreases the product prices and margins (Kinnunen & Turunen, 2012). Product markets are highly competed markets in the age of globalization, so it is easy to order cheaper product from abroad. Also, maturity of a product or industry can lead into a situation where companies cannot differentiate their products anymore, and services are one path for improvement and differentiation (Suarez, Cusumano & Kahl, 2013). When manufacturing companies try to compete in matured markets where product sales are declining, services can improve the financial performance of these companies (Cusumano et al., 2015). Differentiation solely through services might not be sufficient because technologies are constantly advancing as Chowdhury, Haftor and Pashkevich (2018) suggest that conventional product-service systems might not be enough in today's digital era. Maintaining in competition is vital for every company, and specially for companies who try to compete in developing markets. Differentiation is also an attempt to create competitive advantage which enables better competitive success.

Competitive advantage is something that companies try to achieve, but it is not an easy task because competitive advantage means that a company is doing something better than other companies. Product-related competitive advantage has been harder to achieve because of the increased commoditization of the markets (Baines et al., 2009a). Salonen (2011) explains that product-related competitive advantage relates to technological superiority and overall cost leadership which are difficult to maintain. Therefore, companies have started to shift towards services to find easier ways to achieve competitive advantage before they end up losing their product-related competitiveness. Competitive advantage is referred as one the most influential drivers for companies to pursuit servitization because services enable more sustainable competitive advantage than products alone due to the difficulty to imitate the servitized offering (Baines et al., 2009a). Customer needs are related to competitive advantage as competitive advantage is useless for companies who cannot fulfill the needs of their customers. Companies are seeking competitive advantage through servitization to better fulfill various customer needs that have become more complex, and they utilize different internal and external resources in their service networks to deliver these increasing customer needs (Eloranta et al., 2016). Companies do not achieve competitive advantage by just including services into their offerings because services are only one ingredient in the mix of producing competitive advantage.

Competitive advantage can be achieved through different strategies. Eloranta & Turunen (2015) mention that researchers have widely accepted the view that manufacturing companies can achieve competitive advantage by utilizing services. They point out that existing servitization literature has four different views on how companies can achieve competitive advantage: market forces, resource-based view, dynamic capabilities, and relational view. Market forces view concentrates on the differentiation through services. Resource-based view emphasizes utilizing different resources, for example, relationships and product-service offerings that are unique and complex. Dynamic capabilities can enable companies to adapt to changes in dynamic markets as these service-related capabilities can organize the resources of companies. Relational view focuses on the capabilities that enable the utilization of service and solution networks. Eloranta & Turunen (2015) discuss that more recent studies emphasize that competitive advantage is formed through complex networks of actors, systems, and structures. They described that this network of actors includes companies, people, and technologies, which consist of actors internal to the company that has servitized their offering, and also external actors, for example, suppliers, subcontractors and partner companies.

Market developments and the changes that competitors perform force companies to rethink their position in the markets. Because many manufactures are shifting towards service-orientation, this shift changes the market dynamics, and therefore product-orientated companies should consider if service-orientation could improve their value offering and help them to maintain in the competition (Kinnunen & Turunen, 2012). Sudden impacts on the markets can emerge when new companies enter to the competition. Berman (2012) discuss how some

companies might radically reshape their business by changing value proposition and operations because of new disruptive companies who enter to the same markets. Despite how markets are developing and changing, companies should concentrate on the changes around them. Lerch and Gotsch (2015) emphasize that it is vital for companies to follow the industry development and develop their own business accordingly because new emerging forces of servitization and digitalization can reshape the markets and start the extinction of companies who do not follow the general development of the industry. Key activities for companies to cope with these forces are the reconfiguration of customer value proposition and business operating model (Berman, 2012). Renewal of customer value proposition seems appropriate due to the customer related changes in the markets.

Increasing customer needs and demands are changing the markets and how companies should compete. This is another aspect why companies are moving towards product-service integrations. The shift from products to integrated solutions is happening due to market demands as developing global economy and technological advancements have effect on these demands (Zhang & Banerji, 2017). These market demands are one of biggest reasons for companies moving towards services. Economic pressure and more demanding customers are key motivators for transition (Penttinen, 2007) as customers have started to demand more services from product companies (Oliva & Kallenberg, 2003). These services can change the offering and value proposition that customers are receiving as customers can impact to these during the early stages of the product lifecycle. Customers have started to increasingly demand holistic solutions to fulfill their needs and services to support every phase of the product lifecycle as customers desire customized features and functions, and they are pursuing also other benefits as well (Wiesner et al., 2017). These services can also facilitate the use and maintenance of the product. Customer demands and needs have been regarded as important drivers for the transition. Penttinen and Palmer (2007) conducted a multiple case study and their findings indicate that customer needs and demands, and financial stability were the most important drivers for the transition in the case study. They specified that customers are demanding better value propositions that utilizes services with products because these customers who are companies want to focus on their core competencies. Gebauer (2008) suggests that service-related customer needs are more significant drivers for servitization than the competitive situation of the market. He specifies that companies should servitize their offering when they realize that their customers begin to express service-related needs because this evolvement of customer needs initiates the decline of product-related competitive advantage.

Companies are responding to customer needs and demands by concentrating on how to improve customer value. Berman (2012) discuss how companies from every industry are enhancing their products to increase customer value through better customer experience as companies add new features and services to traditional products. Customers seem to demand more value for them as companies are enhancing their value propositions through various methods. Customers are increasingly expecting more value from the benefits through the use

of a solution instead of concentrating on the product price (Wiesner et al., 2017). As products are constantly becoming smarter, customers also desire more value. Beverungen et al. (2019) argues that service customers who use smart products are primarily interested of customer value that is produced through value in-use. Customer value is a part of increased customer needs which effects to markets and ultimately to companies.

Companies need to address increased customer needs and this requires companies to concentrate on their customers. Individual customer needs can be quite unique and companies are pursuing to deliver these needs by tailoring their offerings (Gebauer, 2008). Salonen (2011) discusses that both of the cases in her study emphasized that the transition enabled focusing on customer needs. Customer centric qualities, such as problem-solving, eagerness, innovativeness, and flexibility are part of the service-orientated culture which is essential for companies to concentrate on their processes, customers, and value generation instead of focusing on the mix of products and services of their offering (Kinnunen & Turunen, 2012). In other words, companies should focus how to fulfill customer needs and produce value out of that. How value is developed and delivered to customers relates to how companies can match their offering to customer needs, and how they can deliver the value of their offering to customers (Zhang & Banerji, 2017). This is not an easy task especially for companies who do not have customer centric qualities. Lerch and Gotsch (2015) suggest that more personalized and responsive offerings enable advantage in the markets. They also mention that customized product-service systems enable fulfilling customer needs that are highly individual.

Competitive success can be the objective that drives companies for product-service transition. In search of growth and improved profitability, companies are starting to focus on services instead of products (Penttinen, 2007). Seems that services enable better tools for growth compared to growing business only through selling products. Barrett et al. (2015) discuss how large companies in many different industries have shifted to offering services as a primary mean for growing their businesses. It is apparent that services can have major impacts to how businesses evolve. Zhang and Banerji (2017) note that within academic and business worlds exist a wide consensus that the transition of manufacturing companies towards services has positive effects on business profitability and growth as servitization enables novel income for business, which also balances the impacts of economic cycles.

2.2.2 Key activities of the transition

The transition from products to services has many different aspects that must be considered before, during, and after the transition. There are different ways to perform the transition, and different companies require different approaches for the transition. Oliva and Kallenberg (2003) discuss the requirements of a transition as they depict that "services require organizational principles, structures and processes new to the product manufacturer", and also "new capabilities, metrics

and incentives" are needed (p. 161). As the role of services grows in manufacturing companies, strategies and business models are reconfigured (Cusumano et al., 2015). The transition is about changing the value proposition, and successful transition includes service-orientated business model (Adrodegari et al., 2017). Business model's value creation must be changed from transactional exchange based to relational exchange based (Oliva & Kallenberg, 2003). Besides the reconfiguration of strategies and business models, organizational structures and activities must be changed. The processes and structures of manufacturing companies are not directly suitable with services, and many viewpoints within these companies are product-orientated. Baines et al. (2009b) point out that traditional manufacturing companies most probably have different principles, structures, and processes which are not applicable for producing services as only specific mix of these are appropriate for companies who servitize their offering. When companies move toward services, there are factors that are essential to consider and required to achieve. Maglio, Kwan and Spohrer (2015) state that "capabilities, interaction, change, and value are fundamental to service" (p. 2). These four fundamental factors are discussed in more detail in this chapter.

The transition begins with different organizational changes and considerations. According to Kinnunen and Turunen (2012), the first three steps in the transition are defining a service strategy, creating a new organizational culture, and building an organizational structure. Huikkola, Kohtamäki & Rabetino (2016) discuss that many aspects are required to change for a successful transition. They mention that organizational structure, processes, resources, and business model must be realigned to match the changed business, and new capabilities are necessary for the implementation of the new business model. They emphasize that the realigning of resources is especially important because without the service-orientated resources companies can get stuck with the old product-focused business model. This means that these companies cannot focus on service-orientated business, and they end up relying on the old business. Some of the factors change and some are totally new, but it is important to abandon some of the old ones that are not necessary anymore. For companies to be productive, unnecessary resources should be discarded proactively to make way for new resources (Huikkola et al., 2016). They also discuss that the findings of their study indicates that when companies systematically invest in resource realignment and building dynamic capabilities, they can have significant impacts on their market performance.

Defining service strategy and business model is essential because these are the guidelines for how companies operate. As discussed earlier, many changes occur during the transition, and therefore these changes should be considered in the strategies and business models of companies. Kinnunen and Turunen (2012) discuss how service strategy is an important part of service orientation as they suggest that "service strategy should be considered as the foundation for companies seeking to successfully operate in the service business" (p. 61). They also discuss that service strategy is a foundation for success in service business, which drives companies' pursuit to differentiate from their competitors by utilizing

service offerings, and guiding as well as motivating in organizational change. Gebauer, Bravo-Sanchez and Fleisch (2008) depict that servitization requires the use of service strategy, and for the service strategy to be successful, companies must appropriately align their external environment, strategy, and different factors of their organization. They emphasize that these must be aligned in relation to each other and companies should better realize their new environment that is changing through the servitization. The external environment of companies typically involves market competition and customer needs (Gebauer, 2008). As the external environment is critical for companies to operate and compete, companies should consider these aspects more. Gebauer et al. (2008) suggest that key factors for designing service strategy are customer and market orientation which companies and managers should implement. Baines et al. (2009a) also suggest that customer centricity is a key factor for successful service strategy as they describe that as a result of the servitization companies begin to offer customer specific and desired solutions. If strategy is an important part of servitization, then business model is as equally important.

Companies need to make changes to business model when different aspects of business changes due to the servitization. Zhang and Banerji (2017) discuss that transitioning companies are paying attention to reconfiguring their business models because business models represent how the value propositions of companies are created, developed, and delivered. Changing business model is always topical if companies undergo some changes that effect on their core business. Iansiti and Lakhani (2014) discuss how digital transformation, i.e., the digitalization of products and services, forces companies to rethink their business models for them to be able to compete through new means of value creation and capture because transformation changes both of these. They describe the value creation as a value proposition that depicts how value is created for customers, and value capture is described how companies make money out of the value proposition. These reflections should be applicable with servitization as well. Lightfoot et al. (2013) bring up that customer centricity is important when considering business models of servitized companies because the offerings of integrated solutions require business models to include more detailed customer knowledge. When business models are designed with increased consideration towards customer centricity, companies are capable of producing more value for customers. Business model can facilitate matching customer needs to value propositions and implementing service strategy in companies (Zhang & Banerji, 2017). Both strategies and business models must be kept up to date, and companies should consider this. Service strategy must be reconfigured according to changing markets, and management should maintain service strategy continuously (Kinnunen & Turunen, 2012). Changed business model in the transition process implies to new matters that companies are required to change. After defining the basic blocks of business, the next task is to change the organizational culture.

The transition continues by reviewing the organizational culture of a company. Zhang and Banerji (2017) point out that cultural change is a key challenge for the transition. Manufacturing companies have customed to a culture that

revolves around products, and therefore transitioning from products to services can be challenging. Product-orientated culture is a common view for traditional manufacturing companies who concentrate on producing and selling their products in efficient way without unnecessary variations and flexibility that would increase their costs (Kinnunen & Turunen, 2012). They also mention that product-orientated companies see services as "unprofitable necessities to sell products" (p. 62). The service-orientated culture differs quite much from the product-orientated culture. Kinnunen and Turunen (2012) found out from the previous studies that service-orientated culture focuses on creating value for customers, customer-centricity, value co-creation, and value in-use. They added that service-orientated culture also emphasizes services being the core offering and the source of value, products as mediators for value creation, and customers being the co-producers of services.

Service-orientated culture is important for companies who decide to start the transition. When company transitions from product-orientation to service-orientation, they must shift their focus from manufacturing and sales to customer value creation, improving customer relationships, and service co-production with customers (Kinnunen & Turunen, 2012). In other words, this shift requires companies to be more customer-centric, and focusing on customers through many different aspects as they suggest that companies should start to concentrate on customer requirements instead of manufacturing issues. They continue that customer-centricity requires companies to start offering customized solutions utilizing products and services. When company shifts to being a service-orientated company, organizational structure and cultural mindset must change from product-centric to service-centric because servitization changes the value creation process (Zhang & Banerji, 2017). Kinnunen and Turunen (2012) discuss the same matters and they bring up that cultural change is on the deepest level of the organizational change. Besides the cultural change, service orientation will profoundly change how value is created and perceived.

Value creation is a subject of change when company adopts the service orientation. Smith et al. (2014) discuss how value creation changes from product-orientated view where value is determined through production and exchange of products, i.e., value in-exchange, to service-orientated view where value is generated through the use of the result-orientated offering and the delivery of customer needs, i.e., value in-use. They remind that "it is the consumption experience that defines what is valuable to a customer" (p. 251). The transition changes the value creation process as value is produced through integrated solutions, i.e., the bundle of products, services, and service personnel, and consumed through value in-use (Baines et al., 2009b; Zhang & Banerji, 2017). Also, value is no longer created solely by the company who previously offered only products. Tuunanen, Kazan, Salo, Leskelä and Gupta (2019) discuss that value is co-created during the interaction between service provider and user, and the user determines how much value the offering produces during the use of the service. Before value creation changes to value co-creation, value is created and delivered unidirectional (Zhang & Banerji, 2017). Because value creation changes, other aspects of service

orientation become even more important as these aspects have necessary supporting role for the changed value creation. If employees are not service orientated and customer centric, changing the value creation of a company to service orientated is a difficult task (Zhang & Banerji, 2017). After companies have adopted service-orientated culture, companies are required to make organizational changes to business structure.

Organizational structures must be changed in a way that these structures are aligned with service strategy and service-orientated culture. According to Zhang and Banerji (2017), servitization research focuses on how to support business transition by changing the internal structures of a company. These internal structures have major impacts on the abilities of companies to follow defined service strategies and utilize the service orientation. Huikkola et al. (2016) discuss how companies can change their organizational structure as some companies create a new business unit for services, and some companies change the structure in a way that product and service businesses are integrated. According to Huikkola et al., the latter option is much more convenient because when companies structure, for example, into a matrix organization, companies can enable product and service personnel to work together. They state that this kind of collaboration is required for companies to produce complex and integrated solutions. When organizational structure changes toward service orientation, companies will probably need new capabilities, such as new service personnel.

2.2.3 New capabilities, resources and assets

Capabilities, resources, and assets are essential parts of the transition as these are the building blocks for operating the changed business. Penttinen (2007) states that service orientation requires the acquisition of new capabilities, resources, and assets. The terms capabilities, resources, assets, and competencies are used by many researchers. Capabilities and competencies are commonly used, and sometimes it seems that these are used as synonyms even though there are slight differences between them. Day (1994) defines capabilities as "complex bundles of skills and accumulated knowledge, exercised through organizational processes, that enable firms to coordinate activities and make use of their assets" (p. 38). He specifies that different business activities that are enabled by capabilities typically are, for example, product development and service delivery. Competencies are developed through capabilities and can described as "well-defined routines that are combined with firm-specific assets to enable distinctive functions to be carried out", which are mostly static by its nature (Day, 1994, p. 38). In other words, the end result of development is competence which consist of skills and knowledge that are utilized to perform specific tasks (Vargo & Lusch, 2004).

Resources are also important for companies, and traditionally resources has been considered as natural resources or goods, which are used in producing value (Vargo & Lusch, 2004). They suggest that due to the market shift toward service-dominant logic primary resources for value creation are knowledge and

skills. Resources are critical for companies because value is created through the integration of resources and competencies, in which different resources are utilized, for example, people, information, technology (Vargo et al., 2008). Besides capabilities, competencies, and resources, assets are essential for companies to produce value. Day (1994) describes assets as accumulated resource endowments of a company, for example, equipment, systems, and brand equity. Assets alone do not produce value as Day explains that assets can be used for the advantage of a company through capabilities. When moving from product-dominant focus to services, the required physical assets are quite different (Huikkola et al., 2016). The transition requires new assets as well as new resources, and capabilities or competencies.

The transition forces companies to seek new capabilities or competencies. In the research of Penttinen and Palmer (2007), they found out that many companies cannot cope with the transition on their own, and they suggest that companies need to acquire new competencies. Another option is to develop capabilities if acquisition is out of the question. Salonen (2011) discuss how both of the companies in her case study developed new capabilities as these companies transitioned to offering integrated solutions, and she describe this development project as a tremendous process for these companies. Service-related capabilities are essential for companies who are transitioning towards service orientation, and these capabilities can be developed, hired, or acquired, for example, through mergers and acquisitions of smaller specialized companies (Huikkola et al., 2016). They note that companies usually acquire new capabilities and also continuously develop existing capabilities at the same time.

Usually, companies develop new capabilities as a result of the transition as Baines et al. (2009b) discuss that the actual transition process is "the innovation of a manufacturer's capabilities and processes" (p. 14). The importance of capability development grows when companies move further towards services on the product-service continuum. The more a company transitions towards service orientation and customer centricity the more significant capabilities must be developed (Oliva & Kallenberg, 2003). Service orientation creates a demand for companies to obtain capabilities that are necessary for the changed business. Some of the capabilities are more vital than others. New capabilities for sales force are critical for companies who change their orientation to services (Salonen, 2011; Ulaga & Loveland, 2014). Ulaga and Loveland (2014) discuss that sales force has a pivotal role in servitization, and the problems with aligning the sales force of a company to service and customer orientation can create major challenges for servitization. Many researchers have discussed that manufacturing companies do not usually have capabilities for selling services and solutions, so therefore salespeople need to develop new skills and mindset (Huikkola et al., 2016). The development of specific sales capabilities is a tremendous challenge for companies (Ulaga & Reinartz, 2011). Capable and specialized people are the key to service growth and customer satisfaction, so new people and resources must be acquired to meet the capability requirements (Zhang & Banerji, 2017).

Resources are equally important as capabilities and competencies. When the core offering changes due to servitization, companies should consider that they have the right resources and competencies for delivering the new value proposition (Smith, Maull & Ng, 2014). Companies that changes due to servitization have existing resources and they are in demand for new ones, so companies should carefully consider how to proceed. Huikkola et al. (2016) emphasize that resource realignment is vital for companies to create value through the service-orientated business model. They specify further that resource realignment consists of different activities that enable the creation of new customer-orientated capabilities through changed resources which can include, for example, technologies, IT systems, finance, and delivery. According to Huikkola et al. (2016), resource realignment can include "the creation of new resources, the leveraging of existing resources in new ways, and the release of resources that are no longer relevant" (p. 37). It is sensible to modify the existing resources to meet the new demands, and companies also have less burden to bear and more space for new resources when they release the irrelevant resources.

Usually manufacturing companies do not have all the necessary resources and competencies as their existing resources and competencies are product orientated. Therefore, new resources and competencies are required for new offerings that have been created as the result of a servitization (Lerch & Gotsch, 2015). There are few options in acquiring new resources. Companies can obtain new resources, for example, technologies, competencies, and market knowledge, through creating or building new resources by themselves, or acquiring resources from outside of the company (Huikkola et al., 2016). They specify that it is difficult to create new resources or modify the old resources because specific capabilities are needed, such as learning and development, which can be utilized to gain or create new knowledge, skills, processes, and way of thinking.

One specific resource is particularly important when companies are moving towards services and innovating new services. Huikkola et al. (2016) discuss that companies in their study required technologies as a new resource to transition from products to services and to provide specific services. In this case, technologies proved to be important, but other researchers have discussed the significance of technologies. Penttinen (2007) emphasizes the role of technology as he stated that information technology innovation is essential when companies transition from products to services. Barrett et al. (2015) also discuss the importance of information communications technology (ICT) in service innovation, and they bring up that new competencies are combined with new resources, such as ICT, to enable innovations even further as well as creating value in novel ways. Technologies can have a significant impact on services and service innovation. Technologies enable better customer experiences in new smarter services, and simultaneously customer relationships shift to more dynamic (Grenha Teixeira et al., 2017). Services can be enhanced through different new technologies as services can utilize different technologies, for example, service-related technologies can improve service productivity, and remote sensing technologies can improve the value in-use (Huikkola et al., 2016). When different technologies are a part of the

service innovation and the transition from products to services, complexity increases and new challenges emerge. However, need for new resources and competencies might be affected by the company size. When digital elements are part of servitization, big companies will more probably succeed in the transition because they have presumably the required resources and competencies (Lerch & Gotsch, 2015).

2.2.4 Customer-orientated mindset

Customer relationships become more important when companies start to orientate towards services. Companies must change their orientation towards customers and form closer relationships with them (Penttinen, 2007). Penttinen and Palmer (2007) adopts the idea of buyer-seller relationship which is a continuum from transactional relationship to relational. They found out that commitment, cooperation, and relational norms lead to relational relationship. They also mention that the lack of these attributes and lack of trust enables only pure transactional relationship. It is apparent that relationships are vital for companies who shift to service orientation. Also, better relationships with customers enable companies to understand their customers better, which is important for companies who are forming a new offering. To customize better offering for customers, it is important to understand the customers' processes (Penttinen & Palmer, 2007).

According to Penttinen (2007), transparency and building trust between provider and customer are essential for shifting focus towards services because it is more difficult for customers to monitor what they get in return for paying the service fee. Trust and transparency were issues in Penttinen's and Palmer's (2007) research as they found out that customers had uncertainties and they were afraid of opportunistic behavior when companies shifted to providing services. They continue that these issues might lead to customers rejecting the more complete offering that companies are trying to offer. If customers are unconfident in regard of the new offering, companies must figure out how to solve these issues. Researchers mention few options that companies should consider.

Companies who are shifting towards service-orientated offerings can increase interaction, trust, and loyalty with customers through improving customer relationships (Barile & Polese, 2010). To improve relationships, companies should arrange continuous relationships through contracts. Better customer relationships, customer loyalty, and customer knowledge are possible for manufacturing companies through service contracts (Kinnunen & Turunen, 2012). In some cases, service offerings can increase the confidence of customers instead of decreasing it. Kinnunen & Turunen (2012) discuss that many researchers have pointed out that service propositions can increase customers' confidence for purchase in regard of complicated or expensive products. It seems that these kinds of products benefit from service offerings as these offerings can ensure support for users and improve reliability of the product operation. However, Baines et al. (2009a) point out that services are in general thought to be increasing customer confidence for purchase. Since companies are establishing better relationships

with their customers, companies should consider utilizing these relationships in other ways.

Service co-production is essential activity for companies who are developing new services. Companies should collaborate with their customers to develop better offering. Watanabe & Mochimaru (2017) discuss service co-production being a fundamental process of service development, and customer involvement has been a point of interest in many studies. They point out that service co-production can also be a key challenge despite it has been regarded as particularly important activity. In addition, they mention that service co-production can affect to customer satisfaction. Zhang and Banerji (2017) also discuss how service co-production can facilitate service development and servitization. They bring up that engaging customers during the development phase enables better consideration of different customer needs, and because of that better offerings can be designed. They continue that service co-production is a valuable activity for companies, in which companies can receive instant feedback on the developed service. They explain this by describing that without service co-production activity it would be harder to get feedback quickly because services can only be tested during consumption. Huikkola et al. (2016) discuss how companies in their study developed new services and solutions through co-production methods with their customers because customers provided valuable insights into this process. It is evident that customers should be engaged in the development process, but service development has also other aspects that companies should consider.

2.2.5 Development and challenges

Development is an important part of the servitization. Zhang and Banerji (2017) remind that development is not only for business growth because development enables also better offerings for customers and better delivery of customer needs. The development processes of companies undergo major changes when companies shift towards services. If companies want to succeed in servitization, they must shift their research and development activities towards solutions orientation, in which IT systems and services are bundled with products (Lerch & Gotsch, 2015). Before the servitization, development has been focused on the product development. This poses new challenges for companies. Products and services should not be developed separately because the servitized offering do not consists of separate products and services (Zhang & Banerji, 2017). In other words, products and services should be integrated at the start of the development phase because those are integrated in the offering. Wiesner et al. (2017) specify that requirements for products and services concern the entire product lifecycle of product-service systems, and therefore products and services require integrated development including the development of manufacturing processes. Integrated development reduces the gap between different parts of the system. Cavalieri and Pezzotta (2012) emphasize that seamless integration is necessary from the initial phases of the service consumption as product functions and service activities interplay and create value. When products and services are

developed together, they are probably more balanced in relation to each other. This is something to consider as Smith et al. (2014) suggest that tangible products and intangible services should have equal roles in the creation of product-service system based value proposition. The importance of integration increases when different technologies are involved in the product-service bundle. The efficient use of technologies in services requires this integrated development (Watanabe & Mochimaru, 2017). Development poses a specific challenge for the servitization, but other challenges emerge as well.

Numerous challenges relate to the servitization and companies must overcome these challenges to be successful in the transition. Baines et al. (2009a) simply define that challenges relate to service design, organization strategy, and organizational transformation. These matters are quite vast and complex, and when all of these are under development, the situation can definitely appear as challenging. Many companies are struggling with the servitization because these companies experience the change of structures and processes of their business challenging (Cavalieri & Pezzotta, 2012). In addition, changing customer relationships and organizational culture can increase the challenges of the servitization, and all the different changes can lead to change resistance within the company (Kinnunen & Turunen, 2012). Kinnunen and Turunen specify the different areas that are particularly challenging: "defining a service strategy; creating a service-orientated organizational culture; establishing a customer-centric organizational structure; creating and developing the service offering; and managing service, knowledge, and communication" (p. 60). Challenges mentioned here are related to different areas of business, but challenges are ultimately related to people who have cope with the challenges.

Big organizational changes pinpoint the challenges to management. Servitization is mainly a managerial challenge because of all the complexities that are related to the transition towards services (Oliva & Kallenberg, 2003). Salonen (2011) supports this viewpoint as they state that management who have vast experience on product-orientated manufacturing can have major challenges to shift their mindset towards services and develop the required capabilities. Management also have to face the challenge of how to change the mindsets of employees and managers who have used to the product-orientated view on value creation. Many researchers suggest that one of the apparent challenges that manufacturing companies face in the servitization is the shift of mindset from value in-exchange to value in-use (Smith et al., 2014). Another challenge related to the value emerges when customers experience the change that the company is undergoing. It can be challenging to convince the existing customers to accept the new service-orientated value proposition (Penttinen & Palmer, 2007). In addition to the complexity of the traditional servitization, new challenges can emerge due to the digitalization. Lerch & Gotsch (2015) discuss how servitization can face considerable obstacles when services are digitalized. They point out that in this scenario, abstraction and complexity will increase, and this leads to new skill requirements of employees. Despite of all the challenges, successful servitization is possible and the outcomes of it can be very beneficial.

2.2.6 Solutions of the transition

When manufacturing companies transition from products to services, their opportunities to offer something more than products increase dramatically. Penttinen (2007, p. 4) describes the transition as the customization of company's offering, which is done by bundling new services with products. Kayastha (2011) calls this bundling as the composite exchanges of services that occur over a period of time. This bundling must be transformed into a solution that tries to solve different customer problems (Penttinen & Palmer, 2007). Zhang & Banerji (2017) call this transition as shift from selling goods to offering integrated solutions. One might say that these companies are becoming solution orientated. Salonen (2011) describe the solution orientation of companies by depicting that "transforming into a solution orientation is essentially a way complement existing core capabilities in product excellence and technological leadership rather than to replace them or to compensate for lack of such capabilities" (p. 687). This solution orientation improves the delivered value for customers. Penttinen and Palmer (2007) implies that solutions for customers are far more valuable than tools provided to customers for them to create solutions by themselves. As mentioned earlier, solutions are intended for solving customer needs, so this requires solutions to be customized for different customers.

Solutions are usually customized to meet different customer needs. When companies offer solutions, these solutions are often produced as customized solutions to deliver individual customer needs (Salonen, 2011). The reason for companies to change their offering is simple. These companies have started to offer customized solutions and services to cope with the decreasing profitability of selling products (Eloranta et al., 2016). Even though companies are pursuing increased profitability, customized solution offering poses a significant challenge for companies. It is important that solutions are cost efficient and scalable because otherwise these solutions can decrease the profitability and growth of a company (Salonen, 2011). She continues that when solutions are customized, cost efficiency can be achieved through standardized processes and modularity, i.e., customized solutions are then scalable. There are different levels of customization and extensive customization can produce unique offerings for customers.

Unique offerings are one type of solutions that service-orientated companies can offer. Unique offerings as a value proposition are one of the core thoughts of offering solutions for customers (Salonen, 2011). These offerings must be different from the other offerings in the market. Companies can offer unique offerings through the differentiation and customization of products and services (Gebauer, 2008). This can be achieved through leveraging different resources. Eloranta et al. (2016) discuss that unique and complex offerings is one of the resource-based view's approach to solution offerings. Solutions can be complex without being unique. One concept offers complex combination of products and services.

Product-service systems are complex solutions to deliver different customer needs. The shift towards services does not mean that companies are abandoning

product-orientated views as Kinnunen and Turunen (2012) point out that the combination of products and services create a middle ground between the product and service-orientated cultures, which can increase profitability by increasing the total customer value of offered solutions. According to them, this middle ground is intended for product-service systems. Product-service systems can also decrease the high investment costs and operational costs of companies when these systems are purchased as services and customers pay for the use or performance because in these cases, the service provider installs, operates, and maintains the product-service system (Wiesner et al., 2017). Besides the financial benefits, customers can receive increase value when companies are able to fulfill various customer needs. Product-service systems are capable of delivering specific customer needs, and these systems consist of products, services, support infrastructures and networks (Cavalieri & Pezzotta, 2012). These systems are more than integrated solutions of products and services. Watanabe and Mochimaru (2017) discuss how product-service systems is a concept for integrated solutions as they point out that product-service systems is a marketable combination of products and services. They describe that product-service systems development includes product and service design processes that begin with customer value comprehension and value proposition creation, and end with results that consist of life cycle analysis and business model development.

Product-service systems can exist with different orientations. Bask et al. (2014) discuss that product-service systems are somewhere on the product-service continuum, and these systems can offer customized solutions for specific customer needs through integration of products and services that delivers value in-use for customers. The reason for product-service systems to exist somewhere on the line of continuum is that product-service systems can have different mixtures of products and services. Smith et al. (2014) discuss that product-service systems can be classified into three categories: product-orientated services, use-orientated services, and result-orientated services. In product-orientated services, the ownership of the product transfers to customers, and services are intended for guaranteeing the product's operability. In use-orientated services, service provider owns the product and offers the use of the product for customers. In result-orientated services, service provider offers results for customers through various solutions that fulfill specific customer needs. These three categories can be placed on different locations on the product-service continuum where the product-orientated services are closer to the product end and the result-orientated services are closer to service end (Smith et al., 2014). Despite of this, usually more advanced services are referred as product-service systems (Lerch & Gotsch, 2015). Product-service systems as other integrated solutions can offer operability for customers.

Operability is an important feature that solutions can offer. Increased operability is something that customers desire and companies are moving towards. Penttinen and Palmer (2007) noticed that many articles propose that companies are shifting their focus to services and more complete offerings. The more complete the offering is, the more service is provided for customers, which leaves less

self-service to be done by the customers (Penttinen & Palmer, 2007). Companies as customers usually prefer to focus on their core business instead of solving some operability problems of a product they have purchased. Business-to-business customers pay willingly a premium price for services which ensure that everything operates reliably and without any surprises (Beverungen et al., 2019). Service orientation is essential for companies to offer operability. Service contracts enable easier access to customers for service providers to maintain the operational status of products. With service contracts, companies can ensure the product business (Penttinen, 2007). All these solutions enable different benefits that customers and service providers receive.

2.2.7 Benefits of the transition

The transition offers many new benefits for companies and customers. Manufacturing companies have started to offer services to increase their profitability and help them to better maintain their existing customer relationships (Kinnunen & Turunen, 2012). Companies are clearly shifting towards services as they are pursing different benefits. As the business changes from offering products to offering services, many aspects of the business changes and this impacts on the outcomes and benefits. Kinnunen & Turunen (2012) point out that servitization enables new customers, growth, and financial stability, as well as the retention of existing customers. They also mention that services usually increase product sales and services are more profitable according to many studies.

The transition effects on different areas of business and business capabilities, for example, financial capabilities and competitiveness. Zhang and Banerji (2017) discuss three categories of benefits enabled by servitization: strategic, financial, and marketing. They describe strategic benefits as competitive advantage which have been achieved through unique offering. Financial benefits consist of steady income through services. Marketing benefits includes customer relationship related factors, such as increased customer engagement, customer satisfaction, and customer loyalty. According to them, these three categories have wide consensus among researchers and businesspeople. Kinnunen & Turunen (2012) have created a table that consists of viewpoints to each of the three categories from 14 scientific articles done mostly by different authors. This table included many benefits, and these benefits are presented in the summarized table (table 1). These benefits are sorted on descending order from the most occurred to least. Numbers after some benefits indicate how many times particular benefit occurred in the original table.

TABLE 1 Servitization benefits (adapted from Kinnunen and Turunen, 2012)

Marketing benefits	Strategic benefits	Financial benefits
Better customer relationships 7	Competitive advantage 10	Profitability 7
Delivery of customer needs 4	Customer insights 2	Increased revenues 7
Facilitate product sales 4	Service co-production 2	Financial stability 6
Customer knowledge 3	Research & Development 2	
Customer value 3	Growth in matured markets	
Customer loyalty 3	Customer trust	
Competitive success 2	Create dependency	
Improved market offering 2	Diffuse new innovations	
Improved corporate image 2		
Customizable offerings		
Customization of products		
Customer satisfaction		
Improved product adoption		

These benefit categories are connected in a way that a specific benefit can affect or even enable benefits in different category as Zhang and Banerji (2017) point out that sustained competitive advantage is one of the key factors for exceptional financial results. Benefits can also be connected within one category. According to Kinnunen & Turunen (2012), sustainable competitive advantage is possible through services which have been co-produced with customers. Lerch and Gotsch (2015) also mention that competitive advantage can be achieved through servitization as they specify that innovative product-service systems enable competitive advantage, and they add that these systems also increase customer value. They specify that the competitive advantage can be achieved, for example, with more customized and responsive offerings than the competitors have.

Increased value is generated through different aspects, such as delivery of needs and better relationships. Lerch and Gotsch (2015) discuss that innovative product-service systems can increase the value that customers receive by enabling, for example, availability guarantee. Increased value is not just for customers as companies also receives value for product-service offerings. Companies in Penttinen's and Palmer's (2007) study managed to receive increased value when these companies transitioned from products to services. This value can be financial or non-financial, for example, increased quality of customer relationships (Gebauer, 2008). As table 1 depicts, companies not only increase their profitability, but they also increase revenue and financial stability through constant and steady revenue stream. Product sales can fluctuate greatly in different months, or sales can be seasonal. Service contracts offer steady income and ensure maintenance, repair, and operability for the products (Penttinen, 2007; Suarez et al., 2013). With steady cashflow, companies can operate easier and with reduced uncertainty of income.

Customer knowledge and customer insights are valuable benefits that companies can achieve through service orientation and better relationships. The service relationships between customers and service providers enable valuable asset in a form of better customer knowledge through information sharing, which can

be utilized, for example, in developing the daily practices (Kinnunen & Turunen, 2012). Besides improving service processes, companies can improve their offerings. For companies, services offer an effective method for gaining customer insights on various customer needs, which can be utilized to develop better offerings (Baines et al., 2009a). Huikkola et al. (2016) discuss how companies in their study utilized customer insights as these companies used the insights for developing their services and solutions. These customer insights can be used also to discover new customer needs. Companies can benefit greatly from services as services can offer more information about customer needs, and also offer customers information about products (Suarez, Cusumano & Khal, 2013). Customer insights are very valuable when companies are developing new offerings. Smith et al. (2014) suggest that better customer understanding on the requirements of customers are essential when companies develop complex product-service systems. They also point out that service-orientation enables companies to gather more profound insights on customer value. Companies can also get a better sense on how satisfied their customers are when customer relationships are well-functioning.

Customer satisfaction is critical benefit for both the customers and service providers. Penttinen's and Palmer's (2007) study findings indicate that customer satisfaction increases through servitization as every participant companies noticed better customer satisfaction. Services enable many customer satisfaction increasing factors, such as new product adoption, customer confidence, provider credibility, and value in-use (Salonen, 2011). When customers are in collaboration with the service provider, customer satisfaction is usually increased. Satisfaction can be increased with service co-production activities which increase the mutual understanding (Watanabe & Mochimaru, 2017). Also, satisfaction is easy to increase during the service consumption as customer satisfaction can be directly affected with service professionals who interact with customers (Zhang & Banerji, 2017).

Companies can achieve remarkable competitive success through the transition. Servitization enables increased and more stable revenues, longer product life cycle, higher margins, growth, and ultimately competitive success for manufacturing companies (Oliva & Kallenberg, 2003). Penttinen and Palmer (2007) discuss how companies in their study received competitive success in a form of increased revenues, profitability, and customer retention. In addition to different benefits that enable success, Cavalieri and Pezzotta (2012) specifies that companies can achieve competitive success through product-service systems which can produce benefits in the form of increased revenue, more sustainable competitiveness, and barriers for competitors. Sometimes success can be measured how companies manage during difficult times. Salonen (2011) discuss that companies in her study described that they can be successful even during the recession times because their sales and profitability are stable due to service orientation. Usually, researchers discuss on different examples that illustrate the competitive success of large companies. Maglio et al. (2015) discuss how large companies, such as Rolls-Royce and John Deere, have had major success through servitization. Many

others have been mentioned in different studies, but the case of IBM is particularly interesting. Gebauer (2008) describe that service orientation can enable potentially three to four times bigger growth on revenue when comparing to product orientation. He discussed that IBM has had tremendous success after shifting their company from a manufacturer to a service provider. Cusumano et al. (2015) specified this case by explaining that customers in the 1950s and 1960s were reluctant to buy expensive and new technology products, so IBM started to offer product-service bundles that included, for example, product, maintenance, and leasing. The reason why this is interesting is the period of time when the transition occurred. IBM realized the value of services when they were developing new products. Suarez et al. (2013) state that services can have an important role for new products and technologies to be successful. Despite of many benefits presented here, services do not always produce benefits for manufacturing companies and their customers.

In some cases, disadvantages can emerge as a result of the transition. Cavalieri and Pezzotta (2012) discuss that outcomes of servitization are not always positive. They describe that some companies increase their service offerings but do not realize the expected profitability because these companies have unsuitable business structures and processes which increases the costs. Gebauer and Friedli (2005) discuss the same matters and they acknowledge the role of structures and processes. In addition, they introduce few more reasons for failing servitization as they suggest that managerial problems and wrongly restructured business have major impacts on the servitization success. They explained that managers can have carefree attitude towards risks of servitization, disbelief on the value that services provide, impatience towards changes that should be executed during longer period of time, insufficient change management skills that negatively impacts on employees, and lastly managers can set too ambitious objectives which are experienced as improbable by the employees. Kinnunen and Turunen (2012) point out that financial benefits from the servitization are not always systematic and profitable even though companies might invest massively to the shift towards services. The most probable reason for this failure is the through-life management of costs and risks which have been impacted by the operations of companies (Baines & Lightfoot, 2014). Sometimes, new technologies can affect negatively on the benefits. Watanabe & Mochimaru (2017) discuss the importance of technologies for services, but the benefits from the adaptation of new technologies might not always come to realization as they mention that inadequate capabilities and resources lead to a situation where many service providers do not receive much benefit from ICT.

3 CYBER-PHYSICAL SYSTEMS

This chapter introduces cyber-physical systems (CPS) and cyber-physical systems enabled services, i.e., cybernized services. CPS topic is described through different aspects of CPS: research, expectations, definition and characteristics, applications and examples, depiction of how CPS functions, and challenges related to the development. The last chapter moves from CPS towards cybernized services explaining the difference between the two, and what can be expected from these new services.

3.1 Cyber-physical systems

Cyber-physical systems research focuses on knowledge and different engineering principles integration to contribute to CPS science and technology development (Baheti & Gill, 2011). Khaitan and McCalley (2014) states that CPS has become a key area of research. This is not surprising because many researchers emphasize the importance of the future CPS as they envision different possibilities and benefits of the future technology. CPS can offer formidable growth opportunities and novel services (Poovendran et al., 2011). Rajkumar (2012) suggests that CPS have transformational effects to interaction and control between humans and physical world. He continues that customer needs and competition pressures different industries to develop CPS, for example, factory automation, healthcare, and defense. In the future, design and development of different systems are predicted to be CPS or influenced by CPS (Khaitan & McCalley, 2014). Monostori et al. (2016) discuss the potential and expectations of CPS as these systems can have major effects on different aspects of life, and the possibilities seem to be endless as CPS can be created for almost every industry. Expectations seem to have grown over the past decade, as well as the importance towards CPS research.

Broy, Cengarle & Geisberger (2012) discuss the vision of CPS in which open ubiquitous systems are able operate in different contexts through learning abilities and connection to other similar systems. They emphasize that these systems must be able to evolve as the full benefit from these systems can be achieved only

if CPS can adapt seamlessly and safely to various contexts, and prove to be dependable system. Conti et al. (2012) envision the future of CPS as they discuss smart devices and advanced technologies:

> "By exploiting these devices and various technologies, information about physical reality (e.g., collected through sensor nodes) is seamlessly transferred into the cyber world where it is elaborated to adapt cyber applications and services to the physical context, and thus possibly modifying/adapting the physical world itself through actuators" (Conti et al., 2012, p. 2).

Monostori et al. (2016) envision CPS through depicting the maturation of CPS into full potential systems (see figure 1). In this depiction, the system is evolving from basic setting to a sophisticated self-optimizing CPS. This model has five levels of maturity from basic to self-optimizing. Every level introduces new capabilities, such as information generation, information processing, information linking, and interacting CPS.

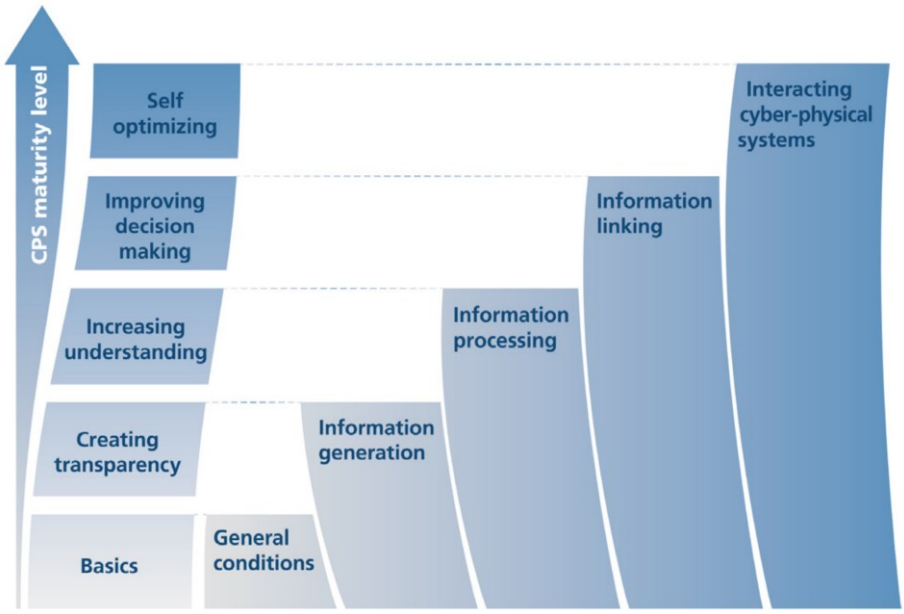

FIGURE 1 CPS maturity model (Monostori et al., 2016, p. 623)

Other visions related to CPS are customer related. Broy et al. (2012) reminds that CPS must be able to address different customer needs. Besides different customer needs, CPS should be developed as a discreet system that does not affect the physical world in a disruptive way. Beverungen et al. (2019) discuss that ideal CPS should be inconspicuous by blending in the environment, and should not bother users with its presence.

CPS originates from embedded systems which are defined as "a computer system within some mechanical or electrical system meant to perform dedicated specific functions with real-time computing constraints" (Monostori et al., 2016, p. 623). This defines CPS to some extent as well, but the definition do not

comprise the advanced complexity of cyber-physical systems. Broy et al. (2012) discuss CPS being an outcome of the development and integration of "systems with embedded software" and "global data networks like the internet with distributed and interactive application systems" (p. 2). In addition to the depiction on the CPS origins, Broy et al. (2012) compares CPS to embedded systems as they state that CPS are "open sosio-technical systems that provide a range of new functionalities, services and features which go far beyond the current capabilities of embedded systems with controlled behavior"(p. 7). This comparison illuminates the superiority of CPS when considering the future possibilities and advancements in technology.

CPS are high-confidence systems that consist of computational and physical capabilities which are integrated together to interact with physical environment (Baheti & Gill, 2011). Rajkumar (2012) discusses CPS in more detail as Rajkumar describes that CPS is a system which is monitored, coordinated, and controlled through communication capabilities. CPS are utilizing internet connection to access other data, and cloud computing for analyzing data (Monostori et al., 2016). CPS definition by Khaitan and McCalley (2014) include also networking and context dependence, and they emphasize the close collaboration between the cyber and physical components that interacts continuously. The similar emphasis on collaboration is discussed by other authors as well. According to Monostori et al. (2016), the intensive interaction between cyber and physical elements is essential, and they continue that it is important to understand that these elements are not unified but independent collaborators interacting with each other. Poovendran et al. (2011) also discuss the close connection between cyber and physical elements as they describe this connection as closely controlled, tweakable, precise, and predictable.

One of the most important characteristics of CPS is the ability to interact with the physical world. Cyber capabilities are embedded to various elements to sense and actuate with physical world (Poovendran et al., 2011). Broy et al. (2012) describe these elements as they discuss that CPS consist of "powerful infrastructure of sensors, actuators and communication networks" (p. 2). The interaction between CPS and the physical world set requirements for the operation of CPS as its operation should be dependable, safe, secure, efficient, and in real time (Rajkumar, 2012). Because there are endless variations of environments in the physical world, it is essential that CPS can adapt. CPS consist of systems and services which are dynamically adaptable to different contexts as CPS is autonomous and aware of itself, as well as aware of its own capabilities and the environment where it is located therefore being location independent (Broy et al., 2012).

As there are different contexts where CPS operate there are also differences in the characteristics of CPS. Khaitan and McCalley (2014) state that CPS differ with each other mainly having different characteristics, levels of operations, and what kind of applications CPS are used. They mention few common characteristics of CPS: cyber capabilities of physical elements, automation on high-level, networking, integration, and reconfiguration. Broy and Schmidt (2014) discuss on the technical characteristics as they mention the most usual ones that are

included in CPS are actuators controlled by computing, network connectivity, sensors enabling environmental awareness, actuators interacting physical environment, distributed systems, and real-time operations. Beverungen et al. (2019) bring up similar notions as they mention four important capabilities of CPS: monitoring, control, optimization, and autonomy.

CPS have started to surface in different industries, for example, transportation, communication, entertainment, and manufacturing (Broy & Schmidt, 2014). Khaitan and McCalley (2014) have listed different industries that have been linked to CPS in various articles, and the list consists of 18 different industries. Clearly, CPS are objects of interest within many industries and this interest will probably expand to many other industries as well in the coming years like Monostori et al. (2016) suggest that "the potential application fields are almost endless" (p. 624).

Usually CPS are complex, but applications can also be simpler as Broy and Schmidt (2014) state that these systems are not limited to be complex and expensive. They give an example that the size of CPS can vary from handheld devices to factories. Other examples found from the literature include many different applications, for example, modern vehicles, medical devices, robotic systems, factory automation, and critical infrastructures. According to Khaitan and McCalley (2014) and Broy et al. (2012) modern vehicles are CPS because they consist of many different complex systems, for example, enhanced displays, motion and energy consumption systems, intelligent parking system, and navigation. Beverungen et al. (2019) present a more recent example as they discuss on modern washing machines that have different sensors for adjusting the operation of the product, for example, water and detergent consumption is adjusted according to the weight and dirtiness of laundry. They added that these products are connected to their manufacturer who can use the collected data of many products to fine tune the operation of all similar products. These complex activities require different technical features.

CPS consists of sensors, actuators, and computational and networking capabilities as discussed previously. This combination enables the operation of CPS. The computational and networking capabilities provides abilities for CPS to operate and adapt autonomously in different situations and environments as they can store and process data locally, and exchange data with other actors in their network (Beverungen et al., 2019). The processing and communication capabilities are orchestrating the operation of the product, but sensors and actuators are vital components in achieving the intended functions. As the sensors and actuators enable the interaction between the cyber and the physical world, CPS must coordinate how these heterogenous systems (sensors and actuators) including computational devices interact with each other (Khaitan & McCalley, 2014). Different sensors enables CPS to examine the surroundings of it, and the insides of the physical product of CPS as well. CPS are active objects in the physical world as they collect physical data adjacent of themselves, and use the actuators to affect their surroundings, so CPS can become aware of the physical environment,

and be an actor in it (Beverungen et al., 2019). All this complexity increases the difficulty to build these systems.

Developing and building these complex systems pose new challenges. One major challenge relates to the novelty of CPS as Baheti and Gill (2011) describe that design and development of CPS is not supported by existing engineering and science knowledge. They continue that the challenge lies in building system and control methodologies which would operate as a platform for designing and operating CPS. Broy and Schmidt (2014) discuss the same challenge as they state that traditional design constraints do not apply to CPS, and knowledge for developing CPS must be sought from multiple disciplines. They also discuss that developing CPS brings up requirements that are on a totally different scale than before, and there exist challenges related to the manufacturing, network integration, and maintenance of CPS. Another challenge relates to the interaction of the physical and cyber world. Intensive pairing of these two fundamentally different worlds is extremely complex task (Poovendran et al., 2011). Accurate and appropriately timed communication is essential but also challenging as CPS need seamless interaction between the cyber and physical world (Khaitan & McCalley, 2014). This complexity is also increased by continuously advancing technology. When using more advanced components and technology for data processing, communication, sensors, and actuators, major challenges will emerge (Baheti & Gill, 2011). Despite the different challenges, service orientation will increase with CPS and this will lead to new services.

CPS literature do not often mention services, but services are a part of CPS at some extent. Broy et al. (2012) describe that "CPS are open thus dynamically adaptable systems and services" (p. 3). Also, Drath and Horch (2014) explain that there are three levels included in CPS: physical objects, data models, and services. They specify that these services are based on the data that is available to the CPS, and CPS can also utilize third-party services, such as weather, calendar, geolocation, historical data and payment solutions. Based on the literature, it seems that services are merely add-ons to CPS as these are basically smart products, such as smartphones. When considering the technological perspective, smart products are similar to CPS (Rizvi & Chew, 2018). Smartphones have different services, for example, smartphones are updated regularly and application markets provide new features in a form of applications. In the end, smartphones are products that customers purchase, and most of the services are additional, although some of the services can be critical for the smartphone operation.

Rizvi and Chew (2018) discuss cybernized services by using the concept cyber-physical product-service systems (CPSS), and they describe that CPSS is the combination of cyber-physical features and product-service systems. As they compare CPS to CPSS, they suggest that CPSS is much broader concept than CPS because it includes the aspects of service, value, actor network, and environment. The complexity increases when service components, new stakeholders, new kind of interactions, and new disciplines are involved in the mix (Wiesner et al., 2017).

3.2 Towards cybernized services

New technology enabled services are emerging and these services have a huge potential to disrupt the markets. Beverungen et al. (2019) argues that service systems and service science theory will undergo transformational impacts due to the novel combination of smart products and service systems. They suggest that transformation from service systems to smart service systems will begin with smart products. Wiesner et al. (2017) discuss similar matters as they suggest that integrating cyber-physical systems and product-service systems enables the functionalities of both and the business model of product-service systems. They describe this combination as a holistic solution that can enable novel innovative value propositions. These smart products discussed by Beverungen et al. are similar to CPS, and smart service systems can be regarded as cybernized services. Tuunanen et al. (2019) discuss that cybernized services are services that are enabled by CPS and they define cybernized services as "the application of cyber-physical systems to develop, design, and provide context-aware and interactive services" (p. 84).

Beverungen et al. (2019) specifies these smart service systems in more detail as they describe the integration of CPS and services. They depict CPS as an additional channel for designing, offering, and delivering services which can be configured and delivered to locations of the users. They emphasize the importance of different technologies of CPS in the service development, customization, delivery, and use. According to them, the connectivity of CPS can be utilized in service co-production with capabilities and resources of different stakeholders, sensors can be used to customize the service, storage and computation enables the autonomous operability of the service, and actuators can effect on the physical manifestation of the service. Also, they describe that service is co-produced locally through the interactions of products and users.

In addition to smart service systems and cybernized services, some researchers have introduced different terms, such as Smart PSS, Cyber-physical PSS, Digitalized PSS, Smart Product Service Ecosystem, Smart industrial product-service system of systems (Zheng et al., 2019), and cyber-physical product-service systems (CPSS) (Wiesner et al., 2017). There is also manufacturing concentrated term cyber-physical production-service systems (CPPSS), which is a combination of product-service systems and cyber-physical production systems referring to new and complex services of production equipment (Mennenga et al., 2020). These different terms and concepts have also different approaches, but the end result seems to be highly similar. Different approaches based on the literature have been illustrated in figure 2. This figure depicts how different approaches effect on the evolvement of products and services.

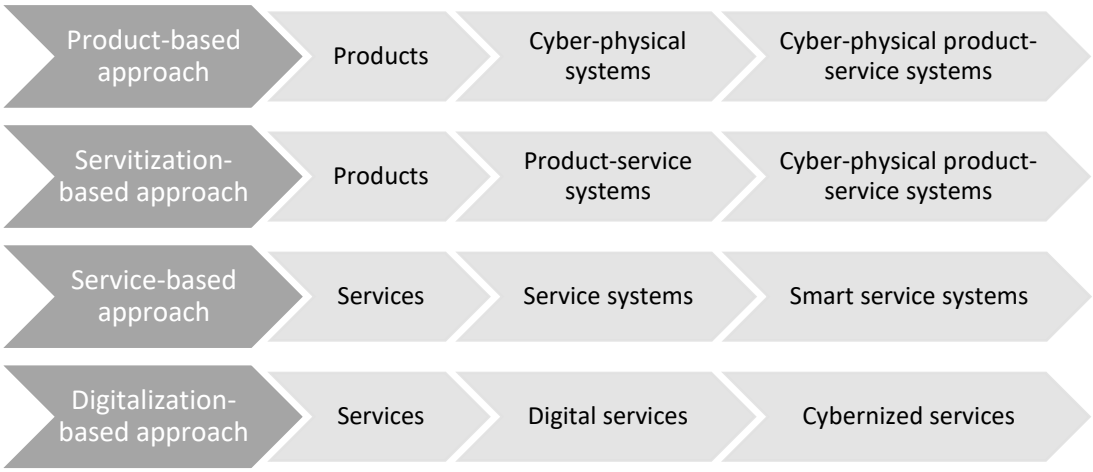

FIGURE 2 Evolvement of products and services

In product-based approach, products are transitioned to cyber-physical systems, and in the last stage, cyber-physical systems are combined with services or product-service systems (Wiesner et al., 2017). This approach emphasizes how products can be transformed into something more valuable through advanced technologies, and the last option to increase value is to add services. In servitization-base approach, products are transitioned to services or product-service systems, and in the final stage, cyber-physical features or systems are added to product-service systems (Herterich et al., 2015; Lerch & Gotsch, 2015; Chowdhury et al., 2018). The result of the last stage can also be some other applicable concept, such as Digitalized PSS or Smart PSS. In this approach, the value of products is increased through integrating services to products, and after this, value can be increased by including advanced technologies.

In service-based approach, services evolves to more complex service systems, and ultimately this evolvement leads to smart service systems through advanced technologies (Peters et al., 2016; Beverungen et al., 2019). Service systems are "a configuration of people, technologies, and other resources that interact with other service systems to create mutual value" (Maglio, Vargo, Caswell & Spohrer, 2009, p. 395). Smart service systems are technologically much more advanced than service systems. In this approach, value is created by adding complexity and technologies in each stage. However, smart services systems seem to have few different approaches as smart service systems have been discussed in the service science field as a next step for service systems (Barile & Polese, 2010), and as a subset for product-service systems (Mittag et al., 2018). Therefore, smart service systems are a bit more difficult to classify. Digitalization-based approach begins from traditional services that are transitioned to digital services by embedding digital systems, and finally digital services are transitioned to cybernized services by embedding cyber-physical systems (Tuunanen et al., 2019). This approach is more technology-orientated because the transition from stage to stage is performed by adding more advanced technologies to increase value.

The research regarding cybernized services is at its infancy and only handful of studies have been conducted. Lerch and Gotsch (2015) note that product-service systems have been discussed widely, but digitalization of product-service systems do not have a comprehensive framework in literature. They address cybernized services topic from another direction as product-service systems are transformed into digitalized product-service systems. According to them, future research should concentrate on identifying different impacts of these systems, such as technical, economic, and industry changing. Recently, some researchers have started to study more the relation of services and CPS. Beverungen et al. (2019) conceptualized smart service system to enable better understanding on value co-creation between consumers and service providers because previous research has been concentrating on technical aspects of smart products. Tuunanen et al. (2019) argue that future research should concentrate on understanding the cybernized service users and their process of value creation because the research of cybernized services is a very important research frontier.

4 RESEARCH FRAMEWORK

The literature review is utilized to form a conceptual framework (figure 3) which acts as a theoretical research framework for the empirical study. This conceptual framework depicts different reasons which will lead companies to start the transition from products to services and what are the outcomes of this transition. The primary reason for the transition is the customer needs that affect to the provider needs of a manufacturing company. Provider needs can be fulfilled with the transition in which service orientation is adopted. Service orientation changes many different perspectives of the offering of a company. The transition impacts on companies who start to offer solutions instead of products. The transition changes many aspects of a company. Companies must change in strategical level and develop new capabilities and processes to successfully provide new services. Solution orientation and value in-use approach is essential for fulfilling different customer needs. Collaboration between a company and a customer is important for building better relationships that enable co-creation of value and service co-production. This transition enables new solutions and benefits for providers and customers. Most of the benefits are produced through solutions, but some of the benefits emerge due to the service orientation. Better relationships with customers increase customer knowledge, and different customer insights can be utilized to build better solutions.

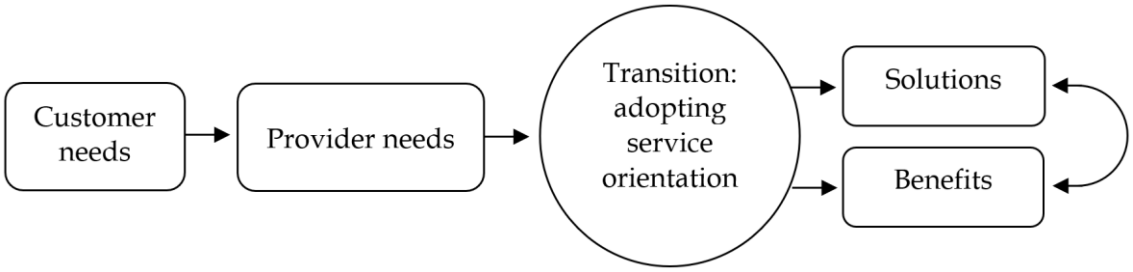

FIGURE 3 Conceptual framework

In the table 2, customer needs, provider needs, transition, solutions, and benefits are presented with detailed constructs. These constructs are linked to the authors who have presented these constructs. Customer needs consist of increased needs, demands, customer value, and confidence for purchase. Customers have increasing needs due to changing markets, new technology and price competition. Customers are also more demanding because they have usually plenty of choices to choose from. Customer value is a value that customer determines. In other words, customer evaluates the relation of expenses and value in-use. As offerings become more complex, customers need more confidence to make the purchase.

TABLE 2 Framework constructs from the literature

Constructs	**Authors**
Customer needs	
Increased needs	Penttinen & Palmer (2007); Gebauer (2008); Salonen (2011); Kinnunen & Turunen (2012)
Demands	Oliva & Kallenberg (2003); Penttinen (2007); Penttinen & Palmer (2007); Wiesner et al. (2017); Zhang & Banerji (2017)
Customer value	Penttinen (2007); Berman (2012); Kinnunen & Turunen (2012); Wiesner et al. (2017); Beverungen et al. (2019)
Confidence for purchase	Penttinen (2007); Penttinen & Palmer (2007); Baines et al. (2009a); Kinnunen & Turunen (2012)
Provider needs	
Delivery of customer needs	Penttinen & Palmer (2007); Gebauer (2008); Kinnunen & Turunen (2012); Lerch & Gotsch (2015); Zhang & Banerji (2017)
Profitability	Penttinen (2007); Suarez et al. (2013); Kinnunen & Turunen (2012); Zhang and Banerji (2017); Chowdhury et al. (2018)
Maintain in competition	Penttinen (2007); Penttinen & Palmer (2007); Berman (2012); Kinnunen & Turunen (2012); Suarez et al. (2013); Cusumano et al. (2015); Lerch & Gotsch (2015); Chowdhury et al. (2018)
Competitive advantage	Baines et al. (2009a); Salonen (2011); Kinnunen & Turunen (2012); Eloranta & Turunen (2015); Eloranta et al. (2016); Lerch & Gotsch (2015); Zhang & Banerji (2017)
Growth	Penttinen (2007); Kinnunen & Turunen (2012); Barrett et al. (2015); Zhang and Banerji (2017)
Transition	
Service orientation	Penttinen (2007); Penttinen & Palmer (2007); Kinnunen & Turunen (2012); Zhang & Banerji (2017)
Change in strategy and business model	Gebauer et al. (2008); Baines et al. (2009a); Kinnunen & Turunen (2012); Lightfoot et al. (2013); Zhang & Banerji (2017)
Service co-production	Penttinen & Palmer (2007); Kinnunen & Turunen (2012); Huikkola et al. (2016); Watanabe & Mochimaru (2017); Zhang & Banerji (2017)
Value in-use	Baines et al. (2009b); Smith et al. (2014); Zhang & Banerji (2017); Beverungen et al. (2019)
Resources, assets, and capabilities	Oliva & Kallenberg (2003); Penttinen (2007); Penttinen & Palmer (2007); Baines et al. (2009b); Salonen (2011); Smith et al. (2014); Ulaga & Loveland (2014); Barrett et al. (2015); Lerch & Gotsch (2015); Huikkola et al. (2016); Watanabe & Mochimaru (2017); Zhang & Banerji (2017)

(to be continued)

Table 2 (continued)

Solutions	
Customization	Salonen (2011); Kinnunen & Turunen (2012); Lerch & Gotsch (2015); Eloranta et al. (2016)
Product-service systems	Bask et al. (2014); Smith et al. (2014); Lerch & Gotsch (2015); Watanabe & Mochimaru (2017); Wiesner et al. (2017); Zhang & Banerji (2017); Chowdhury et al. (2018)
Unique offerings	Gebauer (2008); Salonen (2011); Eloranta et al. (2016); Zhang & Banerji (2017)
Operability	Penttinen & Saarinen (2005); Penttinen & Palmer (2007); Suarez et al. (2013); Barrett et al. (2015); Beverungen et al. (2019)
Benefits	
Customer satisfaction	Penttinen & Palmer (2007); Salonen (2011); Kinnunen & Turunen (2012); Zhang & Banerji (2017)
Increased value	Penttinen & Palmer (2007); Gebauer (2008); Kinnunen & Turunen (2012); Lerch & Gotsch (2015)
Customer insights	Baines et al. (2009a); Kinnunen & Turunen (2012); Suarez et al. (2013); Smith et al. (2014); Huikkola et al. (2016)
Competitive success	Oliva & Kallenberg (2003); Penttinen & Palmer (2007); Gebauer (2008); Salonen (2011); Cavalieri & Pezzotta (2012); Kinnunen & Turunen (2012); Suarez et al. (2013); Cusumano et al. (2015); Maglio et al. (2015)
Well-functioning relationships	Penttinen (2007); Penttinen & Palmer (2007); Barile & Polese (2010); Kinnunen & Turunen (2012); Zhang & Banerji (2017)

Provider needs consist of different needs that are related to customer needs and the objectives of companies. Companies have great interest to serve their customers in the best possible way. One of the most important things is to deliver different customer needs. Companies want to solve the different issues that customers might have because then they can sell various solutions to customers. Profitability is very important to every company. Competition is intense in many industries and being a profitable company can be challenging. Profitability enables many things, such as maintaining in competition and growth. Some companies are struggling to compete with other companies due to the highly competed markets or effects of globalization. These companies are just trying to survive. Competitive advantage is an objective that many companies are hoping to find or create. When a company has a competitive advantage, it can profit greatly. Growth is important for many companies and it might be even crucial for companies in some specific markets. Growth usually scales up every aspect of business, for example, more customers, revenue, personnel, and profits.

The transition changes many aspects of organizations. The most important aspect is to move from product orientation to service orientation. Instead of offering products, companies shift towards providing solutions in a form of services that are complemented with necessary products. To achieve this shift in orientation, companies must change their strategies and business models. Companies must rethink their business. Service co-production means that services are

developed in collaboration with customers. Customers are seeking solutions for a specific problem and co-production enables deeper insights how new service should work and how it could solve the problems of customers. Value in-use is related to service orientation whereas product oriented companies focus on value in-exchange. When companies offer solutions and services, it is important to focus on value in-use because customers determine value when they are consuming the service. To offer services and solutions, companies must acquire new resources, capabilities, and assets. These can be developed within a company or obtained some other way.

Solutions are outcomes of servitization. When companies have adopted service orientation and made all the necessary changes, companies can produce new type of solutions for customers, and various benefits can be captured through these solutions. Customization of a product or service can lead into many things, for example, increased customer satisfaction and perceived value. A customized product or service can better fulfill various customer needs. The more the products are customized the more unique offerings customers receive. Product-service systems can offer solutions to the complex problems of customers. This is also related to operability. Companies can offer operability of something instead of selling products or services, for example, flight hours for airplanes instead of selling jet engines or maintenance services.

Benefits are the outcomes of the transition and solutions. Customer satisfaction increases with better services and solutions. Both the company and customers can enjoy increased value in the form of customer value or increased profits. Service relationship provides customer insights for companies, which can be utilized to produce better solutions for customers. Competitive success is enabled through different solutions. These solutions are hard to mimic by other companies. Profits are higher in services, and revenues are steady. Well-functioning relationships between companies and customers can enable long lasting relationships that benefit both companies and customers.

Updated conceptual framework

The conceptual framework was updated to better guide the data analysis phase of the empirical study. The following figure (figure 4) describes how the need-based process advances from needs to transition resulting different solutions, and in the end, different benefits. There are three levels in the framework: customer, service, and service provider. Each of these levels include the appropriate constructs. The customer and service level are visible to customers, whereas the service provider level is only visible for service provider for the most part.

The customer level includes different customer needs, product-related solutions, and increased value for customers as a benefit. These customer needs are the catalyst for the service provider. Product-related solutions are different solutions that are mainly embedded to the actual product, and therefore these solutions are visible to customers. Customers benefit from the value that is produced through different solutions.

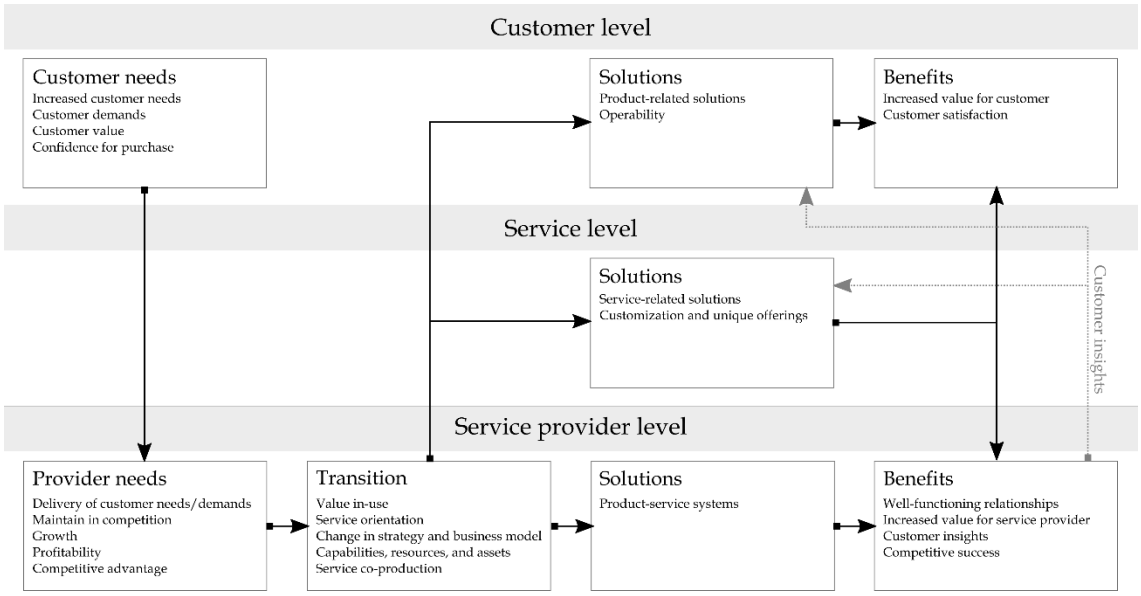

FIGURE 4 Updated conceptual framework

The service level consists of solutions which are strongly related to services by nature. Operability is a theme that describes how independently from the user actions products can operate. The actual service-related solutions enable the operability of a product. This theme consists of different services, for example, the maintenance service. Customization and unique offerings are themes that consist of services that provide different customizations mostly to products. The service provider level comprised of different provider needs, transition, product-service system as a solution, and different benefits. The transition includes various activities and processes. Product service systems theme describes the combination of product, service, and technology. The benefits include different benefits that the service provider receives.

Everything starts from the customer needs which will lead to provider needs. The transition is required to fulfill different needs. In transition, provider changes their focus on providing continuous value in-use instead of value in-exchange, and they start to position themselves as a service company instead of being a product company. These changes require changes and investment to strategy, business model, people capabilities, various resources, and assets. Customers are also a part of this transitions as they are involved in producing the service. The transition leads to different solutions on different levels. These solutions produce benefits for customers and service providers. The customer and service provider level solutions mainly produce benefits for the same level, but the service level solutions produce benefits for both customers and service provider. One benefit from the service provider level can have an effect on the service level and the customer level solutions. Customer insights can be used in the development of products and services.

5 RESEARCH METHODOLOGY

Quality empirical study should be based on a previous literature (Eisenhardt & Graebner, 2007). In this research, literature was studied to formulate knowledge and to create a conceptual framework as a foundation for the empirical study of this research. The conceptual framework consisted of constructs drawn from the literature. Constructs can help when designing a research, and they can be beneficial during the later stages of a study if these constructs prove to be relevant to the information that was studied, in which case those can connect better the research to previous literature and lay a foundation for a new theory (Eisenhardt, 1989).

The constructs of the conceptual framework were used to design the empirical study, and the same constructs appeared in different phases of the empirical study. The interview questions were formulated using the constructs, and the same constructs formed some of the main themes in the data analysis. Miles and Huberman (1994) described conceptual framework as a map of the current knowledge of the study, which displays the key factors and constructs, and as well how these relate to each other (pp. 18-20). They continue that a conceptual framework is subject to change when the knowledge is improved, and at first it may work as an explanatory framework for the intended study subjects. The conceptual framework was updated during the early stages of the data analysis because the data required more constructs for appropriate categorization. The updated conceptual framework and the knowledge gained from the findings were utilized to create a conceptual model for depicting the transition from products to cybernized services. The objective was to find answers to research questions, and the model facilitated and guided in this task because this model visualized the main findings of this research.

The research methodology chapter explains in detail how the research was conducted in different phases. This chapter will also explain how different choices made during the research were justified. The following chapters will portrait the objectives for this research, what are the research questions, what research methods were used, how the data was collected, and how the data was analyzed.

5.1 Research objective and research questions

The motive of this study was to understand the transition from products into cybernized services. This transition is a topic that has not been studied much, and information regarding this topic does not exist widely. There is definitely a research gap in information systems science to which this study is intended to produce more information. A research that does not test an existing theory must be justified sufficiently (Eisenhardt & Graebner, 2007). In this study, the intention is not to test an existing theory, but to study a phenomenon which is relatively new and little researched. Eisenhardt and Graebner (2007) state that in a study in which the research question is focused on explaining the phenomenon, sufficient justification should be the relevance of the topic, and the absence of studies and theories regarding the topic.

The objective of this study is to form an understanding on the topics that was mentioned earlier. Product-service transition has been studied previously, and few of the studies have dealt with the transition of a product into a digital service to some extent. Product transition into a complex and smart system has not been studied on a level that would provide thoroughly information that could be used in theory and practice. The findings of this study could be possibly utilized with other products in different companies to analyze the suitability of products for transition, and how the transition could be feasible. Cybernized services will increase in the future and new technology will be possible to combine into old product concepts. Due to this development, it is necessary to better understand how these kinds of complex services can be produced to replace products and what kind of benefits can be achieved through this process.

Selection for the research strategy affects how the research question is formed. This study was performed as a case study. Case study is very suitable method for investigating area that is not studied much (Benbasat, Goldstein & Mead, 1987). At the beginning of the study, it is important to set the research question because research question focuses and guides the work of a researcher in many different phases of the study, for example, in data gathering and analysis (Eisenhardt, 1989). Previously mentioned research gap should be considered when setting the research question. The research question should be focused on the found research gap (Eisenhardt & Graebner, 2007). Also, it is important to pay attention to other important factors when forming the research question. When constructing the research question, it is vital to ensure that it is possible to find a useful answer to the research question, and the research questions should be interesting, relevant, and value producing for the research field (Darke, Shanks & Broadbent, 1998). The main research question in this study is as follows:

> How can products be transitioned into cybernized services?

The objective of this study was to understand the phenomenon of transitioning a product into cybernized service. The objectives of a case study can be describing the phenomenon, testing an existing theory, or creating a new theory (Eisenhardt,

1989; Darke et al., 1998). In this case study, the objective was to describe the studied phenomenon as well as possible. The objective was to identify different factors that have various effects on the transition process, and to find different enabling and preventing factors, which can facilitate or obstruct the transition process. Another objective was to form a perception regarding the following questions: what matters that are essential for the transition, how the transition occurs, what kind of reasons lead to the transition, and what kind of benefits are produced through the transition. The secondary research questions are:

1. Why are products transitioned into cybernized services?

2. What are the results and outcomes of the transition from products to cybernized services?

The findings of this study might have meaningful insights for scholars who are interested of this phenomenon. Also, companies who develop smart services and systems might discover new viewpoints for their business and operations. This topic is relatively new, and technology is developing constantly, therefore all of the studied knowledge can be very meaningful for everyone who is interested in it.

5.2 Research method

5.2.1 Case study as a research strategy

The transition of a product into a cybernized service is a phenomenon. Phenomena are events that occur or have occurred, and these events have boundaries. A case can be defined as a phenomenon within a context that has boundaries (Miles & Huberman, 1994, p. 25). The case study is an effective and logical strategy when the objective of a research is to study a phenomenon more profoundly to gain better understanding how the phenomenon functions and what are the characteristics of the phenomenon. Selecting the case study as a research strategy is logical when the subject is not studied much, and the phenomenon is still dynamic and has not reached the mature stage (Darke et al., 1998). They also added that the case study is widely used method in information systems science. Benbasat et al. (1987) brought up the same viewpoints regarding the suitability of the case study to a phenomenon that have been studied little. The case study approach is definitely suitable for studying phenomena.

When using the case study strategy, the objective is to gain better understanding on the studied case. Eisenhardt (1989) defined that "the case study is a research strategy which focuses on understanding the dynamics present within single settings" (p. 534). It is also important to appreciate the context to which the case is connected. The case study is for gaining better comprehension on the selected case, and its complexity and uniqueness within the context of the case

(Stake, 1995, p. 16). Case can be defined as a phenomenon occurring within a boundary, which is observed at a specific moment or over some duration of time (Gerring, 2006, p. 19). Gerring added that the case consists the type of phenomenon which is pursued to be explained using the methods of deduction. In overall, the case study is suitable strategy for studying the transition, and the case study strategy should produce in-depth knowledge on the studied matter. Most importantly, the research questions should be answered with the help of the gained knowledge.

The research strategy in this study is to investigate more deeply the phenomenon of the research question using the case study strategy. The subject of the case study is a company who have transitioned an ordinary product into a complex and smart system to which service components have been embedded. When looking at only one company and the process of transition it has implemented, case study is very suitable because it focuses on understanding the dynamics of a single case (Eisenhardt, 1989). In a case study, there can be a single case or multiple cases (Miles & Huberman, 1994, p. 25). Single case study is suitable when the case is extreme, unique, or revealing by its nature (Darke et al., 1998). The subject company should fill these criteria.

The subject company offers a real-world phenomenon which is possible to study more deeply. Case study inspects a phenomenon occurring in the real-life context of which the objective is to form a profound understanding with all the contexts (Darke et al., 1998). In order to understand the complex processes and the nature of a specific phenomenon, one must thrive to answer the questions of how and why, to which the case study is the proper strategy (Benbasat et al., 1987; Yin, 2013). Eisenhardt and Graebner (2007) added that case study can answer to how and why questions particularly well. These factors have been considered when the research question was formed.

In addition to the research strategy, suitable methods must be selected for different phases of the research. The case study strategy includes different phases, such as the design of the study, data collection, data analysis, and presenting the findings (Yin, 2011, p. 3). In a case study, it is possible to gather different kind of information, such as qualitative or quantitative, and there are various methods for data gathering, such as interviews, surveys, observations, or archives (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). In this research, qualitative method was selected for gathering empirical data. One of the most important data gathering methods for the case study are interviews which are the best way to bring forward the participants' different viewpoints and interpretations of different matters (Darke et al., 1998). Interviews are an efficient way to collect versatile and profound information on the studied phenomenon (Eisenhardt & Graebner, 2007). Interviews might be the only viable option for gathering data. Eisenhardt and Graebner (2007) states that interviews are often the main data collection method in studies which subject phenomenon is unregular and strategic by its nature. The studied phenomenon fulfills these criteria as it is not an ongoing process that occurs over and over, and it is a strategic process to achieve different important objects.

Empirical data was gathered through interviewing the key personnel of the case study company, and a selected group of their customers. To decrease the problem of bias in interviews, one good method is to interview multiple people and people outside of the organization who have different viewpoints (Eisenhardt & Graebner, 2007). The key personnel provided more thorough information regarding the transition, whereas the customers provided their own viewpoints. The objective was to find similar viewpoints as well as some conflicting viewpoints between the interviews, and between the company and their customers.

The objective of data analysis is to find answers to research questions. Analyzing large amount of data can be challenging. The challenge for single-case study can be very rich qualitative data which should be presented in the research report in a meaningful way (Eisenhardt & Graebner, 2007). Data must be refined into more understandable form. In this study, the qualitative methods for analysis were used. Because qualitative studies are flexible, better understanding on the studied matters can be achieved (Miles & Huberman, 1994, p. 10). This idea of flexibility facilitated the data analysis as different approaches were used. In the data analysis, methods that were used were partly grounded theory methods in which interview transcriptions are coded using themes and concepts, which are used to form higher level categories, and relations are created between categories, and in the end theoretical framework can be built to describe the studied phenomenon (Darke et al., 1998). With the help of this analysis method, rich and detailed data can be transformed into understandable concepts, entities, and higher-level abstraction. The analysis was implemented as unrestricted thematic analysis which includes previously mentioned components, but does not include the heavy components of the grounded theory method (Braun & Clarke, 2006). The objective for the end result of the analysis was to form a framework or a model, which depicts the studied phenomenon in its context. Theoretical constructs, propositions, and mid-range theories can be created by using case study method (Eisenhardt & Graebner, 2007).

5.2.2 Reliability and validity

It is important that research can be considered as reliable and accurate. To increase reliability and validity of a research, there are various methods which should be considered. The reliability and validity of a qualitative study is formed through credibility, quality, and accuracy (Golafshani, 2003). Research and different phases of it should be executed with quality. For example, chosen literature, research methods and analysis affects to reliability and validity. Also, it is important to put an effort to writing the report of a research. The validity of a research is increased by well and correctly drafted text which deals with different matters of the research convincingly and accurately (Darke et al., 1998).

The reliability and validity of a qualitative research can be increased by decreasing bias and utilizing different data sources (Golafshani, 2003). It is easy to collect too unilateral data, and this can be a reason for data being too biased. This

problem can be decreased by interviewing people outside the organization (Eisenhardt & Graebner, 2007). In this study, many outside organization interviews were conducted as many customers were interviewed. When data is gathered from multiple different sources, the reliability of the collective knowledge is better, and the findings of the study are stronger (Darke et al., 1998).

5.3 Data collection

The data collection of a case study can be performed as qualitative or quantitative, and it is possible to use various methods, such as interviews, surveys, observations, and archive data (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). In the research methods chapter, the research strategy for this study was justified. The reasons for this study to be a qualitative study and the appropriate data gathering methods for this study were presented as well. In qualitative study, interviews are one of the most important data gathering methods, and it is the most used one as well (Myers & Newman, 2007). For case studies, interview is very common and substantial data gathering method (Darke et al., 1998). Empirical data collection method for this study was semi-structured interviews.

5.3.1 Semi-structured interview as a data gathering method

In this study, interviews were used to obtain in-depth information on the studied phenomenon. Qualitative interviews are used in many different studies because they reveal viewpoints that are not usually visible (Myers & Newman, 2007). The interviews were conducted as semi-structured interviews in order to obtain useful information as much as possible. Myers and Newman (2007) described semi-structured interviews as flexible and open by its nature, and in which questions and script for interview has been defined beforehand. They emphasized that one of the most important benefits of semi-structured interviews is the possibility of the interview to advance into a situation where information can be obtained at a very in-depth level. This means that the interview is not strictly defined and there is some space to improvise, for example, improvised questions can lead to in-depth discussion on some essential topic regarding the study. If cases are to be understanded as precisely and profoundly as possible, data gathering should be flexible (Eisenhardt, 1989). The data gathering method for this study was selected as qualitative semi-structured interview which should provide meaningful information for the case study in the best possible way, and as well the interviews were planned to be recorded.

Other qualitative data gathering methods were not suitable options for this study. Because the phenomenon was not continuous by its nature, in other words, the phenomenon has already occurred in a form of the transition in the case company, observation was not considered as a usable method. Utilizing the case company's documents was not an option because there probably was not much of

documents which would include information regarding the transition, and this kind of documents would be covered by business secrecy. Also, quantitative methods, such as survey, would not be appropriate to use when considering the nature of the study.

5.3.2 Selecting the case and the interviewees

It was important to find a suitable case company in which the transition had already occurred. In case study, one case is formed through one sufficiently information providing unit of analysis which can be a person, group, or organization (Darke et al., 1998). To gather sufficient amount of data, the case company should have employees who can provide information on various matters, and the case company should have customers who can give their viewpoints to different matters. When the sampling is versatile, it is possible to gain differing viewpoints through information that is contrasting and comparative (Miles & Huberman, 1994, p. 34).

The most important interviewees are people working for the case company because they have vast knowledge regarding the transition and the service package they offer. These people should have worked for the company for a long time and their title could be, for example, chief executive officer or chief technology officer. Customers can provide important information that can provide different viewpoints to various matters. It was important to find the right persons who have been part of the purchase of the service, and who have good knowledge regarding the use of the service and other essential matters throughout the customer relationship. In qualitative research, usually small sample size of people is used to obtain in-depth context related knowledge (Miles & Huberman, 1994, p. 27). The objective was to interview three key persons from the case company and approximately ten customers. The interviews were designed in a way that key person interviews concentrated on the transition and the service package, whereas customer interviews concentrated on use, features, value, and how the service fulfills customer needs.

The selected case company was contacted and motivated for them to participate in this study. In order to motivate the participants of a study, research questions should be interesting and important, and these questions should concern the participants (Darke et al., 1998). It was important to bring forward the objectives of the study, benefits for different stakeholders, and how the study concerned the participants. For organizations, it is important to introduce the possible benefits of a study, for example, in-depth understanding of the phenomenon that occurs in the organization (Darke et al., 1998). Other possible benefits for organizations that a research can provide could be better understanding on their own organization, new insights, and external feedback (Benbasat et al., 1987). The selected case company was motivated by giving the essential information regarding this study, how they can benefit from it, and how the data collection was intended to be carried out. Possible benefits of the study should be

presented for the interviewees as well. In other words, what kind of benefits this study can provide for the case company and their customers.

The case company provided contact information of selected customers. These customers were selected on the basis of pre-defined criteria. It was important that the customers who participated this study were not too similar to each other because dissimilar customers might provide more different viewpoints, and the gathered data would be richer. The pre-defined criteria was that there should be customers who have different lengths of customer relationships, and these customers should have been involved with the purchase phase or at least have sufficient knowledge regarding it, and these customers should also have knowledge regarding the use of the product and the service that the case company offers. Different lengths of customer relationships should offer richer information because older customers can describe if something has changed over the years, and younger customers can better remember matters related to the purchase phase. These customers were invited to participate into this study and approximately half of the invited customers agreed to participate. It was important to motivate these customers by briefly presenting the objectives of this study, telling how they could benefit from this study, and how the interviews were intended to be performed.

5.3.3 Introduction of the case and participants

The case company in this study is a Finnish company named Naava who offers wellbeing for their customers through their smart product in which services are tightly connected. This smart product is a green wall which offers greenery through living plants, and it uses plants to purify indoor air and it also humidifies indoor air when necessary. Different services are necessary for the product to operate, so the product and services form the service package that Naava offers. The three key persons from Naava who were interviewed have been working for the company since the early days of the company, so every one of them have comprehensive knowledge regarding the company, their service package, their customers, development work the company has been doing throughout the years, and how different matters have changed over the years.

Customer sample is introduced in the following table (table 3). Eleven customers who participated in this study have been Naava's customers from one month to near a decade. Most of the customers relationship lengths were one to three years, but few of them were over five years. These customers had different quantities of Naava's products. These quantities ranged from two to almost 40, but usual quantity was two to six products. Few of the customers did not remember the exact quantity of products they had, so an approximation was used. The locations of products varied, but mostly products were located in workspaces. Other often used locations were break rooms and lobbies. Purchasing products was more common purchase method, but leasing was used as well. Few of the customers had used both methods.

TABLE 3 Customer sample introduction

Customer	Customer relationship length	Product quantity	Product location	Purchase method
Customer 1	3 years	2-5	workspaces	purchased
Customer 2	1 month	2	break room	purchased
Customer 3	over 5 years	36	workspaces	leased, purchased
Customer 4	2 years	5-10	workspaces	leased, purchased
Customer 5	1 year	2	workspaces	purchased
Customer 6	1,5 years	2	lobby	leased
Customer 7	2 years	2	lobby	leased
Customer 8	1 year	3	workspaces, break room	purchased
Customer 9	3 years	6	various lobbies	leased
Customer 10	8 years	4	workspaces, staff canteen	purchased
Customer 11	5 years	6	workspaces, lobby, break room	purchased

5.3.4 Interviews

The interviews were prepared and planned beforehand, and 14 interviews were conducted in total. Because interviews were semi-structured, the interviews consisted of predefined questions and a script that were followed during each interview. Semi-structured interviews are scripted as the key questions and the script are prepared before the interview process, and the script should include at least the opening, the introduction, the key questions, and the closure (Myers & Newman, 2007). The opening is for introducing yourself, and the introduction is for introducing the study and the interview. The script worked as a guideline for the interviews, and it was followed most of the time, but some of the interviews needed more flexibility to obtain more valuable knowledge. Myers and Newman (2007) states that the qualitative interviews should be conducted with a script that is not too strict and over-prepared, which leaves room for improvisation and openness, and gives more flexibility for the interviewer.

The interviews differed somewhat between the service provider and customers. For the most part the questions were the same, but some of the questions were suitable only for either one. The script was also different regarding the introduction and the closure part because the participants from the service provider were already familiar with the research subject. The introductions of the customer interviews explained the reasons and objectives of this study and the interviews, and the closure was more of a discussion on different matters that interviewees wanted to bring forward. Many of the customers had questions of their own related to the study, and these questions were discussed. There were differences between the interviews because the script was used only as a guideline, for example, different interviews included different improvised follow-up question to gain more information on some specific topic of interest. Sometimes the interviewees had already discussed some matters quite thoroughly during the earlier questions, and therefore the questions that dealt with the same matters were skipped due to avoiding the unnecessary repetition. Occasionally the order

of the questions needed to be changed during the interview because of how the interview was advancing. The interviews in this study were quite flexible as Myers and Newman (2007) suggested that semi-structured interviews should be flexible.

The interview questions were created utilizing the framework developed through previous literature. The questions were formed in English, but translated into Finnish because all of the interviewees were Finnish speaking, and the interviews were conducted in Finnish. Both English and Finnish versions of the questions can be found as an appendix (appendixes 1-4). There is an appendix (appendix 5) about the design of the interview questions. More detailed information regarding each question is included in this appendix. The themes from the framework have been connected to each question, and also there are remarks of the objective for each question. In other words, this information clarifies how each question was formed and what was the intention for each question or what kind information was hoped to obtain from each question.

The service provider interviews consisted of 21 questions and each of these questions had a follow up question, so total amount of questions was 42. One of these interviews was managed to complete with every question gone through, but due to time limits the rest of the service provider interviews were performed as more compact versions by leaving some of the nonessential questions out. The customer interviews consisted of 13 questions and each of these questions had a follow up question. Besides these main questions, there were four questions regarding basic information. The total amount of questions was 30. The customer interviews had six customer specific questions that were not found on the service provider interviews. On the other hand, the service provider interviews included 22 questions that were specific for these interviews. Both the customer interviews and the service provider interviews included 20 questions that were exactly the same.

The interviews were conducted face-to-face, by phone, or using video call. The most used method was by phone. The customer interviews were 40 minutes by average and the service provider interviews were 60 minutes by average. The shortest interview lasted 25 minutes and the longest one 80 minutes. The introduction and the closure required approximately 10 minutes per interview. The objective was to interview maximum 45 minutes per interviewee. The service provider interviews lasted longer because they had more knowledge regarding different topics, therefore the amount of information was larger compared to the customer interviews, and also these interviews included more questions. Every interview was recorded and permission for recording was asked from every interviewee at the start of their interviews. The interviews were transcribed in detail using the audio recordings. The list of interviewees can be found from appendix 6.

5.4 Data analysis

The empirical data was analyzed using thematic analysis method, in which the objective is to identify, analyze, and report themes that are recurring in data by using the following steps: getting familiar with the empirical data, creating preliminary codes, searching for themes, evaluating the found themes, defining and naming themes, and writing the report (Braun & Clarke, 2006). The first step includes the transcription of the interviews and writing down the preliminary view. Verbal description works as a foundation for data analysis in which the purpose is to discover regularities and patterns (Darke et al., 1998). Darke et al. stated that accurate transcriptions of interviews are important especially when the research is thesis.

In order to utilize the empirical data, data must be refined into more understandable form. Qualitative data is rich and holistic by its nature, and it can be complex because qualitative data can provide expressive descriptions that are connected to real contexts (Miles & Huberman, 1994, p. 10). To make sense of the collected data, it was necessary to use methods that can refine the data. The collected data was quite rich, and many different topics emerged from each interview. Data reduction thrives to simplify the original data into more abstract direction (Darke et al., 1998). Data reduction is an important part of data analysis process where data, for example, transcription data, is simplified and focused into more abstract form from which conclusions can be drawn, and this can be achieved by concentrating, categorizing, and constructing data, and as well discarding excess data (Miles & Huberman, 1994, p. 10). Miles and Huberman continued and specified that the actual data reduction during the data analysis phase includes many activities, for example, writing summaries, coding, forming themes, writing memos, and creating clusters and partitions.

The coding activity was an important part of the data analysis. Coding the data is a thematical analysis method for simplifying large amounts of data by defining codes for different parts of the data (Braun & Clarke, 2006). The transcription data was processed and coded using a qualitative analysis software Atlas.Ti as Darke et al. (1998) suggested that special software facilitates data analysis. With the help of the coding, different themes started to emerge from the data as well as from the literature. The themes were identified using both of the existing strategies: inductive strategy and theory-based strategy. In inductive strategy, themes are formed using the empirical data, whereas in theory-base strategy, themes are based on literature (Braun & Clarke, 2006).

The coding was not the only important part of the data analysis. Other analysis methods were used as well. The case subject can be an organization and a single case study can have subcases (Miles & Huberman, 1994, p. 26). As the case company being the case subject, every customer interview was defined as a subcase and the three case company interviews formed one subcase. This enabled the use of two different case analysis strategies during different phases of the thematic analysis. Comparing cases using within-case and between-case

methods enable gathering knowledge on constructs in general and how these constructs relate to each other (Miles & Huberman, 1994, p. 27). Within-case analysis facilitates processing one case and large amount of data, and enables the emergence of unique themes because part of the within-case analysis is to describe a specific case and build a narrative for it (Eisenhardt, 1989). The cases should be compared to each other to reveal how the cases are similar or how they differ. The strategy for between-case analysis is to use categories and levels, in which similarities and differences are searched, which will form, for example, different categories (Eisenhardt, 1989). Categories and levels are similar concepts than themes. Between-case analysis increases the validity of a research and improves the chance to discover new findings from the empirical data (Eisenhardt, 1989).

Miles and Huberman (1994) describes the data reduction as an ongoing process throughout the qualitative research where the understanding of the study subject is formulated continuously (p. 10). This idea seemed to be valid after conducting the research. The data reduction was an ongoing activity throughout the data analysis phase. Another important part of data analysis is data display in which data is presented in an accessible and compact form, for example, graphs or charts (Miles & Huberman, 1994, p. 11). They added that data display supports the understanding of a reader towards text.

The data was analyzed iteratively, and during the first iteration the objective was to familiarize with the data. The data analysis phase began with going through the data and coding different sections of the data using preliminary codes that mainly described the content. Also, the constructs from the conceptual framework were created as codes and coded to the data. Because the rich data was described quite precisely, over 500 codes were created. The use of the Atlas.Ti was necessary because coding the data without a special software seemed to be impossible. After the first iteration, every main question and the conversation after each question were marked as one data block or one quotation as these were called in the Atlas.Ti. The relevant main constructs were assigned to each quotation, as well as the descriptive codes that were created. At this point, there were codes from three different levels. The first level was the top level of the main constructs which consisted of customer needs, service provider needs, transition, solutions, and benefits. The second level included the constructs that belonged to each first level main constructs. The third level included all the descriptive codes that were created.

The next iteration included different activities that were designed for forming a better understanding regarding the whole data. The data was reviewed through once again, and the coding was under assessment as well. Every quotation was shortened by leaving the questions out. Each descriptive code received a prefix that indicated to which main construct the code belonged to. Codes that had similar topics were grouped together. Similar codes were merged together, and unessential codes were deleted. For each subcase, a short narrative was created to visualize each case verbally instead of the data and codes. These activities refined the data to some extent.

The third iteration included some of the same activities as the second iteration. The data was reviewed once again, and some codes were merged, some deleted, and some renamed. Hierarchical networks were created to link every code to another. Before this, the hierarchy was indicated with simpler methods, for example, quotations included codes from the three different levels. Quotations were cluttered with too many codes, and this was solved with parting every quotation into smaller and more specific quotations. Only the essential information were left. There were still too many codes for each quotation, so the main constructs were left out. At this point, every quotation only had the descriptive codes. These measures simplified and clarified the data. There was a demand for some changes to the structure of the main constructs. The structure was changed, and new constructs were created to clarify the structure, hierarchy, and the content. At this point, the main constructs were changed from the original conceptual framework. Networks were built for each subcase which made it easy to observe each case visually.

The fourth iteration included the same activities that had become basic at this point, for example, reviewing the data, merging, deleting and renaming the codes. There were still nearly 350 codes at the start of this iteration. The created networks were used to organize some of the codes more appropriately. Different themes started to emerge due to the previously done activities. A new level was created to the hierarchy. A theme level was created between the second level which consisted of the constructs and the third level which consisted of the descriptive codes. Networks were used to organize every fourth level code under an appropriate theme. The hierarchy and the links between the codes were updated. A new network view was created to present the first three levels. This view was the abstract visual result of the data analysis, which helped to understand the whole better.

The fifth iteration included reviewing the data and the networks, and making some adjustments. When everything seemed to be in place, every fourth level code were merged into the appropriate third level code. This was done because the data was needed to be accessed through the themes which were the third level codes. Before this, every quotation had only level four codes. After this merging activity, there were left five main construct codes, 29 construct codes, and 78 theme codes. This was the end of the actual data reduction phase. By using Atlas.Ti analysis tools, a table was created that included every theme code occurrence for each subcase. This helped to outline the prevalence and the significance of each theme. The data was ready for the reporting.

After the data analysis, the findings chapter was written using different themes that were created during the data analysis. Different sections of the data was easily accessed through these themes. When the data analysis was done properly, it facilitated the writing process of the findings. A new conceptual model was created to summarize and visualize the findings of this study as earlier suggested to use data display.

6 FINDINGS

This chapter outlines the most prominent findings of this case study. These findings are the results of analyzing all the eleven customer cases which are supported by different views from the service provider interviews. The cases were compared to each other to find similarities and contradictions. In addition, the cases were compared to the service provider's point of view to find out if the customers and the service provider have similar understanding regarding different matters that were gathered through interviews.

Next, I will present the findings in more detail using the framework's five stages as a classification method: customer needs, service provider needs, transition, solutions, and benefits. These five stages form the main chapters of the findings. The first chapter addresses different customer needs before purchasing a product and during the purchase process. Customer needs are important catalysts for customers to start searching for something that would fulfill their needs. These needs also form the requirements for the purchase that must be realized by the service provider in order to enable the purchase. In the next chapter, these customer needs create needs for the service provider as they pursue to fulfill these different customer needs. These customer needs direct the needs of the service provider as the service provider is required to adapt for them to succeed in fulfilling different customer needs. In other words, the service provider needs to develop different aspects of their company to be able to fulfill these different customer needs. The third chapter addresses the adaptation and development that the service provider must perform to meet various customer needs and the needs of their own. The fourth chapter introduces different solutions that have been enabled through the process of need based adaptation and development. These solutions thrive to fulfill the various needs of the customers and the service provider. The last chapter presents different benefits that the customers and the service provider can achieve through the various solutions.

In the findings chapter, the viewpoints and citations of the customers and the service provider will be presented using anonymity. It was agreed with the service provider that every interviewee in this research will be anonymous because some of the interviewees requested anonymity, and only some of the

customers of the service provider are public, therefore, the service provider prefers not to disclose their customers.

6.1 Customer needs

Different cases revealed many different needs that customers have. Some of the needs are more important than the other, but most of the needs are the kind of needs that customers expect to be fulfilled, and some of the needs are requirements that must be fulfilled by the service provider. These customer needs are classified under the four main themes: increased needs, customer value, confidence for purchase, and demands.

Increased needs and customer value themes present various needs that the customers have before the purchase and at some level after the purchase. The customers thrive to fulfill these needs by searching for something that could accomplish this. Increased needs are the actual needs that customers have, for example, comfortability or wellbeing. Most of these needs exist before the purchase, but some needs might only emerge after the purchase. Customer value describes how valuable customers experience their purchase, and this value can change during the customer relationship. Customers also have expectations towards the purchase, and they expect sufficient amount of customer value to be delivered.

Confidence for purchase and demands themes consist of needs that exist before the purchase. These needs are more of requirements that the customers want to be fulfilled than needs that the customers are hoping to be delivered. Specially demands are the kinds of needs that can be dealbreakers if these are not fulfilled by the service provider. Customers have needs regarding the confidence for purchase because they need assurances to increase their confidence, for example, sufficient amount of information regarding the purchase. Demands are mostly requirements that customers demand to be fulfilled to enable the purchase.

Many of the discovered needs appeared in multiple cases, but some of the needs were such specific that these needs only appeared in a single case. Increased needs for wellbeing and customer value stood out from the discovered needs. Other notable needs were confidence for purchase and improving corporate image. Many customers also experienced new emerging needs after the purchase. These needs were mostly practical needs in connection with the operation of the product or the service. The findings indicate that only few customers had any demands regarding the product or the service.

Increased needs

Wellbeing was the most prominent need that was common for all the cases and one of the biggest reasons for customers wanting to purchase Naava green wall. Some of the cases emphasized more personal wellbeing and some other occupational wellbeing. These both types of wellbeing both existed in multiple cases like customer 3 described their needs by saying that "we just want to get better indoor

air and then also it (the product) would bring comfortability" (personal communication, March 21, 2019). Only few cases included only one of these types, not both. Personal wellbeing relates more to personal health whereas occupational wellbeing relates to the comfortability of a workplace. Other notable needs were better corporate image and needs that have emerged after purchasing the product. The needs are categorized according to five themes: personal health, occupational wellbeing, corporate image, after purchase needs, and other needs.

Personal health was discussed by many of the customers and half of the customers had symptoms due to bad indoor air. Few of the customers said that indoor air was stuffy or dusty, and few others discussed how they had some symptoms due the bad indoor air. One customer said that they have had serious health problems due to the indoor air problems as they described that "I had a continuous flu for six months" and they continued that "I have suffered from indoor air problems for years, so it was easy to figure out why I was sick because I just had started working and I got sick sometime after starting the work" (customer 4, personal communication, March 29, 2019). Some of the customers mentioned that they had problems with dry indoor air specially during winter, and they needed more humid air.

The service provider discussed that their customers have problems with indoor air, and they described these situations by saying that "in case of indoor air problems where people have symptoms, then they have obvious need to which they want a solution that would make their indoor air better" (service provider 1, personal communication, January 7, 2019). They mentioned that they started their company with better indoor air in mind. Service provider 3 described this by saying that they "started with indoor air problems" and they continued that "we have moved slowly from there to best air and décor" (service provider 3, personal communication, January 10, 2019).

Occupational wellbeing consisted of different types of comfortability increasing matters, such as aesthetics, greenery, and nature. The customers discussed how they wanted to improve the comfort of their offices. Some of these customers said that they wanted to decorate their workplace as customer 8 described that "regarding decoration we have wanted to invest to that employees feel good when working and they are comfortable at work" (personal communication, April 11, 2019). Few of the customers said that they specifically wanted greenery and nature into their work environment. Customer 8 stated that they "wanted closer to nature" (personal communication, April 11, 2019). One customer described that they wanted comfort which is easy and carefree at the same time because as they said that "previously we've had green plants much more, but then we realized that we are not in flower shop or gardeners, and that our business is to do something else than take care of flowers and water them" (customer 2, personal communication, March 20, 2019). Some of the customers discussed that they had purchased the product when they were decorating their new office. This need for decoration occurred when these customers were moving or planning their move into new office spaces. In these cases, this need only related to the event of moving to a new office as customer 6 described that "if we

had stayed in the old office then we hadn't probably even though of it, but when we had to think of the entire furnishment then in that context (the need emerged)" (personal communication, April 5, 2019).

The service provider discussed comfort in office spaces and how customers want to decorate uncomfortable workplaces because these workplaces can be, according to the service provider, dark and stale looking. They mentioned that their product offers comfort through "beauty, greenery, and nature brought to indoors" (service provider 3, personal communication, January 10, 2019). They continued that when their product is used for comfort and décor then the design of the product is very important. The design was emphasized multiple times. The service provider also discussed how their customers have needs regarding work efficiency as they said that "they (customers) want to boost somehow their employees work efficiency and the level of alertness" (service provider 1, personal communication, January 7, 2019).

Corporate image was discussed by over half of the customers. These customers wanted to improve their corporate image by purchasing Naava green wall. These customers had different agendas regarding image building. Some customers wanted to support startup green tech company and the development of their technology as customer 1 depicted this by saying that "I have followed the service provider and how it has grown, and this way (by being a customer) it's possible to support them" (personal communication, March 15, 2019). In one case, the customer specifically wanted something spectacular into their reception premises to better their image. Furthermore, one other customer believed in a general level that "these (green walls) are acquired with the image in mind to increase comfortability and spectacularity in reception premises for guests" (customer 11, personal communication, June 19, 2019). The service provider did not have much to say to this theme, but they had noticed that Finnish customers like to support Finnish startup companies.

After purchase needs were quite common by occurring in over half of the cases. The nature of these needs was practical by nature, for example, relocation of the product, some new features to the product, or small adjustments to the operation of the product. One of the customers described their emerged needs more specifically. They were hoping that their product could be movable from space to another space and that there would be an additional product to help them to fill the water tank of the product. They also had issues with the product at first as they described that "light (of the product) shone to the eyes of the users" and "it (the product) blew cold air to the feet of the users next to it" (customer 1, personal communication, March 15, 2019). Few customers mentioned that they would prefer to have some sort of evidence regarding the effectiveness of the air purification capabilities because the product does not have any measurement device that would provide this information. In other words, customers had difficulties measuring through their own senses that how much indoor air is purer than before. One customer was quite doubtful concerning the effectiveness as they expressed that "if the product was guaranteed to work in a way that it would completely purify indoor air, then it would be invincible and these products would

be everywhere" (customer 10, personal communication, June 18, 2019). They continued that "there is no indisputable evidence to support this (the effectiveness of the air purification)". The service provider briefly mentioned that their customers sometimes have requests to make small tweaks to the operation of the product, or some customers do not want to fill the water tank anymore.

Other needs that few of the customers mentioned were a need for ease of use and carefree product, and a need for customized and unique product. The service provider also discussed carefreeness and customization. The need for carefree product relates to fears that some of the customers have as the service provider explained that "large plant elements are associated with the fear that they will die, and who is going to take care of those" and they continued that "customers are interested during the purchase phase that they will have not any problems later" (service provider 1, personal communication, January 7, 2019). The service provider discussed that many customers want something different than the basic product that they offer, for example, a customized product, a consumer product, new features, or different plants.

Customer value

Customer value was the second prominent need that concerned all the customers. The findings indicate that every customer desired for a valuable product and service. Most of the customers felt that they received enough value, but few of the customers expressed that they did not receive enough value. These customers were more critical regarding the value that they received for their investment due to the price or costs that were experienced high. This experience was connected to a feeling that these customers were expecting something more from the product or the service. One of these customers expected more from both the product and the service as they stated that "it would bring satisfaction to us, if we were able to know for sure that it (the product) works (purifies air effectively) and to have better knowledge regarding the maintenance service schedule" (customer 3, personal communication, March 21, 2019). The same customer also mentioned that they do not have indoor air problems anymore, so therefore they experienced these products too pricey just to be used as a decoration. In other words, the value had decreased in this case. The service provider disclosed that they have received feedback regarding the maintenance service prices being high. They also said that one of their customer group was very design aware and these customers demanded better value in a form of better design.

Most of the customers stated that the product and the service produce more value than the costs are. Many customers acknowledged the high price, but they were able to justify it as customer 7 described that "it (the product and the service) is a bit pricey, but it is also an investment to better air and comfortability, so therefore, it is worth every penny" (personal communication, April 9, 2019). Few of the customers thought that the product and the service produce value continually. One customer did not have any doubts regarding the produced value by the product as they said that "it's instant value for your money, one can count how much it will cost to an employee if someone is sick for many months, so if people stay healthy then it's going to definitely cover expenses" (customer 4,

personal communication, March 29, 2019). Customer 5 emphasized the value of services by describing that in case of some problems the service provider "reacts well with different solutions, maintenance and so forth" and they continued that therefore "customer receives continuously value for money" (personal communication, April 4, 2019).

Some customers brought up the need for value in-use that existed before the purchase. These customers were worried about the operation of the product and felt that the service is essential as customer 9 said that "of course we wanted service from them (the service provider) to make sure that the product works as it should be, so it doesn't happen that the product that we bought would operate inefficiently or in the wrong way" (personal communication, April 26, 2019). The service provider had also come across with many customers that had these same concerns.

Confidence for purchase

Confidence for purchase effected in almost every customer case. The most important confidence increasing factors were information, offered services, and acquisition facilitation. Information was provided through different methods, such as the internet, email, phone, and face to face. Customer 1 described how they improved their confidence for purchase by themselves as they depicted this by saying that "I searched for arguments, research and so forth what I could find from the Internet to support the purchase of the product" (personal communication, March 15, 2019). Also, the variety of information included, for example, basic information, references, scientific research results to argument the benefits, and the service provider's offering with all the services and the assurances of operability. Customer 9 described what kind of information was provided for them as they discussed the information produced by a research as they said that "the research what has been done regarding these products, of course it solidified (the confidence for purchase)" and they continued that "the features (operation) were based on scientific research, which of course facilitated our purchase decision" (personal communication, April 26, 2019). They also added that they were given references to which they were able to be in contact and ask questions. The service provider discussed how they provide information during the sales process and after the purchase. They said that they use information to better argument on different customer needs and to justify the services included with the product.

Offered services, such as the leasing and the maintenance service, had major influence on the confidence with many customers. The leasing enabled customers to acquire the products without making a costly investment as customer 6 discussed that "the price was really expensive if we would have bought the products, but the leasing worked for us quite nicely" (personal communication, April 5, 2019). The maintenance service provided a free of care product which seemed to be quite important for some customers as customer 4 mentioned that "it effected to our purchase decision that it must be as easy as possible for the user" (personal communication, March 29, 2019). The service provider discussed how they are planning new services for lowering the threshold for acquiring products. They

said that currently they offer guarantee for plants through the maintenance service.

The service provider helped many customers by facilitating the purchase phase as much as possible. Usually, the service provider visited customer's office and reviewed the space to form the most suitable offer for this customer. In some cases, the service provider wanted to build trust by offering a trial use of the product, a buyback option if the products do not work as expected, or organizing indoor air research before and after the purchase. The service provider stated that "in case of a new product, it is important to build up trust towards our company" (service provider 1, personal communication, January 7, 2019).

Approximately half of the customers admitted being confident and the other half told that they had concerns. First, it seemed that the confident customers had made their decision of purchase only on the spur of the moment. Closer inspection revealed that the confident customers had some concerns and they had based their decision on information that was researched from the internet or provided by the service provider. However, one customer did not have any confidence increasing factors, even though, this customer had concerns regarding the price and longevity of the service provider. This customer described their purchase being as simple as "going to a florist" and the process straightforward as they stated that "we asked for an offer and made the order, simple as that" (customer 2, personal communication, March 20, 2019). The unconfident customers were mostly worried about the price, how well the product works, and the longevity of the service provider due to being a startup company. The service provider had acknowledged that information is important because it helps them to argument better and justify different product or service related matters. In addition, the service provider spotlighted the guarantee for plants and well-known companies as reference customers, which increase the confidence for purchase.

Demands

Demands only appeared in some of the cases and these demands related to both the product and the service. The product-related demands concerned information security and the dimensions of the product, whereas the service-related demands associated to maintenance schedules and automatic irrigation schedules which should be programmed to perform irrigation only at a specific time, for example, after office hours or during times that a specific space is not used. Customer 1 described their product-related demands more specifically saying that "the product shouldn't have any cameras or microphones" (personal communication, March 15, 2019). One customer said that they demanded service for the product because they wanted a carefree product. This customer's demands were met as they said that "they (the service provider) had existing services available to meet our demands" (customer 11, personal communication, June 19, 2019). One other customer told the same thing that they demanded service for the product.

The service provider admitted that customers usually do not have any demands after the service provider has presented the service package thoroughly because most of the demands that customers have in mind are addressed with

existing services and product features. According to the service provider, demands relate to the same matters that the customers discussed, but there are also demands for the mode of operation in certain locations, such as airports.

6.2 Provider needs

Many provider related needs were discovered and most of these were connected to customer needs. Majority of these needs were directly in relation to the service provider's needs, but some of those were connected indirectly. These various needs were categorized under the following five main themes: delivery of the customer needs and demands, maintain in competition, growth, profitability, and competitive advantage.

Delivery of the customer needs and demands theme is the most prominent theme in this chapter. The service provider needs to fulfill different customer needs, so they thrive to accomplish this by using various means, for example, developing their offering. Even though the rest of the themes are related more to the business of the service provider, these themes have a connection to customer needs. Maintain in competition theme deals with the competition of the service provider that they face in their business. The service provider needs to understand their competitors, so that they can compete and maintain in the competition. They can also use this comprehension to argument their offering better for customers. In order for the service provider to meet customer needs, they must remain competitive. Growth, profitability, and competitive advantage are building blocks for the service provider to better fulfill the needs of their current and future customers. The service provider needs to develop these different aspects of their business to enable better offer development.

Delivering customer needs and demands surfaced from the interviews as the most prominent service provider need. Both the customers and the service provider mentioned different aspects of delivering customer needs, such as customer experience delivery, delivery of different needs, and offer improvement. Other service provider needs that both the customers and the service provider discussed were competition and growth, but these needs were less significant than the previous ones. The rest of the needs were mainly addressed by the service provider of which the most noteworthy needs were profitability development, maintaining in competition, and competitive advantage through unique, versatile, and well branded integrated solution of product and services.

Delivery of the customer needs and demands

The service provider seemed very determined to fulfill different customer needs, and they thrived to provide good customer service for their old and new customers. Delivery of the customer needs and demands is divided into four stages that illustrate different aspects of the service provider's need to fulfill their customers' needs. The first stage customer experience delivery focuses on the service provider's approach towards customers. Next stages concentrate on the evidence of

intentions and deeds provided by the customers and the service provider. The last stage demonstrates how the service provider has delivered customer needs that addresses many customers.

Customer experience delivery was the most prominent need that consists of different aspects of delivering the best possible customer experience. Many customers valued highly that the promises given by the service provider were fulfilled as customer 6 described the service provider's key factors to customer satisfaction by stating that "what has been agreed will be taken care of as agreed" (personal communication, April 5, 2019). Another aspect that many customers appreciated was the flexibility that the service provider has. Besides these, customers felt that the service provider is customer centric and quality orientated with both the product and the services as customer 8 discussed that "quality and customer centricity have been positive things for me" (personal communication, April 11, 2019). One customer described the service provider's customer centricity and responsibility towards their customers as they said that "I got a good feeling about the service provider that they are not just selling the product, taking our money, and then forgetting their customers" (customer 10, personal communication, June 18, 2019).

The service provider emphasized the same matters as the customers. Trustworthiness is an important aspect in service business as the service provider stated that "customers want us to do the things we promise" and they continued that "we will come (to do the maintenance) as we have promised and do the things that we have promised" (service provider 1, personal communication, January 7, 2019). The service provider found flexibility and customer centricity to be quite essential in their business. Service provider 2 described customers as "individuals at a certain level" (personal communication, January 10, 2019). This has led them to being more flexible in different situations, for example, flexible schedules with customers and flexibility in the operation of the product as the service provider gave an example by saying that "we have changed the operation of the product through remote controlling to prevent irrigation at a certain time" (service provider 2, personal communication, January 10, 2019). Service provider 1 also expressed the need to be flexible and treat customers more individualistically as they said that "one must always settle into the position of the customer to understand how the customer experiences something" (personal communication, January 7, 2019).

The intention to deliver customer needs and the actual delivery of customer needs were mentioned by most of the customers, which were based on their experiences and conceptions related to the service provider. Many customers discussed their different needs and how these needs have been delivered. Some of the customers had noticed the service provider's intent to deliver different customer needs. These customers felt that the service provider always strives to fulfill every customer need if possible. The customers described the service provider as a solution orientated company that actively tries to discover customer needs and reacts quickly to different customer needs. This statement is supported by the customers who discussed the actual delivered needs. One customer said that

they are "very satisfied how they (the service provider) react to different matters, and there is no need to ponder whether the matter will be taken care of" (customer 8, personal communication, April 11, 2019). These customers also gave examples of different situations where they had new needs, and how the service provider fulfilled their needs, for example, one customer had a problem with the green wall light as it dazzled, so the service provider relocated the green wall to a better location. The service provider could not always deliver every need that their customers have. One customer was dissatisfied on how the service provider had addressed their needs when this customer needed an auxiliary product. The customer said that the service provider responded that "some of the customers have done it by themselves, so the service provider wasn't able to provide that" (customer 1, personal communication, March 15, 2019).

The service provider discussed on the importance of serving their customers and they stated that key factors to satisfaction are "quality and quick respond to customer problems because problems will always emerge" (service provider 3, personal communication, January 10, 2019). They continued that "if a customer wants something, and it's possible to deliver that then it will be delivered". The service provider emphasized many times that they always pursue to deliver different customer needs, but they acknowledged that sometimes this might not be possible, for example, if the costs are too high. The findings indicate that the service provider has a high priority to solve and deliver different customer needs as they want to stay in contact with their customers in case of emerging needs or problems.

Offer improvement is a way to deliver customer needs that are common among many customers. The findings indicate that the service provider had done much of development throughout their existence. They are continuously developing different aspects further and their customers see this similarly as one customer referred them as "a young and innovative company" (customer 1, personal communication, March 15, 2019). This is supported by the narrative of one customer who discussed their experience where the service provider wanted to experiment with the customer in a form of a unique product prototype. The customers described different matters that have improved over time, for example, the design of the product, product range, productization, services, and price. One of the customers described the development done by the service provider by saying that "they have thought this thing through and built a product round the air purification" and they continued that "to have a functioning product they have tested and chosen carefully which plants to use in it (the product)" (customer 5, personal communication, April 4, 2019). In addition to the development work, the customers were aware of the product related scientific research that has been done. Some of the customers were even a part of some research that the service provider conducted as customer 10 discussed that "they measured the air quality before we got the products, and they measured again after a while to see if there was any impact (to the air quality)" (personal communication, June 18, 2019).

Offer improvement was the most discussed theme by the service provider, so it is an important theme in the service provider's business. The service

provider discussed the development during the past years, and they said that many different aspects have improved, such as quality, design, versatility of the product, technology, software, and service. Many of these matters have improved due to the feedback from their customers. Service provider 1 depicted this development by discussing that "we receive a lot of feedback, and because of the feedback, we have just changed the design of the product, and how we operate on customers' facilities and how the service is experienced there" (personal communication, January 7, 2019). They seem to have done much of development without any signals from their customers as they said that "we have proactive, and we've done a good product from the start" (service provider 2, personal communication, January 10, 2019). Service provider 3 also discussed how they thrive to improve their offering by "continuously keep trying again and search for something new, and to allow these to enable different solutions" and they continued that "one must do things and the more these things happen the more good it will enable" (service provider 3, personal communication, January 10, 2019).

The service provider also discussed how the use of their product has changed from purifying air to increasing wellbeing in many ways. Huge part of this change has been the development of the product. They discussed how the product development has taken huge amount of their resources, and they said that "the product has changed physically, and the current generation is the third" (service provider 2, personal communication, January 10, 2019). They said that their technology has always been basically the same, but they have improved it constantly. Another aspect of product development has been the development of their software which have allowed the plants to survive better. The service provider discussed that they are developing their existing services: the maintenance service and the installation service. In addition, they mentioned that they are currently developing a new service to enable a new customer segment. They said that their services have been basically the same from the start even though they have developed these. The service provider described that the service processes have improved due to the development, but the costs have not changed for their customers. Service provider 2 summed up what they want to develop further as they said that "we want to develop our business, and we want more satisfied customers, and we want to remove obstacles for purchase" (personal communication, January 10, 2019).

Maintain in competition

Maintaining in competition theme consists of two subthemes: who are the competitors and how to compete against them. Over half of the customers mentioned that the service provider has competition, but only some of the customers discussed products that compete with the service provider's product. These products were other green walls and electronical air purifiers. Electronical air purifiers seemed to be more traditional competitor for the service provider, but green walls are common as well as customer 10 told that "today, green walls can be seen in many places, and other green walls than the service provider's" (personal communication, June 18, 2019). In addition to previously mentioned competitors,

one customer said that they have art that competes with their green wall. Customer 10 mentioned different air purification solutions, but they did not specify any further what kind of solutions were involved as they only stated that "we have used and tested some other air purification solutions, so this (the service provider's product) was only one alongside with the others" (personal communication, June 19, 2019). According to the findings, the service provider's product mainly competes in air purification and comfortability in a form of green walls.

The service provider had discovered the same competitors that the customers mentioned. Furthermore, the service provider discussed indirect competitors which can be anything that increases comfortability or occupational wellbeing, for example, better furniture, art, wallpaper, houseplants, or renovation of office air ventilation system. According to them, one of their strongest competitors are ordinary green walls which does not have any air purification capabilities. They discussed the challenges they might face when competing with other green walls as "our high price gives advantage to our competitors if someone is only looking for aesthetical green wall" (service provider 1, personal communication, January 7, 2019). They continued that "our product is much more expensive because it has other functions as well".

The service provider depicted the challenge regarding their competition by stating that "we have to figure out who the competitor is in different situations because we don't have direct competitors" (service provider 3, personal communication, January 10, 2019). They also told that they must constantly learn how to compete and especially when they expand to new markets. According to the service provider, maintaining focus is very important in their situation and for maintaining in competition as they described that "keeping the focus is really important, and sometimes it's really difficult, especially in the early stages" (service provider 2, personal communication, January 10, 2019).

Growth

Growth was a theme that was mainly discussed by the service provider. This theme was divided into the subthemes: intention to grow and the actual growth. The customers only discussed the actual growth. The intention to grow is high due to the service provider's growth vision that has been mainly the same since the start of their company. The service provider revealed that they aim to grow their company faster through the expansion to abroad. This has been the plan all along as they discussed their growth vision by saying that "our vision was that we weren't going to be just a Finnish company but instead we wanted to create a global success story" (service provider 2, personal communication, January 10, 2019). They said that their plant to expand geographically boosts the growth of their company because the volumes of sales should be much higher abroad. Service provider 3 also stated that "substantial growth is the only option for us", even though, they feel that the growth is "painful, uncomfortable, stress causing, very laborious, and there is a great chance for failure" (service provider 3, personal communication, January 10, 2019). Their intentions of growth are supported by their growth strategy in which they plan to utilize foreign partner companies to enable faster growth.

The actual growth was noticed by many customers. Two customers, who have been customers for over five years, described the growth as very substantial as customer 10 said that "the company has grown tremendously" (personal communication, June 18, 2019). They continued that "it (the service provider) has become much more versatile" and "they have more employees". The service provider said that the number of customers has increased, and they have expanded to many new regions. In addition, they started piloting the partner model for sales and operations in abroad where they ship the products to a partner company who handles sales and provides the necessary services for the product. Despite the growth, the service provider was not satisfied which seems to indicate that they truly have great ambitions for growth. Service provider 1 discussed this situation by saying that "the growth in the other markets have been slower than we expected" and they continued that "it hasn't been bad, but our goals have been much bigger" (service provider 1, personal communication, January 7, 2019). They have also noticed that growth produces loss at first when expanding to new regions. This is something that resonates with the negative side of growth that was mentioned earlier by the service provider 3.

Profitability

Profitability was a theme that the customers did not have much to say about. Few customers had noticed that there is a connection between profitability and product customization. The service provider had many different aspects to profitability, and they revealed that they are constantly trying to develop their profitability with smaller adjustments and with few strategies. The most important single factor to their profitability seemed to be the constant revenue from the maintenance service contracts which are always sold with the product as the service provider said that "it effects very positively to our profitability" (service provider 1, personal communication, January 7, 2019).

The service provider thrives to develop different areas of their business to improve their profitability, such as their software and cost-efficiency of their services. Software development is important because their software is used in the operation of their products. Software can change the operation of a product according to the intended use, for example, if a product is used only as a decorative element, then the software can adjust the air cycle to minimum, which increases the wellbeing of the plants and decreases the costs of plant maintenance. They described one of the main purposes of their software development by saying that "software development relates to the fact that we want to make those plants to survive better" (service provider 1, personal communication, January 7, 2019). The service provider also constantly develops their services and how things can be done internally in more cost-efficient way. They said that "we have been able to cut our costs by doing things smarter" (service provider 1, personal communication, January 7, 2019).

They also have different strategies to improve profitability, such as limited customization, city strategy, and partner strategy. Currently, they offer limited customization to products because extensive customization is not profitable as they explained that "designing customized model takes a lot of work time" and

continued that "we should get very good offers from our subcontractors regarding customized parts, so that it would make sense (to build customized products)" (service provider 1, personal communication, January 7, 2019). All the extra work and more expensive small batch parts or even individual parts increases the costs and effects the profitability as service provider 3 said that "financially it didn't make much sense" (personal communication, January 10, 2019).

In city strategy, the service provider concentrates their customer acquisition to specific areas because of the maintenance service that they must produce as they described that "the focus is to concentrate geographically as much as possible to create sensible hubs which will produce more money" (service provider 3, personal communication, January 10, 2019). By concentrating their service to specific locations, the service provider can lower their service-related costs and improve profitability. At first, they sold products wherever they could, but one case forced them to rethink because they sold a product to a very distant location which was not profitable as the service provider described that "the maintenance service wasn't profitable because traveling to the location was very expensive" (service provider 2, personal communication, January 10, 2019).

In partner strategy, they utilize the partner model to decrease costs because partners have ready infrastructure for sales and operations. The service provider explained how the partner model works and how it can benefit them. They said that "we can use the partner strategy in new markets in which we use our partners for sales, so that there is no need to consume so many resources and money to build up and maintain a team of our own" and they continued that "we just produce the products" (service provider 1, personal communication, January 7, 2019). They added that "we can expand faster which is more risk-free, with lower expenses, and by utilizing our partners' existing networks".

Competitive advantage

Competitive advantage is basically formed through the unique combination of two ordinary items: plants and air purifier. The service provider described this combination by saying that "without the air purification functionality, our product would be an ordinary green wall, and we don't want that" and they continued that "we need the functionality" (service provider 2, personal communication, January 10, 2019). This combination seems to be quite unique because the service provider did not have any knowledge if there was anything similar in markets. They emphasized that they have a unique patented product that others cannot offer or even produce because it would be very hard to mimic their product due the complex combination of product, technology, and services. Therefore, they are confident that they will not have any direct competitor anytime soon. The service provider described how the uniqueness benefits them in the competition as they said that "for the moment, we have a unique product, therefore we don't have a direct competitor now, which is probably the biggest advantage in competition" and they continued that "we can argument ourselves in totally different way" (service provider 3, personal communication, January 10, 2019).

They also discussed other aspects that distinguish them from their competitors, such as technology, versatility, high quality, and brand. Technology enables

remote monitoring and controlling of their product, which enables better quality in a form of healthier and better-looking plants. This benefits the service provider compared to their competitors as they said that "it (the product) will look better for a longer time than ordinary green walls" (service provider 1, personal communication, January 7, 2019). Moreover, their air purification technology, that uses plant roots, is unique. The versatility of their product is a distinguishing factor as they mentioned that "usually products are single-functioning in which case we can win with our versatility" (service provider 3, personal communication, January 10, 2019). The service provider discussed how the versatility can be an advantage in competition as they said that "we have more functions in it (product), so it's not just a decorative green wall, but we have managed to produce more benefits for customers due to our technology, and that's clearly an advantage" (service provider 1, personal communication, January 7, 2019). This versatility has helped them to distinguish as a brand and they said that they have a much better-known brand as their competitors in green wall markets. They also tend to have a better reputation than electronic air purifiers which, according to them, usually indicates indoor air problems, for example, in the eyes of employees or guests. Interestingly, there was a conflicting view on this matter when one of the customers said that air purifying green wall indicates indoor air problems.

6.3 Transition

The service provider must transition into service-orientated company for them to be able to better fulfill different customer needs and their own needs. This transition requires the service provider to embrace different aspects. These aspects are the five main themes of the transition: value in-use; service orientation; change in strategy and business model; capabilities, resources, and assets; and service co-production.

Value in-use is important part of the transition because when the service provider can offer value in-use through services, they can produce better customer value that was one of the customer needs. Service orientation is the mindset of offering a service instead of a product. The service provider must embrace the change that they are a service company. The transition needs changes to strategy and business model. A service company operates differently than manufacturing product company. Strategies and business model must support the service provider to operate as a service company. In order to function according to different strategies and the business model, the service provider must acquire necessary capabilities, resources, and assets. Lastly, the service provider should utilize service co-production activities with customers to develop more suitable service package and solutions to address different customer needs.

The most apparent themes of transition were value in-use and service orientation. Both the customers and the service provider discussed these themes and for the most part they had similar opinions. Service orientation was somewhat conflicting theme among the customers, and between the customers and the

service provider. Other themes, the changes to strategy and business model, new capabilities, resources and assets, and service co-production were discussed mainly by the service provider. The customers did not have much information regarding to these themes. The service co-production theme was the least significant theme of transition.

Value in-use

Value in-use consists of two customer value increasing factors: services and solutions. Services that increase value in-use was the most significant theme in transition. The customers discussed many different situations where value in-use was increased due to different services. The most common value increasing service event was the maintenance service that enables well-functioning products with healthy plants. For many customers, the most important matter was the appearance of the product as one customer stated that "it should be green and spectacular" (customer 3, personal communication, March 21, 2019). Some of the customers acknowledged that without the service their product would simply die because they do not have the capacity, capability, or motivation to maintain the product. Many of the customers stated that services enable a carefree ja satisfactory product.

The appearance of the product is not the only value adding factor because for some customers the air purification is the main factor. In one case, the customer perceived value through the service because the service kept the product's air purification capability efficient and this customer compared the product to an ordinary electronic air purifier that they previously had by saying that "cleaners didn't vacuum traditional air purification devices and no one did, so it's a good thing that these products are maintained" (customer 4, personal communication, March 29, 2019).

Few customers discussed continuous value that is guaranteed through the service package that provides different services to solve different matters as one customer described that their "plants began to brown because the irrigation system didn't work properly" and they continued that "then there was a maintenance service visit where they made sure that everything is ok" (customer 8, personal communication, April 11, 2019). According to one customer, the service package relieves their staff from taking care of houseplants because ordinary plants need constant caretaking. Few customers discussed that their problems were fixed through relocation service that can move a product to a more suitable location because customers are not allowed to move the product by themselves. Couple of the oldest customers even received an update where their old products were replaced by new ones.

The service provider discussed similar matters, but they repeatedly emphasized the importance of their services because "the product simply doesn't work without the service" and they specified that "the product doesn't work without the remote monitoring and controlling system, and regular maintenance visits on site" (service provider 1, personal communication, January 7, 2019). Another point of view to the necessity of the services is, according to the service provider, that customers demand for the service provider to take full responsibility

regarding the product and plants. They told that one of their customers had asked that "you are going to maintain this (the product), aren't you?" and after the service provider replied positively, the customer continued that "good because in a workplace people can't even put their coffee cups into the dishwasher, and none of our houseplants have ever survived without the outside help" (service provider 2, personal communication, January 10, 2019). The service provider explained that fear is related to green walls as customers are afraid that these green walls might die, and this causes customers to demand service for this kind of products. Transition to services and value in-use seems to be a necessary step as the service provider stated that "the importance of services has increased in many markets" (service provider 3, personal communication, January 10, 2019).

Some of the customers brought up some situations where solutions increased value in-use. These solutions related to the remote monitoring and controlling which were used to modify and monitor the operation and functionalities of a product, such as the irrigation schedule of a product was tweaked, and customers were notified if there was a problem with the product or if water level was low and water tank needed filling. One customer had many products in different locations, so the service provider offered them a monitoring solution that helped the customer to keep track which of their products were running low on water as this customer described that "we can remotely monitor where we should go to fill (the water tanks)" (customer 3, personal communication, March 21, 2019).

The service provider discussed the same solutions and they also added that they can remotely adjust many functions of customers' products, for example, when the lights are on, or what is the mode of operation. The product can operate on the air purification mode, the plant preservation mode, or something between the two modes. The service provider explained that "we can address the primary needs of customers by doing these small tweaks" (service provider 1, personal communication, January 7, 2019). In addition to these two automated modes, the product can start a survival mode if the water level is too low. They added that "it's a sign for customers that the water level is low" (service provider 2, personal communication, January 10, 2019). The service provider told an interesting case where their customer received unexpected value when the customer's product sent a temperature alert to the service provider. This customer was contacted by the service provider and it turned out that the heating of the building had broken. This happened during holidays and it was winter, so the building was empty for days. Without the temperature alert, there would have been major damages to the building. The low temperature killed all the plants, but "they (the customer) were happy to pay for the new plants" (service provider 2, personal communication, January 10, 2019).

Service orientation

Service orientation was an interesting theme because most of the customers distinguished the service provider as a product orientated company, whereas the service provider considered themselves as a service orientated company. Some of the customers emphasized that the service provider was service orientated,

but most of the customers somehow seemed to only recognize that the product is the only part of the offer, even though, these customers were aware of the offered services. The customers and the service provider were asked to describe what the service provider offers, and it seemed that the product is so prominent that it was difficult to recognize the services being as a part of the offering. Few customers acknowledged the importance of the services later in their interviews, even though, they first emphasized product orientation by discussing that the service provider offers a product or something that is firmly connected to the product.

The service provider was seen as a product orientated company by most of the customers when the customers were asked what the service provider offers for their customers. These customers clearly stated that the service provider offers a product which was usually described with quality, for example, easy decorative element that also purifies air, beautiful decorative element, high quality product, decorative element, or indoor air improving units. Few of the customers described the offering more specifically. Customer 7 said that "they offer green walls that produce better breathing air to offices, and also spectacularity" (personal communication, April 9, 2019). Customer 10 described the offering in similar way but emphasized wellbeing as they said that "they offer nice-looking and many ways wellbeing improving product" (personal communication, June 18, 2019).

The service orientation of the service provider was discussed by half of the customers, but only few of the customers described the offering as service orientated when they were asked about what the service provider offers. The customers who emphasized the service orientation described the offering as a complete service package that includes everything needed. One customer depicted this by saying that "if you think of the whole, they (the service provider) have a pretty good service package that they offer, and there are different options to choose from" (customer 9, personal communication, April 26, 2019). One of these customers stated that the service provider offers "high quality service" (customer 8, personal communication, April 11, 2019). Rest of the customer who discussed service orientated offering mentioned services later in different context. One customer stated that the service provider offers a product, and quite quickly after that they remembered that "you can get everything from the same place that you don't have to think about where to order something" (customer 3, personal communication, March 21, 2019). Customer 5 started to discuss the service package at the end of the interview by saying that "the service package and the product are good, and service concepts work, so we don't have to sacrifice any thoughts for it" (personal communication, April 4, 2019). One other customer brought up the service contract and the maintenance service when they were discussing customer satisfaction.

The service provider discussed the same matters as the customers, but the service provider did not see their offering only as products and services. They stated that they offer wellbeing, decoration, and pure air through their products and services as service provider 3 expressed that "the service is basically

decoration and pure air" and they continued that "the product and the maintenance service are mediating matters (for the service) in a way" (personal communication, January 10, 2019). Service provider 2 had a bit different view on the offering as they said that "our service that we offer is wellbeing" (personal communication, January 10, 2019). They continued that wellbeing is offered through the product and the maintenance service. The service provider always emphasized that they offer a service, so they see themselves as service orientated company.

Change in strategy and business model

Changes to strategy and business model was a theme that the service provider was able to discuss more insightfully. Some of the customers discussed different changes over the years. These customers had been the service provider's customers for several years, so therefore they had more insights to the changes than the other customers. The service provider discussed similar things than the customers, and they explained why some of the changes had happened.

Most of these customers mentioned that the service provider had increased the product range as customer 11 described that "when we purchased the product there was only one model available" and they continued that "since then there have emerged much more different, to different spaces suitable, and narrower models" (personal communication, June 19, 2019). One of the customers had noticed that the payment methods had been increased with leasing option. These customers also discussed that the service provider's company had grown a lot, their offering had become more versatile and better, and their operation had become much more professional and systematic as customer 10 expressed that "it was a kind of pioneering work at the start, but now it's much more professional and systematic" (personal communication, June 18, 2019). There was a conflicting viewpoint when one of the customers discussed how they believe that growth and profitability have forced the service provider to offer more focused offering. They described the change in the offering by saying that "it (the offering) has gone to much simpler direction, so that they don't have so large product range what they used to have" (customer 5, personal communication, April 4, 2019). Few of the oldest customers mentioned that they had noticed the name changes of the company and that the brand had changed.

The conflict between offering less product models and increasing product range, which emerged from the discussions with different customers, was explained by the service provider. They told that earlier they offered extensive customization for the offered products because of the high demand from their customers, but after noticing that this was not very profitable, they changed their strategy and focused only on providing few models that can be customized only at some level. The service provider has developed new product models over the years, and they are offering more models now than they offered during the early years of their company, and these models have limited customization options.

The service provider discussed how their business model has been basically the same since the start of the company, but they said that "of course the details have changed much" (service provider 3, personal communication, January 10,

2019). They have expanded sales channels as they depicted that "we have started to sell more through architect companies who define our products to new office properties" (service provider 1, personal communication, January 7, 2019). This has become possible due to the change in their strategy to move their focus of sales as they described this by saying that "we started from the indoor air problem segment and moved to the best air and décor segment" (service provider 3, personal communication, January 10, 2019). The service provider explained that selling through channels was something that they decided when they started the company. They added that "we have learned and adapted which channels we should use for sales" (service provider 3, personal communication, January 10, 2019).

The service provider described what was their focus regarding the sales when they started the company, and how this focus has changed. They said that "at first it (focus) was 360 degrees, after the first year it was only 180 degrees, and then it might have decreased even further" (service provider 2, personal communication, January 10, 2019). Service provider 2 continued that "we were thinking about internationalization strategy, and we thought that we will never go (expand) to Russia, and that we could practice first in Scandinavia and then go to Asia, but the first country where we went was Russia". They explained that their original plans for expansion have contracted and this has clarified their strategy.

This more focused mind set seems to have affected current growth and sales strategies. The service provider discussed changed growth strategy in which they utilize foreign partner companies for growth. They praised the change by saying that "regarding expansion, we think that we have moved to a smarter system in which we utilize partners" (service provider 1, personal communication, January 7, 2019). Service provider 1 continued that they have had a pilot in South Korea where they sell their products through a partner, and they depicted this by saying that "they have bought our products for the amount of many shipping containers, and sold there, so it has been much more successful strategy than any other".

The service provider discussed that one significant change was when they changed their sales strategy and focused their sales on specific regions to centralize the maintenance service as much as possible. They admitted that they still have learning to do regarding what is best sales strategy in different markets and in different cultures. A more recent change was that they were starting a pilot of a new service intended for consumers because many consumers have requested more consumer suitable service. Even though their current service is for businesses, they already have some enthusiastic consumers as customers.

Capabilities, resources, and assets

Capabilities, resources, and assets were mostly discussed by the service provider. Few customers only briefly mentioned technology and people playing an important part in the maintenance service and design department. The service provider discussed that the key capabilities were the professional skills and learning abilities of their employees. They stated that "capabilities are in the heart of their service" (service provider 2, personal communication, January 10, 2019). The service provider had noticed that growth of the company has forced different

capabilities to develop better as they described that "it (growth) opens up possibilities for people to develop faster because responsibilities increase suddenly and at that point personal growth is a must" (service provider 3, personal communication, January 10, 2019). The service provider mentioned that the role of the maintenance service people is very challenging because one must be "sometimes a psychologist, and sometimes an IT-engineer, and of course one must have understanding for plants" and they continued that "maybe the real capability is that one must be able to learn all of these" (service provider 2, personal communication, January 10, 2019).

The key resources were people, technology, information, and high-quality plants. The service provider emphasized people in different areas of their business. They mentioned that people in the maintenance service and the design department plays a significant role when producing their service. The importance of the technology was also emphasized because technology is an essential part of the operation of the product. They have developed this technology throughout the years, and they added that "we have invested a lot of funds to IT-development" (service provider 2, personal communication, January 10, 2019). Technology mainly consists of remote controlling and monitoring abilities, different sensors in their products, software, and the air purification technology. With the use of technology, they can collect and utilize gathered information. Information that they have been utilizing as a resource relates to the use, operation, and maintenance of products. This information helps their software to function better and optimize the operation of their products. The plants are important resources for the service provider as their products are filled with them. They discussed how they must control the whole process of plant growing, so that they always have enough plants. The service provider said that "we have had to focus very much to plants" and they explained the reason for this as "there have been problems every year" (service provider 3, personal communication, January 10, 2019).

The partners that the service provider utilized seemed to be important resources as well, even though, they did not mention these partners when discussing resources. The key assets consist of their own infrastructure. The most important parts of their infrastructure were transport equipment, and tools and accessories for the maintenance work.

Service co-production

The Service co-production consisted of direct and indirect co-production. The findings indicate that service co-production was used only seldom. The indirect co-production was more common between the service provider and customers. This was done usually through surveys and other user experience feedback, but most commonly customers gave direct feedback regarding some problem or development target.

The customers' experiences of direct service co-production were quite scarce as only one customer discussed how they were designing their customized product together with the service provider. The indirect service co-production was more common as some of the customers mentioned that the service provider had asked them to give feedback as one customer depicted by saying that "they

have contacted us and asked for user experiences and development ideas, and viewpoints what should be improved" (customer 9, personal communication, April 26, 2019). Only one customer discussed that they gave different development ideas that were mainly based on their emerging needs or use experiences. Few of the customers mentioned that there is not hardly any time to participate to matters like service co-production.

The direct service co-production was used during the early years of their company because the service provider was trying to develop their product and services to fulfill the needs of their new customers as they described that "we had more conversations and longer conversations on what they hope and what we should do better, and in a way, together we built what we should offer" (service provider 1, personal communication, January 7, 2019). The service provider discussed that the direct service co-production has decreased since the early years, and now it is used whenever the service provider is going to launch a new product. Interestingly, only one customer had the experience of direct co-production. This experience related to their purchase phase where they discussed and planned together with the service provider for customized product.

After the early years of development, the indirect co-production began to be more common, and usually in a form of feedback that was a development idea. The service provider discussed how solving everyday problems can be indirect service co-production as "they (customers) always participate at least indirectly because there are always daily problems which must be solved, and usually solutions are produced according to processes, so it (the service) is developed indirectly" (service provider 3, personal communication, January 10, 2019). Besides the daily problems, the service provider also receives development ideas from their customers as they said that "we get quite frequently good feedback and feedback regarding development targets" and they continued that "then we validate which would be sensible for development and what wouldn't" (service provider 1, personal communication, January 7, 2019). The service provider discussed that previously the service co-production was more common especially with indoor air problem related customers because they were trying to develop the operation of their product to work in the most efficient way. This service co-production included different tests, surveys, and development in the customer facilities.

6.4 Solutions

A transitioned service orientated company can produce solutions that are only possible through the transition. These solutions are developed particularly with different needs in mind, and should benefit both the customers and the service provider by fulfilling different needs or solving problems. The main theme solutions is divided into five different themes: product-related solutions, service-related solutions, operability, product-service systems, and customization and unique offerings.

Product-related solutions are solutions that can be the actual product or something that is a part of the product. Service-related solutions are all the different services that can contribute or facilitate how different needs are fulfilled. Operability determines how much the end user is required to perform self-service. Product-service system is combined through the product and service-related solutions. Customization and unique offerings are solutions that can further fulfill more specific customer needs that the basic offering cannot. Products and services can be customized at some level and within restrictions. Unique offerings can be solutions that include extensive customization, and which are tailored for a specific customer.

Product and service-related solutions were the most discussed themes of solutions. Within these themes, the compulsory aftermarket services was the most prominent subtheme which was the most discussed theme among all the subthemes in this research. Operability was a theme that was also quite strong theme as well as product service systems. Other themes customization and unique offering were less significant, and unique offerings had very little to offer because customers and the service provider did not have much to say regarding this theme.

Product-related solutions

Product-related solutions were divided into three subthemes: versatile quality product, product that purifies and humidifies indoor air, and product that increases comfortability. The versatile quality product term describes quite well how the customers experience the product, and how the service provider see their product. When the customers discussed the product, it was referred as a basic product, a high-quality product, a good product, and a well-functioning product. One customer described the product as a product that "increases well-being in many ways" (customer 10, personal communication, June 18, 2019). This versatility was discussed by many customers and even though the customers often referred to a basic product, they still brought up many different solutions that the product offers, for example, a plant, a decorative element, an air purifier, and a humidifier. Different customers emphasized different solutions, but all of these customers acknowledged that the product offers many solutions as one of the customers stated that "it's not just a plant" (customer 5, personal communication, April 4, 2019). This basic product seemed to fulfill different customer needs, and every customer that was interviewed said that they had purchased the basic model. Customer 6 said that they purchased "two basic products that happened to be very suitable for us" (customer 6, personal communication, April 5, 2019). In addition to the versatility, few of the customers discussed the quality of the product and one of the customers stated the product as a high-quality product. Customer 10 has had the product of many years and they said that "it has been a good product from the beginning, so it hasn't needed many changes" (personal communication, June 18, 2019). There was also a mention of customized products that can offer even more different solutions, for example, a product that have been designed for a specific space.

The service provider discussed the same solutions as the customers. They described their versatile solution more specific by depicting that their product is a furniture-like adjustable solution that can remove chemicals from indoor air using plants that are not allergenic. They emphasized the versatility and the quality of the product, which are important aspects for them, and they want to offer versatile quality products for their customers because it is a distinguishing factor from their competitors, and this way they can address more of their customers' needs. The service provider discussed how they can offer better solutions than their competitors. They said that "we are so versatile that this one product can do so many different things" and they continued that "quality is another strong advantage" (service provider 3, personal communication, January 10, 2019). The quality was discussed on many occasions and it was regarded to many different aspects of the product and the service.

Most of the customers acknowledged that the product offers both comfortability and air purification, but few customers only mentioned either one of these two. Half of the customers emphasized the comfortability that the product generates, and the other half emphasized the product's air purification and humidification abilities, for example, customer 3 said that "these products are mostly intended for air purification, more than for decorative use" (personal communication, March 21, 2019). The customers described that the comfortability is produced through solutions of aesthetics, greenery, real live plants, ease of use decorative element, beautiful decorative element, and ease of use plant. Most of these customers did not necessarily value the air purification capability at all as customer 8 described by saying that "they are just there as a decorative element" and they continued that "the products are relatively small in relation to our open office spaces, so I can't say if there has been any impact (to air quality)" (customer 8, personal communication, April 11, 2019). The customers who valued better air quality mostly discussed how the product humidifies air. Customer 4 described this by saying that "it (the product) humidifies quite well, when one puts few jugs of water, it vaporizes much of this water to air" and they continued that "this is a more visible result than the air purification which isn't visible" (customer 4, personal communication, March 29, 2019). Still, some of customers valued both sides as customer 9 referred to both comfortability and better air by saying that "live green plants have many good properties" (personal communication, April 26, 2019).

The service provider discussed the same solutions that produce comfortability and better indoor air as the customers discussed. They described the product as a product that can offer both comfortability and better air. The service provider did not emphasize much either of these two sides, but they said that they have concentrated more on offering comfortability and the combination of these two sides. There were differences how the three service providers emphasized these solutions. One of them emphasized better air quality and continued that "which is then combined with a beautiful green wall" (service provider 1, personal communication, January 7, 2019). Whereas service provider 3 emphasized more how they offer a decorative element that also produces better air. Service

provider 2 did not have emphasis towards either of these sides as they described that they offer wellbeing, and what their product offers depends on who the customer is as they depicted by saying that "to different (customer) segments it can offer different things" (personal communication, January 10, 2019). When viewing only the comfortability, it seems that the better air quality has become more of a by-product of the product than the main argument of the offering as the service provider depicted that "when considering décor, then we are only a green wall that produces benefits like beauty, greenery, and nature" (service provider 3, personal communication, January 10, 2019).

Service-related solutions

Service-related solutions includes three different subthemes: purchase phase solutions, aftermarket solutions, and additional aftermarket solutions. Aftermarket solutions was the most significant of these themes and was discussed by all the customers. The most prominent topic was the maintenance service that was depicted by the customers as a regular service where plants are tidied up and changed if they are dead. The customers described the maintenance service as well-functioning, easy, and fast. Particularly well-functioning service was mentioned by every customer. Most of the customers expressed satisfaction towards the maintenance service and that the product is maintained by someone. According to the customers, the maintenance service enables spectacular looking green plants and an easy carefree product because "they (the service provider) take responsibility of delivering longer term added value for their customers" (customer 10, personal communication, June 18, 2019). One of the customers discussed how they can be sure that the maintenance service takes care of the product as they said that "because of the maintenance service, customer can trust that there is no need to do anything except adding water" (customer 5, personal communication, April 4, 2019).

The service provider emphasized that the maintenance service and remote monitoring capability are vital for the operation of their product, and their service is flexible especially in situations where a product related problem has occurred. They discussed that carefreeness for customers is offered through the maintenance service, and it is essential that the maintenance service responds quickly to problems with the products. From the beginning, the ease of use and carefreeness was attached to the product through the service and as the service provider stated that "without the service, or the maintenance service which keeps the product in good condition, our future would have been very short in the B2B target group" (service provider 2, personal communication, January 10, 2019).

Regular maintenance visits are also important to ensure the operability of the product. The service provider briefly described these visits by saying that "our maintenance people visit on site to change the dead plants, to add nutrients, and to trim the plants" (service provider 2, personal communication, January 10, 2019). They continued that "to continuous service, or the maintenance service, lot of invisible (work or matters not visible to customers) is involved" without specifying any further. In addition to the operability, the maintenance service takes care of the product in every possible way to keep the whole as good-looking. The

service provider emphasized that their products are allowed to be maintained only by their maintenance service.

Additional aftermarket services were discussed by half of the customers. These customers mentioned relocation service and product update service. Many of these customers needed relocating their product to a new location and the service provider took care of moving the product because these products are delicate and must be installed to a suitable location. One customer described how these kinds of changes are always performed by the service provider as they said that "they don't let us to do any changes and don't allow us to change the placement of those (the products)" (customer 11, personal communication, June 19, 2019). There was some dissatisfaction regarding this relocation service as customer 11 said that "it took fair amount of time that we got these relocated". Some of the customers said that the service provider had offered newer and better updated products in replacement for the old ones. Customer 10 described this product update by saying that "the products were changed into new ones at some point. Those have been changed for at least once when the model changed and then these came with better features, so they (the service provider) offered the change" (customer 10, personal communication, June 18, 2019). It seems that the service provider is keen to update the older models into new ones.

The service provider on the other hand, discussed their premium service which is upgraded service from the standard service as they described that "most of our customers choose the standard service in which everything else is our responsibility (except filling the water tank)" (service provider 2, personal communication, January 10, 2019). In premium service, the service provider takes care of filling the water tank. They also told that they have prepared to change customers' plants to different ones upon requests, for example, Christmas plants. Surprisingly, the service provider did not mention the services that the customers discussed.

Purchase phase services included the installation service and the leasing option. These services was discussed under the half of the customers. All of these customers mentioned leasing option and some of the customers had purchased their products through leasing. These customers were satisfied with the leasing option as they seemed to have done their purchase due to leasing being an available purchase method as customer 6 described that "the purchase price seemed awfully high" and they continued that "leasing seemed to suit us well" (personal communication, April 5, 2019). Few of the customers mentioned that the service provider takes care of the installation of the product. One customer described this briefly by saying that "they have a good product, a good service concept, and they deliver (products) using a turnkey solution" (customer 5, personal communication, April 4, 2019).

The service provider mainly discussed their installation service, which is not only a product installation, but a part of their turnkey solution. They described this by saying that "when a customer has ordered the product and it will be delivered, so it includes the installation and the preparation of the product so it will be ready for use" (service provider 2, personal communication, January 10,

2019). They also told that they have their own installation crew who can be very flexible if needed as service provider 2 described one case by saying that ”the only option was to install the product during Sunday or nighttime, so we did it according to those terms”. It seems that the service provider definitely wants to provide the installation service by themselves, even though they acknowledged that the installation service is quite costly to produce and this impacts to profitability. The service provider emphasized that their installation service is part of the customer service experience where their installation crew demonstrates and explains the operation of the product. They have also started to provide interior design services to diversify their offering from the basic products to complete spaces which form a carefully designed whole and richer experience.

Operability

Operability was a strong theme and all the customers had something to say about it. This theme was divided into three subthemes: self-service on minimal level, no self-service needed, and some self-service required. Self-service on minimal level related to the daily operation of the product, whereas no self-service needed related more to situations where some problems occur. Some self-service required related to additional matters that some of the customers experienced that they must or want to do.

Self-service on minimal level concerned every customer except one, and these customers experienced that they must do the minimum amount of self-service to make sure that the product can operate. In most of the cases this meant that the customers had to fill the water tank regularly as one customer stated that “we have been instructed to fill the water tanks once per week, so we don’t do anything else” (customer 6, personal communication, April 5, 2019). Some of the customers also added that they are responsible for providing electricity for the product. One of the customers felt that their product required no self-service because they had a third-party service as they described that “we have another company that takes care of our houseplants by watering those” and they continued that “they also observe the product by mostly following the water consumption and if any plants needs to be changed” (customer 8, personal communication, April 11, 2019). Filling the water tank was experienced differently among the customers. Few of the customers felt that this task was very laborious and decreased their satisfaction towards the product. One customer specified that filling the water tank becomes even more challenging during the vacation seasons because there is not anyone to do this task.

The service provider discussed the same matters that customers must provide when they use the standard service. They added that the room temperature must be high enough for the product to operate normally. The service provider gave an example why they emphasize the importance of water, electricity, and temperature as they talked about an incident that happened. They told that “one product was in a physics class (at some school) and it was connected to a light rail (which was usually always on) and someone turned the lights off because of some holiday. It was a total disaster because the product didn’t get any water (water pump needs electricity) and every plant died.” (service provider 2,

personal communication, January 10, 2019). The service provider had acknowledged the issue of filling the water tank which was discussed by the customers, and the service provider said that they were planning to solve it.

No self-service needed was a theme that many of the customers mentioned as these customers experienced that the product does not require any self-service, even though the same customers discussed how they must fill the water tank regularly. The lack of any self-service refers to maintenance of the product, which is done regularly or in case of a problem. The product maintenance is performed solely by the service provider as the service provider discussed that "the product isn't serviceable in any way by customers, and the maintenance always goes through us." (service provider 3, personal communication, January 10, 2019). Customers are aware of this and in case of a problem the only option is to contact the service provider as one customer stated that "we have never done anything by ourselves, we call straight away to the service provider" (customer 6, personal communication, April 5, 2019).

The service provider discussed their premium service which does not require customers to do any self-service. In this service, the service provider takes care of filling the water tank. Customers still must make sure that electricity and sufficient temperature are provided. This premium service can be considered as a full service because electricity and temperature are obvious matters in offices. None of the customers who were interviewed had this premium service as all of them used the standard service.

Some self-service was experienced by few of the customers as they felt that they must do some additional self-service besides the minimum self-service. Few customers discussed how they had to reboot the product by unplugging the electrical socket. This was usually done by the request from the service provider because the remote connection was lost. One of the customers discussed how they plug leaves and wipes dust occasionally. The service provider also discussed that sometimes they might ask their customers to reboot the product by unplugging the electrical cord if there are some kind of connectivity problem. They also mentioned that customers can plug yellow leaves if they want to.

Product-service systems

Product-service system was discussed by most of the customers, and it was addressed many times by the service provider. This theme was divided into the subthemes: the union of a product and a service, and technology and service enabled smart product. The first one describes how the product and the service is connected, and the second one describes how technology and services are essential for the product to be a smart product, i.e., a product-service system.

The union of a product and a service was discussed by many of the customers as one of the customers depicted this union by saying that "it is not just buying a product but buying a product and a service" (customer 5, personal communication, April 4, 2019). These customers discussed how the product needs the service because the product contains living plants. Some of these customers emphasized that the plants need service to stay healthy and alive as one of the customers stated that "taking care of plants is really important, so that those stay

fresh-looking" (customer 1, personal communication, March 15, 2019). The product and the plants seem to be delicate because any alterations and change of placement are forbidden as few of the customers and the service provider have discussed earlier. The customers mentioned that regular service enables good quality for the product. Few customers discussed how the service produces value for them because without the maintenance service the product would be ruined due to the lack of capability to maintain the product by themselves.

The service provider described the relation between the product and the service as very close. According to them, the product cannot operate without the service, so the service is mandatory for the product. They emphasized that the living plants are the main reason for the service. The service provider described their policy regarding product sales by stating that "we get inquiries all over the world that someone would like to buy our product and take care of the product by themselves, but we don't sell our products without the service" (service provider 2, personal communication, January 10, 2019). They have even thought of self-service, but currently it is not possible. The service provider also considers the product and the service inseparable as they discussed how these two are connected. They said that "I don't see that the relationship between those (the product and the service) is going to change, but perhaps those are rather merging together" and they continued that "the benefits are formed through the combination of these two" (service provider 2, personal communication, January 10, 2019).

Technology and service enabled smart product was discussed by some of the customers as they mentioned that the product has automated operations, and it is connected to the service that can monitor the product, for example, the service can notice remotely if the fans are stopped. One of the customers described this by discussing that "it functions pretty automatically" and they continued that "those have been stuck for a few times that the product hasn't blown at all, but of course someone can see in the control room that it is stuck" (customer 1, personal communication, March 15, 2019). There was also an example related to the remote-control ability when one of the customers discussed that they had challenges with filling the water tank, so the service remotely changed the settings of the customer's product to operate on a minimum level that consumes water as little as possible. Customer 9 discussed the remote monitoring as well as they said that "they had this monitoring which seemed pretty effective that this system is monitored remotely all the time" (customer 9, personal communication, April 26, 2019). One customer even stated the product as a smart product.

The service provider discussed more about the technology they use and how it can benefit the operation of the product. Even though the maintenance service is regular, they do not necessarily visit on site every month because technology enables remote monitoring of the product and the service visits can be done when necessary. Technology enables remote monitoring and controlling of products, which are important parts of the service. They said that their products are monitored and controlled remotely, which is possible due to the different sensors that the product has. These sensors produce data that is used to operate the products in the most efficient way. According to the service provider, sensors

and data helps the plants to stay in better condition, which can directly decrease the maintenance service costs. The service provider used the term smart green wall to describe their product.

The sensors cannot measure everything needed, therefore, the maintenance service and people observing the condition of the product is essential as they said that "the products can be monitored remotely, but people must tell what the product's condition in practice is" (service provider 3, personal communication, January 10, 2019). The observed data is connected to sensor data, which enables the further development of the product. The products are connected remotely to the service provider's servers and the data is processed there. They constantly try to improve how they can utilize the data better and optimize the operation of the product. The service provider discussed more specifically why the technology is so important as they said that "the method that we use to grow plants (in the product) is quite challenging for plants because air is cycled through plant roots to purify air" and they continued that "therefore, the technology, the sensors and data measured by the sensors, and how these are connected and how the products operate based on data must be constantly developed to be more precise and better" (service provider 1, personal communication, January 7, 2019).

The software development was mentioned as a part of the technology and how they have been developing new features over the years. The automatic operation of the product is enabled by the sensors and the software that controls the operation of the product. They described this as "a combination of a physical product, and our service, to which are related artificial intelligence and so forth" (service provider 1, personal communication, January 7, 2019). The service provider discussed what the automation of the product does, for example, the automation controls the fans and irrigation of the product in different situations as they depicted that "the irrigation of the product can be changed according to weather satellite data" (service provider 2, personal communication, January 10, 2019). The automation also notifies if water level in tank is too low or if room temperature decreases.

Customization and unique offerings

Customization and unique offerings were less significant themes. Physical product customization was mainly discussed, but the findings indicate that software was customized as well. Customization was discussed by over half of the customers and it was mentioned only briefly by the service provider. Unique offerings appeared in two cases and the service provider did not have much to say to that theme. Some of the customers believed that customization is possible, whereas some other customers knew that customization is possible because customization had been offered to them during the purchase phase. There was one conflicting statement when one of the customers said that customization was not possible when they were purchasing the product. The same customer also said that their product's operation has been customized not to perform irrigation during workdays, which is related to the customization of software.

The service provider discussed that they have been offering more physical product customization previously, but recently they have concentrated on

offering only some customization. According to them, software customization is more common as they depicted that many customers request some minor customization to the operation of the product, for example, the lights of the product should be on for round-the-clock. Regarding physical product customization, they stated that "extensive customization is possible", even though they only offer limited customization (service provider 3, personal communication, January 10, 2019). Physical product customization seemed to be somewhat unpopular among the customers because few of the customers mentioned the costs of customization and some of the customers stated that they were satisfied with the basic product without any customization. The service provider also discussed the costs of product customization and how customization increased the costs. Therefore, they started to offer only limited customization where customers can choose preferred options and measures from predefined options.

The extensive customization relates more to unique offerings through the products which are, according to service provider 3, possible if "someone insists very hard and is willing to pay" (personal communication, January 10, 2019). They also added that some of the special cases are done because those are interesting in some special way. It seemed that the service provider has certain types of conditions when the unique offerings are possible, even though they stated that "customer usually desires something unique that they want" and they continued that "when they hope for something, then we are going to fulfill that" (service provider 3, personal communication, January 10, 2019). One of the customers said that they were planning a unique customized product together with the service provider, but in the end the price was too high. There was only one customer who had or have had a customized or unique product. Unique offerings were not only offered through products, but also through services. The service provider discussed how they can produce a unique whole for their customers without the extensive customization if they provide interior design services as they depicted that "using these methods (interior design) we thrive to produce a unique end result for customers, even though the solution that we offer is only a basic product" (service provider 1, personal communication, January 7, 2019).

6.5 Benefits

The findings indicate that there were many different benefits that the customers and the service provider achieved through the solutions. The benefits were mainly increased value and satisfaction, but better relationships were possible through the solutions. The benefits are categorized under five different themes: increased value for customer, customer satisfaction, well-functioning relationships, increased value for the service provider, customer insights, and competitive success.

Increased value for customers consists mainly of the actual benefits that customers experience. These benefits are different fulfilled needs which are fulfilled through the solutions. Customer satisfaction is a benefit that is formed through

successful solutions that produce benefits. Well-functioning relationships are formed between customers and the service provider when solutions require continuous relationships between the two. Increased value for the service provider include benefits that help the service provider to develop their business, and enable better success. Customer insights are benefits that the service provider can acquire through different methods and utilize to develop their solutions or business. Customer insights is the most probable benefit that can affect to solutions. Competitive success is a benefit that mostly affects to the success of the service provider in markets, but this can benefit competitively the customers as well.

The most significant benefits were customer satisfaction and the value that the customers received through different solutions. These themes were the most significant and concerned every one of the customers. The theme well-functioning relationships was also very strong. Increased value for the service provider was less significant theme than the previous ones, but it was a theme that was discussed by many. The last two themes customer insights and competitive success were the least significant themes, and these themes were not discussed much as only few customers had something to say. Surprisingly, the service provider did not address these themes much.

Increased value for customer

The strongest themes that increased value for customers were enjoyable product and service fulfillment, pleasure through senses, and occupational wellbeing. These themes were discussed by almost every customer. Other notable themes were personal health and wellbeing, and image, which were discussed by half of the customers. In general, wellbeing was a theme that occurred in different contexts. It is not surprising because wellbeing is the foundation that the product has been built on as the service provider expressed that ”service provided by Naava at the top level is well-being” (service provider 2, personal communication, January 10, 2019).

Enjoyable product and service fulfillment was discussed by most of the customers. All these customers said that the product is very easy and carefree. Customer 10 depicted the carefreeness as they are “just the ones who use and enjoy the product” (personal communication, June 18, 2019). In addition, one customer emphasized the service package and praised the goodness of it and how it enables the carefreeness. The customers said that the service enables the good condition of the products and according to these customers their products are always good-looking, and the plants are green. These customers seemed to be very satisfied with the product, and as one customer expressed their satisfaction by saying that “it’s great that it’s taken care of and it’s always healthy and fresh, and we don’t have to do anything to it” (customer 2, personal communication, March 20, 2019). Few of the customers said that they have had the products for many years and their products have always operated very well. It seems that these products have long product lifetime. There was one conflicting statement when customer 3 told that their plants are not always green and sometimes there are noticeable much of dust to be seen.

The service provider discussed how they can provide better quality through service when the products remain in better condition for a longer time. The quality aspect was something that the service provider emphasized and mentioned many times. Quality assurance seemed to be important for them and they discussed different means to accomplish that. They said that technology is an important part of their service as sensors, software and algorithms enable better operational reliability of products, and the maintenance service guarantees the proper operation of products. Service provider 1 was confident that their products are always in good condition due to their technology and service by describing that "those are doing really well, and those are always guaranteed to be in good condition because we have remote monitoring, and we visit our products quite often" (personal communication, January 7, 2019). In addition to reliably working products, they want to provide carefree customer experience as service provider 2 described that "even today the fundamental core of the service is the same, before we had sold any products, we had though that it (core of the service) must be the ease of use and carefree" (personal communication, January 10, 2019). An important part of this ease of use and carefree mentality is the installation service that enables ready for use products for all their customers.

The customers discussed how they receive value through pleasure that they receive with different senses. Customer 10 discussed what their employees have said by saying that "the green walls are nice, and they have a nice scent, and they look nice" (personal communication, June 18, 2019). Many of the customers mentioned that the product produce value through its visuality. They discussed how they value greenery and beauty that they experience with the product. Some of the customers said that there are freshness and nice scent when they are in the vicinity of the product. Few of the customers depicted that the product brings nature indoors. Employees are not the only ones that can enjoy the products as customer 7 discussed that their "guests praise the beauty of it" (personal communication, April 9, 2019).

The service provider discussed the same factors that produce value for their customers. Besides the visuality, they emphasized nature-like air as they described that they offer for their customers "naturally purified and humidified air, to which a beautiful green wall element is also combined" and they continued that "in a way, we bring forest-like air to indoors and as well a green element" (service provider 1, personal communication, January 7, 2019). In addition, the service provider 1 said that the fresh air that the product produce is different and can be sensed through nose.

Occupational wellbeing was discussed by every customer except one who solely emphasized the benefits for personal health. The most common wellbeing increasing factors were positive feelings and comfortability which was not usually specified any further. Some of the customers defined that the aesthetics of the product increase comfort. They said that beauty and greenery are behind the comfort. Few customers mentioned that the greenery of the product has relaxing effect. Many of the customers discussed the positive feelings that they get due to the product. Customer 11 said that the product has "positive effect to people who

are in the area of influence of the product" and they continued that "product increased the comfort of the work community" (personal communication, June 19, 2019). They said that the increased comfort was measured in a research that was conducted after the purchase.

The service provider had clearer understanding how their product increases comfort. They said that their product can "produce comfort in many ways: greenery, freshness, living plants, and light" (service provider 1, personal communication, January 7, 2019). The service provider also stated that work efficiency is improved due to air that their products produce.

Personal wellbeing and health were discussed by half of the customers. All the customers mentioned improved indoor air because of the product. In general, these customers felt that people feel better in a space where is a Naava product. Some of the customer said that during the wintertime air is more humid which have different positive effects. One of the customers believed that better and more humid indoor air probably have a positive effect on sick leaves. Whereas customer 4 acknowledged that more humid air helps against dry eyes and skin during the wintertime. Customer 5 mentioned that air close to the product is fresh especially when the room temperature is high. In one of the cases, there were severe indoor air problems and this customer benefitted greatly from the use of the product as customer 4 told that "it benefitted me as my illness ended" (personal communication, March 29, 2019). This person said that there was a six month long continuous cycle of multiple illnesses which stopped after the product was purchased. Customer 11 discussed how they were a part of a research and the results of this research indicated that "these products improved their indoor air" (personal communication, June 19, 2019).

Not all these customers were such confident of the effects of these products. Few customers said that they think that the product improves indoor air. It seemed that they were not entirely sure how well the product effects their indoor air. One customer had more doubts about the air purification. Customer 10 discussed air quality measurements before and after the purchase, and the results were not convincing as they expressed that "it (the results) was a bit unclear if there was any effect or was it because of random variation" (personal communication, June 18, 2019). Other customers who had not noticed any positive effects regarding the indoor air quality mentioned that it was hard to measure by themselves if there are any effects to indoor air. It seemed that these customers were very doubtful about the air purification capabilities of the product. Few customers discussed how the value have decreased as in one case due to a renovation it was not necessary to use the product anymore as an air purifier, and in another case indoor air problems progressed into so severe that the air purification capacity was not enough anymore.

The service provider also discussed pure and humidified air, and they stated that the benefit for people can be compared to people breathing fresh outdoor air and therefore feeling better. They continued that they improve indoor air quality by purifying and humidifying air, reducing chemicals, and in the end eliminating symptoms that the people have. The service provider has received

feedback from their customers that symptoms have disappeared. Service provider 3 said that they can "improve work efficiency and health of people by bringing the products indoor" (personal communication, January 10, 2019). According to the service provider, it is important that there are appropriate number of products in a space to have an effective air purification.

Image was something that concerned many customers at some level. These customers mostly felt that they receive value from either the corporate image or the employer image. The former was considered as a better image in the eyes of their customers and the latter as a better image in the eyes of their employees. Customer 7 depicted how their corporate image improves as their "customers think that we are a successful business" and the product express "modernity" (personal communication, April 9, 2019). Few customers believed that they have improved their corporate image because they invest in work environment and that way appreciate their employees, and few other knew that they have improved employer image because their employees had noticed that they have invested in work environment. One customer mentioned that they got positive publicity because they were a part of a news article that dealt with green walls.

The service provider discussed that occupational wellbeing product can improve both the corporate image and the employer image. They also added that their product is a safe air purification product in terms of image because it does not indicate indoor air problems. There was a conflicting viewpoint among one customer who believed that the product can be an indication of indoor air problems as they expressed that "we have been thinking that does someone think that there is some problem (indoor air) if they see a Naava green wall" (customer 3, personal communication, March 21, 2019).

Customer satisfaction

Every customer expressed satisfaction towards the service package and many of the customers said that they are satisfied with the service provider. The most satisfying parts of the service package were the product itself, services in a general, and the maintenance service. The customers usually said that the product is good, but few customers brought up that the product's functionalities, quality and visuality are the reasons why they are satisfied with the product. Few of the customers said that their employees have been very satisfied with the product and some of those employees have even come to thank these customers for purchasing the product. Most of the customers were satisfied with the service in general as customer 8 described the service by saying that "I think they provide very high quality and fast service, so if we need something they will then come and see the situation" (personal communication, April 11, 2019). Most of these customers discussed mainly about the maintenance service, and some even mentioned installation service and relocation service. There were some customers who only said that they were satisfied with the well-functioning service. Some of the customers who discussed the maintenance service specified that this service is inconspicuous and well-functioning.

There was also some dissatisfaction as some customers mentioned that they are not satisfied with some matters related to the product or the service. One

customer said that the plants are not always healthy, and the product is sometimes dusty. Few of the customers told that filling the water tank is laborious and time consuming. There was also dissatisfaction towards services as few customers mentioned that they would like to know better about the maintenance schedules, and one customer said that they had wait moderately long time to get the product relocated.

The service provider discussed how they have received feedback where customers say that they are satisfied with the product or the service, for example, customers have told that their wellbeing have improved due to the product, or the installation team has been very professional and informative regarding the product and its functionalities. They also said that key factors to customer satisfaction are that the product operates as expected and high quality of the product, and they perform the maintenance visits as promised. Service provider 2 summarized how the customer satisfaction is basically formed as they said that "the benefit lies in that the customer gets what it has imagined he or she will buy" (personal communication, January 10, 2019). They acknowledged that there are some things that decrease the customer satisfaction, for example, customers find it laborious to fill the water tank and there have been feedbacks on irrigation schedules during middle of the day.

The customers mentioned being satisfied with the service provider and having a positive perception of the service provider. There were different things on what these customers were satisfied. Most of these customers discussed being satisfied with the communication with the service provider. Few of them specified that the communication is well-functioning, and the frequency of the communication is satisfying. Some of the customers said that they are satisfied with the relationship with the service provider, and some mentioned that the service provider is customer centric and the customer service is high quality. Customer 8 described the customer centricity by depicting that "they have a good attitude towards customers, at least I've experienced it that way, so I could recommend them for others" (personal communication, April 11, 2019). Few of the customers discussed about dissatisfaction towards the service provider. One of these customers said that delivery time was long, and the other one said that the service provider promised to do something, but it was not done. In one case, the customer was not pleased that they were not informed about the change of their contact person.

The service provider discussed how reacting quickly to different customer requests is one of most important factors to satisfaction by stating that "there are always going to be some problems, so the question is how the problems are going to be solved, and that is probably the best key factor (to customer satisfaction)" (service provider 3, personal communication, January 10, 2019).

Well-functioning relationships

The customers and the service provider discussed the quality of the relationships they have, how the service has enabled better relationships, and how the relationships have changed over the years. The customers mostly described the relationship with the service provider as ongoing, well-functioning or good.

Customer 5 described the relationship between the service provider and customers as "very good because of the service, so there has to be a working relationship" (personal communication, April 4, 2019). Some of the customers mentioned that the relationship is mainly with the maintenance service people as customer 3 discussed that "we mostly talk about the maintenance and schedules" (personal communication, March 21, 2019).

The service provider described the relationships as very close and dynamic because the product and the service are tightly connected. They continued that due to the regular maintenance visits the service provider is always near the users, and they can easily communicate face-to-face with their customers. Service provider 3 depicted the importance of close relationships as they expressed that "when we stay in contact with our customers, we are better up to date if something happens, and then we can sell more if necessary, or take other measures if necessary" (personal communication, January 10, 2019). The service provider emphasized that it is important to manage trusting relationships with customers because then it is easier to discuss different matters with them and the information that the service provider receive from their customers is much richer. They also discussed that sometimes these relationships can be quite complex, for example, on the customer side there can be many different stakeholders that have different roles and all of them are somehow connected to the customer relationship.

Few of the customers discussed how the relationship has changed over time, for example, at the time of purchase the relationship was much better and there was much of communication, but since then it had changed to almost nonexistent. Few of the oldest customers said that the relationship has changed because of the growth of the service provider. They said that at the start of their customer relationship they were directly in communication with the founders of the company and now there are contact persons who handle the communication.

The service provider discussed that it is a normal development of customer relationships that customers are first in a relationship with salespeople and afterwards the relationship is mainly with the maintenance people. They said that the relationships have been closer before because most of their customers were customers who had indoor air problems, and this demanded more attention. Other thing that has changed over time is that the relationships have changed to more complex as described earlier. Service provider 3 depicted this complexity by saying that "in some cases, we have been pushed further from the decision makers when architects and someone others have taken control of the project" (personal communication, January 10, 2019). The service provider also discussed that new sales strategies have changed the relationships to customers because they use partner companies that handle the customers and therefore, they have lost the connection to these end customers.

Increased value for the service provider

The customers discussed different values that benefits the service provider. Four different value related themes emerged from the discussion: publicity value, profitability, customer perception and operative value. First three were discussed by four customers and the last one was solely discussed by the service provider.

Publicity value was mainly about the brand, public and media visibility, and well-known companies as references. The customers said that they knew the brand before the purchase, and that the service provider brands and markets their products well. Because of the branding, these products are easy to identify as Customer 10 said that "I have come across these products every now and then, and they always immediately hit the eye" (personal communication, June 18, 2019). It seems that the service provider has good media visibility because all these customers mentioned that they have read an article about the service provider from some magazine or paper. These products can be seen in public places as one customer mentioned that they have seen those in an airport. Customer 2 described how they felt when coming across with the product for the first time as they expressed that "I got excited when I first time saw these products and I thought that I have get one those at some point" (personal communication, March 20, 2019). One customer had noticed that the service provider has big well-known clients.

The service provider discussed that they have great references, for example, airports, Finnair, Metso, Valmet, and IBM. They also talked about how they have managed to build their brand into a very well-known brand in Finland. Branding has been important for the service provider because they are constantly growing, and they said that good branding increases their attractiveness. Service provider 3 specified the benefits of branding by stating that "branding can be used in sales, in recruitment, and some other things" (personal communication, January 10, 2019).

Profitability was something that the service provider had more to say. The customers only discussed how they have acquired more of the products due to being satisfied with the products. These additional sales seem to have an impact to the profitability. The service provider admitted that the services that they provide have a positive effect on the profitability and they continued that "once we have sold a product, the maintenance service continues to function, so customers are committed to the maintenance service as long as they want to use the product" (service provider 1, personal communication, January 7, 2019). They also discussed how constant development and the use of technology decreases maintenance costs when they can better anticipate different problems, for example, remote monitoring can help to anticipate if plants are dying.

Customer perception and operational value were not very significant themes. Customer perception was discussed by some of the customers. These customers had a positive perception of the service provider. They saw the service provider as a young innovative startup company who has good values and objects. The service provider had noticed that Finnish customers want to support Finnish startup companies. Operational value was only discussed by the service provider as they said that they have received value through better knowledge of the markets.

The service provider discussed how they have learned more extensively what are the competitive factors and who are the competitors when considering different abroad markets. Service provider 1 described how they have gained

better knowledge of the markets by discussing that "our number of customers has increased so much that we get much more information, and from different kind of customers, and from different regions" (personal communication, January 7, 2019).

Customer insights

Customer insights consists how insights are collected and utilized, and has the service provider gained some customer insights. According to the customers, the service provider has been in contact with few of the customers as customer 11 said that "few years ago, they contacted us, and we went through our current situation and needs" (customer 11, personal communication, June 19, 2019) and customer 9 also said that "they have contacted us and asked about our experiences, and they have asked development ideas or opinions what should be improved" (customer 9, personal communication, April 26, 2019).

The service provider discussed how their customers have given feedback quite frequently regarding the product and the service. They said that the product-related feedback has focused on the design of the product and the operation of the product, for example, irrigation schedules or water tank filling. While the service-related feedback has been mostly about how the maintenance service people should operate in customer facilities. The service provider discussed that they try to listen to their customers closely to figure out if there are any new needs emerging. They continued that this is possible because they are frequently in contact with their customers, and they get a lot of feedback. Service provider 1 gave an example of the feedback by saying that "some architects said that the product isn't neither stylish nor finished enough" (personal communication, January 7, 2019). They added that this led into changing the product's design.

The service provider said that customer insights should be utilized by changing the operating structure and the structure of the offering. They admitted that they could collect and utilize the customer insights more, for example, conducting customer satisfaction surveys. Gaining better knowledge of their customers seemed to very important for the service provider, and they mentioned that one of the most significant customer insights they have learned was a better understanding that "who is the decision maker and at what point, who is the decision maker in different segments, what is faster, what is slower, and at what point should we get into the sales process, so that everything starts to work properly" (service provider 3, personal communication, January 10, 2019).

Competitive success

The competitive success was a theme that the customers did not have much to say, and the service provider only mentioned this theme briefly. Few of the oldest customers had noticed that the service provider has been successful. The service provider discussed on their success and they said that they have had major success in Finland, but it has been a bit challenging in other markets. Service provider 1 described their success by saying that "we have been able to market and exist in Finnish market for a longer time, so our unique offering has been a success factor" (personal communication, January 7, 2019). One other success factor

has been the scaling of the business as service provider 3 said that "there isn't any other company who would have expanded equally extensive, and would have harnessed the entire network or the whole process as we have, in which case, we can offer better quality" (personal communication, January 10, 2019). They continued that "quality and service processes distinguish us from the others".

The service provider also mentioned that they have developed a furniture-like product that differs from the products of their competitors whose products are installed permanently. They added that their furniture-like product has been more easily accepted among furniture resellers, and that has been important because they have been able to make partner contracts with these resellers and expand business this way.

6.6 Summary of the findings

This chapter summarizes the findings chapter. The findings are categorized under the main constructs and the subconstructs, i.e., themes. The following table (table 4) presents the different themes under each main construct. The order of the themes is descending, and the most significant themes according to the findings are on top. The most significant themes are bolded.

The most important themes of customer needs are increased needs and customer value. Increased needs consisted of practical needs that customers have, for example, need for better wellbeing or better indoor air. Customer value expresses how customers expect the service to produce value for their investment. The customers needed enough value for their money, and most of the customers received enough value. Confidence for purchase is also an important theme as many customers experienced that their confidence was increased due to different matters, for example, sufficient information on the service and product, and regular service fee that includes the whole service package instead of high investments.

Service provider needs include one theme over the others as the delivery of customer needs and demands was the most significant theme in this category. This theme describes how the service provider pursues to fulfill different customer needs and demands. Other themes are important as well, but these were discussed mostly by the service provider. Maintain in competition, growth, profitability, and competitive advantage are themes that deal with the objectives of the service provider as they turned out to be very keen to improve in every one of these.

TABLE 4 Constructs according to the findings

CUSTOMER NEEDS	SERVICE PROVIDER NEEDS	TRANSITION	SOLUTIONS	BENEFITS
Increased needs	**Delivery of customer needs and demands**	**Value in-use**	**Product-related solutions**	**Increased value for customer**
Customer value	Maintain in competition	**Service orientation**	**Service-related solutions**	**Customer satisfaction**
Confidence for purchase	Growth	Change in strategy and business model	Operability	Well-functioning relationships
Demands	Profitability	Capabilities, resources, and assets	Product-service systems	Increased value for the service provider
	Competitive advantage	Service co-production	Customization and unique offerings	Customer insights
				Competitive success

In transition, the most significant themes are value in-use and service orientation. Both of these themes are the core mindset of the transition in which a company decides to transition from a manufacturing company to a service company. Value in-use explains how value is produced through services, for example, maintenance service takes care of the product, and the product produces value for the customers when they are near it. Service orientation describes how well the service provider is orientated as a service company. The service provider considered themselves as a service orientated company as did many of the customers, but some of the customers thought that the service provider is a product company because the product is very prominent part of the offering. Other themes were discussed mainly by the service provider. These themes are important as well, but the significance of these themes is clearly lesser when compared to the most important themes. Change in strategy and business model theme describes how these have changed and why. The service provider discussed that their overall strategy have changed to more focused, and sales strategy have changed to more effective form. According to the service provider, the basic idea of the business model has been the same, but many details have changed along the way. The service provider also discussed what kind of capabilities, resources, and assets they have acquired to enable the transition. The most notable were people capabilities and resources for producing different services. Service co-production theme depicts how the service provider have utilized their customers in the service development. Customer collaboration has been more intensive when new solutions or services have been developed.

In Solutions, the most important themes are product-related and service-related solutions. The product-related solutions are solutions that the product can produce, for example, air purification and humidification, and comfortability. The service-related solutions are different services provided to customers, for

example, maintenance service or interior design service. Other solutions are less significant, but these are still essential. Operability describes how much customers are required to do self-service, and many customers experienced that the amount of self-service was minimal. Product-service systems depict the union of the product and services as these were seen as inseparable. This union was described by stating that the product cannot operate without services. Customization and unique offerings illustrates how the service provider can offer different customization services or unique offerings. The products and services are customizable to some extent. The most common customizations related to the functionalities of the product and how service activities were performed. Unique offerings were rare because of the high price.

In benefits, the most important themes are increased value for customer and customer satisfaction. Increased value for customer theme consists different fulfilled customer needs, for example, better wellbeing. Customer satisfaction was expressed by many customers, and it was also important for the service provider. Customer centricity and the delivery of customer needs had the biggest impact on customer satisfaction. Well-functioning relationships and increased value for the service provider themes are also quite important. The former theme is important for both the customers and the service provider because well-functioning relationships are essential in service business, whereas the latter theme consisted of different matters that produce value for the service provider. Customer relationships were described as close and well-functioning. These relationships were the most significant reason for gaining customer insights which were utilized in the development of the product and services. Competitive success was apparent in the old markets as the service provider had tremendous growth in there as well as they had managed to build well-known brand.

7 DISCUSSION

The objective of this study is to understand how the transition from products to cybernized services occurs and what essential factors relate to this transition. To better understand this phenomenon, the main research question is the following: *How can products be transitioned into cybernized services?* In addition, it is important to understand what leads to the transition, what are the reasons for the transition, and what kind of outcomes are enabled or produced through the transition. Therefore, the secondary research questions are the following: *Why are products transitioned into cybernized services? What are the results and outcomes of the transition from products to cybernized services?* The research questions are answered in the next chapter. The second and third sections discuss on the theoretical and practical implications.

7.1 Transition from products to cybernized services

To answer to the research questions and to illustrate the complex transition, the transition from products to cybernized services has been described in the conceptual model (figure 5). This conceptual model is based on the findings of this study. The most relevant findings in regard to the transition have been implemented in the model to provide an understandable and coherent depiction on the transition. The conceptual model has three different sections based on the research questions. These sections include different drivers for the transition, various factors that enable the transition, and solutions and benefits that are enabled through the transition. The conceptual model supports the answers that are presented next.

How can products be transitioned into cybernized services?
The transition from products to cybernized services requires companies to consider many aspects. Because of the transition's complexity, every critical key area must be dealt with. The transition starts from the service provider level in which organizational culture and structure must be aligned to the right direction. Then

the business must be configured through strategy and business model to support the service orientation. For the business to operate according to new strategy and business model, appropriate capabilities, resources, and assets must be acquired. When the organizational setting is changed, a provider can move towards being a service and customer orientated company.

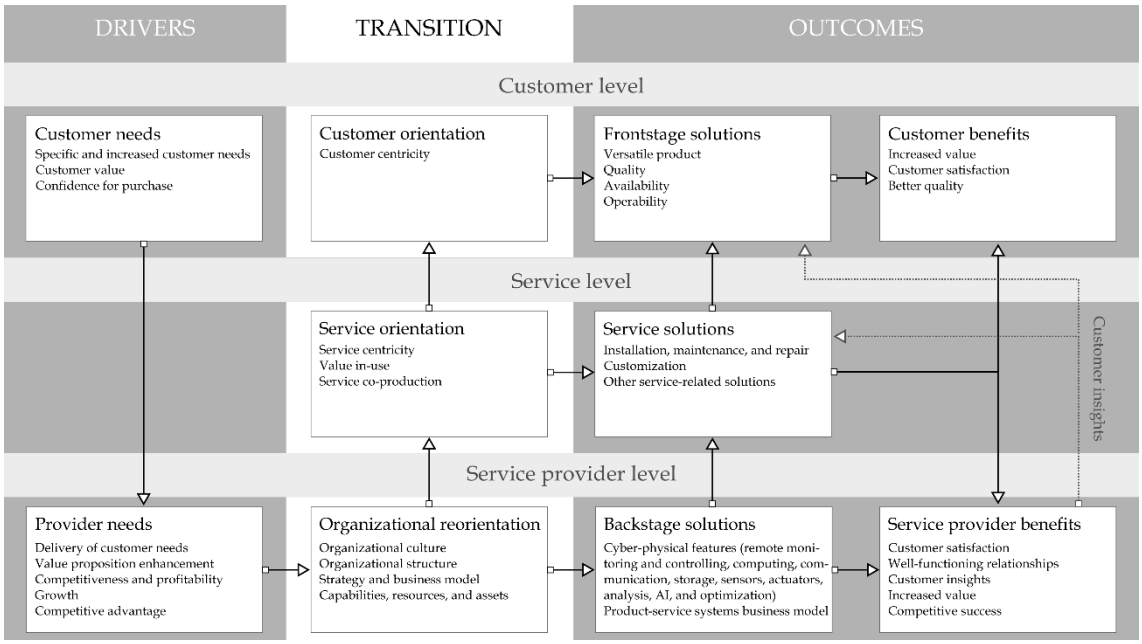

FIGURE 5 Conceptual model

Companies must configure different key aspects to enable the transition. Organizational culture and structure are the foundations for the changing organization. The culture must be appropriate for companies to be able to begin the transition. If the mindset of people is wrong, the transition can be very difficult or even impossible. Organizational culture must support the transition by being positive in regard to service orientation. Organizational structure must be also changed to enable the business to render services. Product-orientated structure enables producing products, but the same structure is not applicable for producing services. Organizational structure requires the correct form and elements to enable the sales and production of services. Strategies and business models must be changed due to the transition. These are particularly important because these two guide how business operates on a daily basis and for a long term. Because the transition do not occur overnight, strategies and business models are probably required to be changed multiple times during the transition. Changed strategies and business models require new capabilities, resources, and assets for companies to be able to offer services. Companies must acquire appropriate capabilities, resources, and assets to enable the production of cybernized services. Skills, knowledge, and advanced technologies are the most important capabilities and resources as these are required for producing the integrated solution of products, services, and cyber-physical systems. When companies have configured their

organization to enable and support service orientation, companies can move to the next level.

On the service level, service centricity increases, value creation changes to value in-use, and services are produced in a collaboration with customers. Service orientation changes companies from product centricity to service centricity. Service centric companies concentrate on the value creation through value in-use because customer value is produced during the consumption, i.e., value co-creation. As customers are involved in the creation and determination of value, they also participate to service production. Service co-production is an important part of the transition as it can be utilized during and after the transition. When companies are developing old and especially new services, customer participation is essential as customers can facilitate many aspects of service production. On the customer level, customer centricity increases due to the service orientation. Customer centricity describes how companies react to different customer problems and needs. Companies must be customer centric in many different ways. Flexibility and eagerness to solve customer problems are key characteristics of customer centricity. When manufacturing companies have shifted from being a provider to a service provider, the transition is complete.

Why are products transitioned into cybernized services?

The drivers for the transition from products to cybernized services are different customer and provider needs which are affected by market developments. These needs have changed and increased partly due to different market changes and advancements leading to a situation where the needs cannot be achieved through traditional products, services, or product-service systems. Therefore, the transition is apparent direction for providers to enable the fulfillment of different and specific needs of customers and themselves.

Customer needs include specific needs that customers desire and require. The specificity can be on a level that cannot be fulfilled with traditional products and services. These specific needs have emerged partly due to customers being more accustomed to the various benefits and individualism that modern technologies have enabled. In other words, markets and demands are changing. Customer value is particularly important as customers want enough value for their money. Also, some customers demand more value in a form of better offerings. These better offerings can include, for example, services or new solutions. Another emerging customer need is the need for increased confidence when purchasing new products or services. Customers can be afraid of making the purchase because markets have vast amount of offerings from multiple companies and offerings have become more complex due to added services and technologies.

Providers have specific needs that are affected by different customer needs. Provider needs can be categorized as internal and external needs. The external needs concentrate on value proposition and the delivery of customer value. Providers must be able to fulfill different customer needs as it is necessary for the ability of companies to compete and operate in markets. Value proposition enhancement and delivery of customer needs are important needs for companies.

As discussed earlier, customer needs can change and increase due to various reasons, therefore it is important that companies are able to react to different changes.

The internal needs of providers focus on how value can be created for the company itself. The internal needs include need for competitiveness and profitability, growth, and competitive advantage. Competitiveness and profitability are important needs for companies because these are the lifeline of companies. These needs are increasingly important when markets are changing to more competed, matured, demanding, and technologically advanced. If companies want to maintain in competition, companies must react to the market developments. Companies also desire for success. Growth and competitive advantage are needs that point to this desire, but also these needs can be key factors in changing markets.

What are the results and outcomes of the transition from products to cybernized services?

The transition from products to cybernized services can enable many different solutions and benefits. The solutions that are the outcomes of the transition can be categorized according to the three different levels: service provider, services, and customer. The first level includes the core solutions that are backstage solutions and mostly invisible to customers. The middle level consists of different service solutions, such as mandatory and additional services. On customer level, frontstage solutions offer different solutions visible to customers.

Backstage solutions include the core building blocks for the cybernized services. Cyber-physical systems enable different functionalities of these services, and product-service systems based business model enables the operation of service-orientated business where integrated solutions of products and services form the offering. Service solutions consist of mandatory services that are vital for the operation of the product and in producing the actual service. The mandatory services are usually installation, maintenance, and repair. Without these services, the operation of the complex cyber-physical features including product would not be possible. In addition, this level includes customization solutions and other services. Customization enables customized products and services that can facilitate the delivery of more specific customer needs. Customization also enables differentiation and uniqueness. Other services can be additional and complementing services that can increase customer value and experience for customers. Frontstage solutions include the actual product, and improved quality, availability, and operability. Products are visible to customers and it can be the only visible element of the service. A product can act as the manifestation of offered service because service might not be visible for customers. Increased quality, availability, and operability can be offered for products and their operation through different services and cyber-physical features.

Various benefits for both customers and the service provider are enabled through different solutions. Customer benefits include increased value, satisfaction and quality. The service provider is benefitting from increased customer satisfaction and value as well, and also on better customer relationships, customer insights, and competitive success. Different benefits are the manifestations of many drivers that lead to the transition as these drivers are mostly related to

benefits pursuit. The most apparent customer benefit is increased value through the fulfillment of customer needs. Various customer needs are delivered through the integrated solution that provides enjoyable customer experience. Other benefits are customer satisfaction and the better quality of products and services. When customer needs are delivered customer receives value and satisfaction. Customer experience also effects on customer satisfaction. In addition, customer value and satisfaction can be increased through better quality.

Many service provider benefits are related to customers. Satisfied customers, well-functioning customer relationships, and customer insights are benefits that are connected with each other, and these benefits lead in increased value for service providers. Service providers can achieve increased value through different solutions as these solutions are improving different aspects that are related to, for example, cost efficiency, profitability, and so forth. Customer satisfaction increases the length of customer relationships and additional sales, well-functioning relationships increase value in-use and customer insights, customer insights can produce value for service providers when customer insights are utilized in development, and all of these benefits as well as earlier mentioned solutions facilitate the competitive success of service providers.

7.2 Theoretical implications

The transition from products to cybernized services is quite similar to the transition from products to services. It is clear that complexity increases dramatically when transition is towards cybernized services. When services or product-service systems are compared to cybernized services, the amount of technologies is much more complicated and advanced in the integration of services and cyber-physical systems. Because complexity increases, it is increasingly important to carefully consider every essential aspect related to the transition. The risk of failure is increased due to the difficulty of the transition. Even the largest companies can fail terribly when they take a technological leap (O'Reilly & Tushman, 2004).

The service that the case company provides is a cybernized service because it includes much more advanced technologies and functionalities than product-service systems. As product-service systems are more of an integration of products and services (Smith et al., 2014), cybernized services are an integration of products, services, and cyber-physical features enabled by advanced technology such as, computation, communication, sensors, actuators, and artificial intelligence (Tuunanen et al., 2019). The findings indicated that the service of the case company is wellbeing and better indoor air. This service is produced through the integrated solution that consists of different essential elements, such as the product, various services, and different advanced technologies. These technologies include the same elements that are included in the earlier description by Tuunanen et al. (2019). This integrated solution can operate autonomously by analyzing cloud and sensor data to optimize different operations and affecting its environment. This is supported by the ideas of Beverungen et al. (2019) as they described

smart products (i.e., cyber-physical systems) as a core property for smart service systems (i.e., cybernized services): "Smart products offer service locally and autonomously, beyond the full control of a central system. Data from single or groups of products is available for analysis in (near) real-time." (p. 10). The different between digitalized product-services systems (i.e., cybernized services) and traditional product-service systems is the high degree of automation and the ability to predict failures and maintenance needs (Lerch & Gotsch, 2015). The findings also indicated that one of the most valuable features of the product are the analysis and prediction capabilities which enable healthier plants and prevents plants from dying. This has implications on many different factors, such as quality and customer satisfaction, but mainly this increases the profitability when less work and resources are required to maintain the product.

Drivers of the transition

Different drivers lead companies to pursuing the transition from products to cybernized services. According to the findings, the service provider had many drivers that led them to the path of the transition. Various customer needs and company needs functioned as important drivers. These needs are supported by different servitization drivers: ability to offer more complete offerings, increased customer needs, and growth and profitability (Penttinen, 2007), differentiation of offering (Kinnunen & Turunen, 2012), gaining competitive advantage (Baines et al., 2009a), and customers demanding for services (Oliva & Kallenberg, 2003).

Customer needs are important drivers as the findings indicated that these needs have increased, for example, the need for better indoor air or the need for natural greenery through carefree real plants as customers are seeking something better than ordinary house plants or items that increases comfortability. This is supported by the idea that customer expectations increase as technologies become more advanced (Broy & Schmidt, 2014) and the notion that customers desire more holistic solutions (Wiesner et al., 2017). The study showed that the confidence for purchase is decreased especially due to the relatively high costs and because the product was not familiar. Additionally, technical complexity of the product had significant impacts on the confidence. These are supported by Kinnunen and Turunen (2012) who point out that services increase the confidence for purchase when products are expensive and complex. The findings indicated that there are other important factors besides services that increase confidence for purchase. Customers require sufficient and understandable information what they are about to purchase. This might not be enough as some customers require assurances related to the operation of the product, for example, if the product do not purify indoor air as promised, customer has the option cancel the deal. Also, customers require services to guarantee the operability and service contract instead of purchasing expensive products.

Provider needs are increasingly important as the study illustrated how the service provider needs to deliver different customer needs. The service provider is very interested on producing value for their customers in a form of customer needs delivery. The importance to address different customer needs is supported by literature as Gebauer (2008) suggest that customer needs delivery is more

significant driver for the servitization than the competitiveness in markets. The service provider also continuously develops reactively and proactively their value proposition to offer better products and services for their old and new customers. This is supported by Berman (2012) who states that value proposition reconfiguration is a key activity for maintaining competitiveness in changing markets. The study indicated that the service provider is pursuing substantial growth for their business. Surprisingly, literature do not consider growth as one of the most influential drivers, even though growth as a driver is recognized (Penttinen, 2007). One of the factors that supports the growth of the service provider is competitive advantage. The service provider revealed that competitive advantage through differentiation is one of the foundational thoughts that they have had since the early days of the company. This is supported by Gebauer (2008) who points out that companies are differentiating their offerings to achieve competitive advantage and Baines et al. (2009a) who states that the pursuit for competitive advantage is one of the most significant drivers for servitization because services offer sustainable competitive advantage. Competitiveness and profitability are critical needs for the service provider to succeed in the old and new markets as they are continuously developing different aspects of their business. Profitability as a driver is supported by the idea that companies are seeking profitability through services because their product sales are decreasing (Eloranta et al., 2016).

The transition

The findings indicated that the service provider embraces the service orientated culture, they use applicable structure to enable efficient provision of services, they have configured their strategy and business model to support service-orientated business, they have acquired appropriate capabilities, resources, and assets, and they have adopted service and customer orientations.

The service provider can be considered to have extremely service orientated culture and appropriate structure as they have built their business as a service. This is supported by the notion from Kinnunen and Turunen (2012) who consider organizational culture and structure as foundational first steps for servitization. The findings indicated that the service provider has changed many aspects of their business plan, for example, new sales channels, new partners and service networks, and new customer segments. Strategy has been changed as well, for example, the service provider has focused on offering the versatility of their service instead of offering something specific, and also their sales strategy has developed along the transition. The changes that the service provider were required to make were critical in regard to the transition. Changed business models and strategies are supported by literature as servitization requires business models to shift from product orientation to service orientation (Kowalkowski et al., 2017) and services require reconfigured strategies (Cusumano et al., 2015).

The findings showed that the transition process includes acquiring new capabilities, resources, and assets. The service provider emphasizes the right people capabilities, such as learning, adapting, and social. Without these capabilities, services would be difficult to produce. Also, the service provider needs specific

capabilities to enable the development of their integrated solution. New and appropriate capabilities for services and integrated solutions are supported by Huikkola et al. (2016) who state that acquiring service-related capabilities are essential and Salonen (2011) who describes that new capabilities are necessary for offering integrated solutions. Specific resources are vital for the service provider for them to be able to render services and producing their complex product. According to this study, technology and people are the most important resources for the service provider in regard to producing cybernized services. The advanced technologies enable all the complex features that the service offering includes, and technologies are also vital for the operation of the product, i.e., technologies are vital for producing value. The importance of technologies are supported in literature, but technological importance is mostly related to services. Additionally, Beverungen et al. (2019) strongly support the role of technologies in advanced services as they state that cyber-physical systems are essential for service development, customization, delivery, and use. The service provider expressed that people are essential for producing the service as the operation of the product is guaranteed through different services in which people are the only option to produce those services. This is supported by Zhang and Banerji (2017) who suggest that capable and specialized people are particularly important for service growth and customer satisfaction, and Smith et al. (2014) who state that services require appropriate resources and competencies. The findings showed that the service provider requires appropriate assets for producing services, for example, vehicles and tools are needed for service activities. Literature do not support this as strong as capabilities and resources because literature mainly focuses on new capabilities and resources, but new assets are also mentioned as Huikkola et al. (2016) describes that service-orientated assets are quite different than product-orientated assets, and Penttinen (2007) state that new assets are needed when companies servitize their offering.

The findings indicated that service orientation is particularly important for the transition. The service provider has embraced service centricity and their value proposition is formed through service offering. The service provider states that they offer services of wellbeing, decoration, and better indoor air through their integrated solution of product and services. They regard products and services as mediums for their services that are marketed for customers. Their supporting services, such as maintenance service, are essential part of their value proposition. The significance of service centricity is supported by the thought that service strategy is the foundation for successful service business (Kinnunen & Turunen, 2012). Service strategy is the service centricity emphasizing guideline for service-orientated companies. The findings demonstrated the importance of value in-use as the service provider concentrates on creating value in-use through their service that produces value for customers through a well-functioning, autonomously working, and versatile quality product that can operate without any self-service. These are supported by servitization literature as value is created through value in-use of integrated solutions (Baines et al., 2009b; Zhang & Banerji, 2017). The findings indicated that the service provider utilizes

customers in service co-production only at some extent when developing new and existing offerings. It was obvious that service co-production was not used systematically. This finding somewhat contradicts the literature as Watanabe and Mochimaru (2017) states service co-production as fundamental process. Perhaps the reason for this lies in the difficulty of service co-production as it can be a key challenge for companies (Watanabe & Mochimaru, 2017).

The findings illustrated on many occasions that the service provider is extremely customer centric, for example, they seem to thrive to fulfill every possible customer need. This viewpoint is shared between the customers and the service provider. This is also supported as Salonen (2011) describes that customer centricity enables companies to better focus on different customer needs, and Kinnunen and Turunen (2012) discuss that customer centricity includes different qualities, such as problem-solving, eagerness, innovativeness, and flexibility.

Solutions as outcomes

Cybernized services can offer many different solutions through the integration of products, services, and cyber-physical systems. The findings indicate that the service provider offers cybernized service for their customers as they provide this service utilizing a versatile product that includes cyber-physical features and supporting services. Customers experience this product as versatile because it includes different functionalities and it is customizable to better fulfill various customer needs. The product can offer quality in a form of the condition of the product, for example, real plants are always in good condition. Availability is offered to customers as products are remote monitored and controlled to guarantee the best possible availability, for example, in case of a problem, the service provider can quickly react and solve the problem. Operability is also important solution for customers as this guarantees that products can operate without any self-service from customers. All of these except quality are supported as solutions are intended for delivering customer needs and solving their problems (Penttinen & Palmer, 2007), individual customer needs are fulfilled through customizable solutions (Salonen, 2011; Bask et al., 2014), innovative product-service systems can enable availability guarantee (Lerch & Gotsch, 2015), and operability can be offered through services (Penttinen & Palmer, 2007) and cyber-physical features (Beverungen et al., 2019). Quality is the only solution that is not supported by literature as quality related matters were not found, even though quality is a significant part of the service provider's offering.

The findings indicated that the service provider uses cyber-physical features in their product and this product is a part of the integrated solution that they offer for their customers in a form of service. These cyber-physical features include sensors and actuators that enable the operation of the product that can sense its surroundings and impact to its environment, for example, sensors can indicate dry air and the product can humidify the air. Product is also connected to weather service data to enable proactive humidification to prevent sudden decrease of air humidity, for example, when outside temperatures lowers to very cold. Additionally, the product is aware of itself as it monitors different aspects of its condition. The product has computational and communication capabilities,

and it is connected to the service provider's cloud services. This enables the use of artificial intelligence features to optimize the operation of products utilizing use-data collected from multiple products. The integration of cyber-physical features, products, services is supported by Herterich et al. (2015), Lerch and Gotsch (2015), and Chowdhury (2018) as they discuss that cyber-physical features can be integrated with product-service systems. Different cyber-physical features discussed here are all supported by Broy and Schmidt (2014) who mentions the same features. In addition, the weather service data example is supported by Conti et al. (2012) who discuss that the utilization of third party services, such as weather services, through the internet connection expands the sensing capabilities of products.

The findings showed that install, maintenance, and repair services are required for the operation of the product making these services essential. The maintenance service is the most important service from these three. These services are supported by literature as Wiesner et al. (2017) describes that service providers install, operate, and maintain product-service systems and Penttinen (2007) depicts that services ensure maintenance, repair, and operability of products. Additionally, findings indicated that customization can be offered to products and services as well. Services can be customized according to customer wishes. Products are customizable in regard to the appearance and measurements, and also how the products function, i.e., the operation of the product can be tweaked to perform differently. Customization is supported as more advanced and complex services can enable customized and unique solutions (Lerch & Gotsch, 2015).

Benefits as outcomes

Customers and companies can benefit greatly from cybernized services. Most of the benefits discussed by literature concentrates on service provider benefits. The findings indicated that customers experience their needs as delivered, customers are satisfied, and the service provider can offer better quality for their customers when compared to their competitors. According to this study, customer needs fulfillment and enjoyable product increases the customer value the most. The literature do not support these, but these benefits were significant for customers. Customer satisfaction is increased through many factors. The study showed that improved health that many customers achieve through the value in-use and service experience can tremendously increase value and customer satisfaction, for example, one customer described that serious symptoms from bad indoor air were reduced dramatically. These are supported by literature as services increase customer satisfaction through value in-use (Salonen, 2011) and quality service interactions with customers increase satisfaction (Zhang & Banerji, 2017). The findings indicate that better quality is received through the well-functioning and healthy product. The plants of the product are kept in good condition through different technologies and services, and that enables better quality compared to, for example, house plants or traditional green walls. Better quality was not supported by literature, but it was an important benefit for customers.

The service provider benefits included well-functioning customer relationships, customer insights, increased value, and competitive success. The findings showed that customer relationships are close as the service provider and customers are regularly in contact with each other. Customer satisfaction and relationships has enabled long-term customer relationships, for example, many customers have been in customer relationship for the majority of the service provider's existence. This is supported by literature as Kinnunen and Turunen (2012) discuss that services facilitate maintaining customer relationships. The study indicated that customer insights have impacted on the service and product, for example, the service provider dramatically changed the design of the product according to gained customer insights. The usefulness of customer insights is supported in literature. Companies can utilize customer insights in service and solution development (Huikkola et al., 2016). Besides the earlier mentioned benefits that increase value for the service provider, also other significant value increasing factors exist. The findings indicate that the service provider receives increased value from publicity, well-known brand, and profitability through increasing and steady stream of service revenues. The profitability is only one of these that is supported by literature. Increased profitability is an important benefit gained through services (Kinnunen & Turunen, 2012). The findings showed that the service provider have achieved competitive success through the unique solution that they offer and scaling up capabilities. This unique solution is the cybernized service that they offer and they have been successfully scaling their business to new markets. The service provider do not have any direct competitors due to the competitive advantage achieved through the unique solution. Growth is supported by literature as Oliva and Kallenberg (2003) suggest that growth enabled by servitization is one of the success factors for manufacturing companies. Competitive success through unique solution is supported by literature as uniqueness enables competitive advantage and sustained competitive advantage is a key factor for exceptional financial results (Zhang & Banerji, 2017).

7.3 Practical implications

Some practical implications can be drawn from the findings of this study. Companies can possibly utilize these implications when they are evaluating their own position and suitability in regard to cybernized services. When companies are considering different business development options, companies should make an assessment if service orientation would be applicable for them. Also, if companies are examining the shift towards services or advanced services, they can possibly evaluate their capabilities for the transition. The transition process includes different essential activities, and companies can possibly use this knowledge to make initial assessments or plans how they should position themselves if they decide to continue in the path leading to the transition. In addition, companies can appraise if cybernized services offer added value for them when comparing

cybernized services to traditional product-service systems. This kind of evaluation can brighten thoughts and facilitate decision making process.

One apparent factor that produces added value is competitive success through sustained competitive advantage. Cybernized services have great potential for producing sustained competitive advantage through various technologically advanced integrated solutions. The practical implications could be the most beneficial for manufacturing companies who are considering if shift towards advanced services would be feasible for them. Also, similar companies to the case company can probably increasingly benefit from the practical implications because of the possible similarities, such as the starting point and objectives of companies.

8 CONCLUSION

The objective of this study was to find answers to how the product to cybernized service transition occurs, what are the reasons for companies to pursuit this transition, and kind of results this transition enables. Extant literature on cybernized services is scarce as this research topic is relatively new. Recently, researchers have acknowledged the importance for cybernized services in relation to tremendous potential and future possibilities. This study included one main research question and two supporting research questions: how products can be transitioned into cybernized services, why products are transitioned into cybernized services, and what are the results and outcomes of the transition from products to cybernized services.

To approach the cybernized services topic, the existing literature of servitization, product-service systems, and cyber-physical systems were reviewed as cybernized services consist of the integration of products, services, and cyber-physical systems. The literature formed the base for the empirical study. Qualitative case study was selected as a research method to seek answers for the research questions of how and why. Semi-structured qualitative interviews were organized to collect rich and in-depth information on the transition and different factors related to it. The key personnel of the case company and their customers were interviewed to obtain different viewpoints. Thematic analysis was conducted to find meaningful knowledge from the rich interview data. The research questions were answered utilizing the results of the analysis.

This study identified different drivers of the transition, different activities of the transition, and different outcomes of the transition. As a result, this study increases understanding on the transition to cybernized services through the representation of one case company. Most of the identified factors were supported by literature. This study provides an overview on the transition and connects the existing literature about servitization to cybernized services. One of the possible practical implications could be that companies can weigh the benefits of the transition to assess if cybernized services are an opportunity or a threat. As cybernized services offer great opportunities for companies, it can also act as a threat if competitors decide to shift towards cybernized services. Despite that this study produced meaningful results and contributions to literature, the generalizability

suffered because this study was a single case study. The lack of generalization can be forgiven due to the novelty of this research topic and the increasing importance of cybernized services in the near future. Future research should consider generalizing different aspects of cybernized services or at least some of the most significant ones.

This study attempted to increase the understanding towards cybernized services and how companies can move towards these advanced services. It is particularly important to increase knowledge of this research topic because cybernized services will be most likely increased dramatically in the future. The case study provided new insights and supported some of the ideas that appeared in the literature. This research contributes to the emerging literature of cybernized services by describing the transition in more detail and providing valuable customer viewpoints to different aspects of cybernized services.

8.1 Limitations

This research included some limitations related to the conceptual framework, case study method, the novelty of the research topic, the case company, and the scope of the study. The most significant limitations regard to the conceptual framework and single case study. Because only one case company was studied, this limits many aspects, such as how well are the findings generalizable. When only one case company is inspected, the findings represents the studied company and it is unsure how the findings relate to other similar or different companies. The conceptual framework was the guideline for this study and it was drawn from the existing literature. The question is that was all the essential elements found from the literature and included in the conceptual framework. If not, some critical aspects might not have been dealt in this study because these aspects might not emerge from the data by itself. Additionally, was the data collected through interviews that included sufficiently appropriate interview questions covering all the essential themes.

Other limitations were not as significant as the previously mentioned. These limitations are acknowledged, but it is unsure how much these limitations have affected on the study. As the research topic is new and emerging, novel literature is published increasingly and it is possible that some essential studies are not included at the start of the empirical phase when interviews were planned. Therefore, interviews might lack some important aspects that should have been addressed in the data collection phase. The research problem was set as slightly too extensive, which caused the increased complexity of the study. The scope of the study was quite wide as the study addressed a large and complicated transition process. The increased complexity and scope limited the depth of the study. The transition process of the case company did not start from the studied setting where manufacturing company decides to transition their product into cybernized service. The case company started doing business as a service provider when their company was started and they did not have any own products that

they could have transitioned into a cybernized service. Instead, they decided to transition a conventional product that was common in markets, i.e., a houseplant. This limitation might have some effects on the drivers for transition and the actual transition process, but solutions and benefits are likely unaffected. Despite of all the limitations, this study functions at least as an introductory study to the new research topic cybernized services, which can lead to different future research topics.

8.2 Future research

Because the topic cybernized services are such a novel research topic, many future research topics are possible. As mentioned in the limitations chapter, the scope of the study was wide, and different specific aspects and areas could be studied in more detail. Future research could concentrate on some of the most important aspects of cybernized services to provide in-depth knowledge, for example, the drivers of the transition are quite similar to the drivers of the servitization, but the benefits might not be. Another important topic could be the future study on multiple case study that aims to generalize different aspects of the transition. Future studies could investigate the transition through companies representing different industries to reveal the similarities of the transition between industries. This would also increase the generalization.

Another topic worth the consideration could be a study that compares the different approaches to cybernized services, for example, does the transition approach through product-service system differ from the cyber-physical system approach, i.e., are the transitions similar when cyber-physical features are added to product-service systems in comparison to when product-service system features are added to cyber-physical systems. These approaches were introduced briefly in the chapter towards cybernized services.

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APPENDIX 1 CUSTOMER QUESTIONS

These interview questions are the English equivalents to the Finnish questions that were asked during the customer interviews. The order of these questions is the same as in the interview script.

How would you describe Naava's offering and how the offering has changed over the years?
What matters have impacted on Naava's offering?

What kind of needs have led into acquiring Naava and how long these needs have existed?
What Naava should change to better fulfill customer needs?

What kind of needs do Naava's customers have, and does everyone has similar needs or are there different needs, or some special needs?
How Naava reacts to different customer needs when these needs occur, for example, new needs or special needs?

What kind of demands your company had regarding Naava service when the purchase of this service was considered?
How has Naava met these demands?

How would you describe your confidence for purchase when you were considering Naava service?
What kind of matters contributed or increased your confidence for purchase?

What kind of customization is possible if customers desire something else?
What are the key factors for enabling customization?

How can Naava offer something unique to a customer if the customer requires it?
What elements of the product, service, or the company guarantee uniqueness?

What measures or elements Naava uses to fulfill customer needs, for example, new emerging needs?
What are Naava's key elements for customer satisfaction and have these elements changed over the years?

What kind of value does Naava produce to you and your organization?
How much value do you experience receiving in relation to paid service fee?

What kind of benefits have you noticed or experienced, and what kind of benefits the Naava service has produced for you?
What matters have enabled these and why, and have these benefits changed over the years?

How has Naava involved customers in the development of the Naava service and has it changed over the years?
How have customers impacted on the service development?

How would you describe the relationships between Naava and customers?
How have relationships changed over the years and why?

What the customer needs to at least take care of for the product to operate properly?
What can the customer do by themselves if there is a problem with the product?

APPENDIX 2 SERVICE PROVIDER QUESTIONS

These interview questions are the English equivalents to the Finnish questions that were asked during the service provider interviews. The order of these questions is the same as in the interview script.

How would you describe Naava's offering and how the offering has changed over the years?
What matters have impacted on Naava's offering?

How would you describe the service offered by Naava and what it consists of?
How would you describe the relation of Naava's services and products, and how has the relation changed over the years?

How would you describe Naava's growth vision?
What kind of benefits growth enables for Naava?

How would you describe Naava's success in the market?
What are the key elements of Naava's success?

What kind of competition does Naava have?
How would you describe the competition now and over the years?

What kind of matters or changes have provided an edge over competitors?
What makes Naava better than its competitors?

How do offered services impact Naava's profitability and why?
How have the offered services impacted Naava's profitability over the past years?

What kind of demands customers have regarding Naava service when considering the purchase of this service?
How has Naava met these demands?

What kind of customization is possible if customers desire something else?
What are the key factors for enabling customization?

How can Naava offer something unique to a customer if the customer requires it?
What elements guarantee uniqueness?

What kind of needs do Naava's customers have?
How Naava reacts to different customer needs?

How does Naava fulfill customer needs?
What are Naava's key elements for customer satisfaction and have these elements changed over the years?

How would you describe the relationships between Naava and customers?
How have relationships changed over the years and why?

What kind of benefits Naava service provides to customers?
How has Naava's customers effected on Naava service?

What kind of increased values or benefits as a company have you noticed or experienced, for example, when you have worked with customers?
What matters have enabled these and why, and have these values or benefits changed over the years?

How has Naava involved customers in the development of the Naava service and has it changed over the years?
How have customers impacted on the service development?

How has Naava utilized customer insights and why?
What kind of matters have enabled more profound customer view?

What the customer needs to at least take care of for the product to operate properly?
What can the customer do if there is a problem with the product?

What kind of resources, assets and capabilities are essential for providing Naava service?
How have these resources, assets and capabilities changed over the years and why?

How would you describe the role of technology in Naava service and how this role has changed over the years?
How has technology impacted on Naava's offering?

How have Naava's strategy and business model changed over time and why?
How have the increase of services impacted on strategy and business model?

APPENDIX 3 CUSTOMER QUESTIONS IN FINNISH

The following questions are the questions that were asked in the customer interviews. The questions are in pairs, so the first question is the main question and the second one is the follow-up question. The questions are in the script order.

Miten kuvailisit Naavan tarjoomaa ja miten tarjooma on muuttunut vuosien varrella?
Mitkä asiat ovat vaikuttaneet Naavan tarjoomaan?

Millaiset tarpeet johtivat Naavan hankintaan ja kuinka pitkään teillä on ollut näitä tarpeita?
Mitä Naavan tulisi muuttaa, jotta se voisi paremmin täyttää asiakastarpeet?

Millaisia tarpeita Naavan asiakkailla on ja onko kaikilla samankaltaiset, onko erilaisia tarpeita tai erikoistarpeita?
Miten Naava reagoi erilaisiin asiakastarpeisiin niiden ilmetessä, esimerkiksi uusiin tarpeisiin tai erikoistarpeisiin?

Millaisia vaatimuksia teillä oli hankintavaiheessa liittyen Naavan palveluun?
Miten Naava on pystynyt vastaamaan vaatimuksiin?

Miten kuvailisit ostopäätökseen liittyvää varmuutta harkitessanne Naavan hankintaa?
Millaiset asiat myötävaikuttivat tai lisäsivät varmuutta Naavan hankintaan?

Millainen kustomisointi on mahdollista jos asiakas haluaa jotain muuta?
Mitkä ovat avaintekijöitä kustomisoinnin mahdollistamiseksi?

Miten Naava voi tarjota asiakkaille jotain ainutlaatuista, eli uniikkia, jos asiakas vaatii sellaista?
Mitkä palvelun, tuotteen tai yrityksen elementit takaavat ainutlaatuisuuden?

Millä keinoin tai elementein Naava täyttää asiakkaidensa tarpeet, esimerkiksi täysin uudet tarpeet?
Mitkä ovat Naavan avaintekijöitä asiakastyytyväisyyteen ja ovatko nämä tekijät muuttuneet vuosien varrella?

Millaista arvoa koet Naavan tuottavan sinulle ja organisaatiolle?
Kuinka paljon koette saavanne Naavasta arvoa suhteessa sen palvelumaksuun?

Millaista hyötyä olet havainnut tai kokenut, ja millaista hyötyä Naavan palvelu on tuottanut sinulle?
Mitkä asiat ovat mahdollistaneet nämä ja miksi, ja ovatko hyödyt muuttuneet vuosien varrella?

Miten Naava on osallistanut asiakkaita Naavan palvelun kehittämiseen ja onko tämä muuttunut vuosien varrella?
Miten asiakkaat ovat vaikuttaneet palvelun kehitykseen?

Miten kuvailisit Naavan ja asiakkaiden välisiä suhteita?
Miten nämä suhteet ovat muuttuneet vuosien varrella ja miksi?

Mitä asiakkaan täytyy vähintään huolehtia, jotta Naavan laite toimii oikein?
Mitä asiakas pystyy tekemään itse, jos Naavan laitteessa on jokin ongelma?

APPENDIX 4 SERVICE PROVIDER QUESTIONS IN FINNISH

The following questions are the questions that were asked in the service provider interviews. The questions are in pairs, so the first question is the main question and the second one is the follow-up question. The questions are in the script order.

Miten kuvailisit Naavan tarjoomaa ja miten tarjooma on muuttunut vuosien varrella?
Mitkä asiat ovat vaikuttaneet Naavan tarjoomaan?

Miten kuvailisit Naavan tarjoamaa palvelua ja mistä se koostuu?
Miten kuvailisit Naavan palveluiden ja tuotteen suhdetta, ja miten suhde on muuttunut vuosien varrella?

Miten kuvailisit Naavan kasvuvisiota?
Millaisia hyötyjä kasvu mahdollistaa Naavalle?

Miten kuvailisit Naavan menestystä markkinoilla?
Mitkä ovat avaintekijöitä Naavan menestykseen?

Millaisia kilpailijoita Naavalla on?
Miten kuvailisit kilpailua nykyään ja menneinä vuosina?

Millaiset asiat tai muutokset ovat antaneet etua kilpailijoihin nähden?
Mikä tekee Naavasta paremman verrattuna kilpailijoihin?

Miten tarjotut palvelut vaikuttavat Naavan kannattavuuteen ja miksi?
Miten tarjotut palvelut ovat vaikuttaneet Naavan kannattavuuteen aikaisempina vuosina?

Millaisia vaatimuksia asiakkailla on hankintavaiheessa liittyen Naavan palveluun?
Miten Naava on pystynyt vastaamaan vaatimuksiin?

Millainen kustomisointi on mahdollista jos asiakas haluaa jotain muuta?
Mitkä ovat avaintekijöitä kustomisoinnin mahdollistamiseksi?

Miten Naava voi tarjota asiakkaille jotain ainutlaatuista, eli uniikkia, jos asiakas vaatii sellaista?
Mitkä elementit takaavat ainutlaatuisuuden?

Millaisia tarpeita Naavan asiakkailla on?
Miten Naava reagoi erilaisiin asiakastarpeisiin?

Miten Naava täyttää asiakkaidensa tarpeet?
Mitkä ovat Naavan avaintekijöitä asiakastyytyväisyyteen ja ovatko nämä tekijät muuttuneet vuosien varrella?

Miten kuvailisit Naavan ja asiakkaiden välisiä suhteita?
Miten nämä suhteet ovat muuttuneet vuosien varrella ja miksi?

Millaisia hyötyjä Naavan palvelu tarjoaa asiakkaille?
Miten asiakkaat ovat vaikuttaneet Naavan palveluun?

Millaista arvoa tai hyötyä olette yrityksenä havainnut tai kokenut, esimerkiksi kun olette toimineet asiakkaiden kanssa?
Mitkä asiat ovat mahdollistaneet nämä ja miksi, ja ovatko arvot tai hyödyt muuttuneet vuosien varrella?

Miten Naava on osallistanut asiakkaita Naavan palvelun kehittämiseen ja onko tämä muuttunut vuosien varrella?
Miten asiakkaat ovat vaikuttaneet palvelun kehitykseen?

Miten Naava on hyödyntänyt asiakkaisiin liittyviä oivalluksia ja miksi?
Millaiset asiat ovat mahdollistaneet syvällisemmän asiakasnäkemyksen?

Mitä asiakkaan täytyy vähintään huolehtia, jotta Naavan laite toimii oikein?
Mitä asiakas pystyy tekemään itse, jos Naavan laitteessa on jokin ongelma?

Millaiset resurssit, omaisuus ja kyvykkyydet ovat keskeisiä Naavan palvelun tarjoamisessa?
Miten resurssit, omaisuus ja kyvykkyydet ovat muuttuneet vuosien varrella ja miksi?

Miten kuvailisit teknologian roolia Naavan palvelussa ja miten teknologian rooli on muuttunut vuosien varrella?
Miten teknologia on vaikuttanut Naavan tarjoomaan?

Miten Naavan strategia ja liiketoimintamalli ovat muuttuneet vuosien varrella ja miksi?
Miten palveluiden lisääntyminen on vaikuttanut strategiaan ja liiketoimintamalliin?

APPENDIX 5 DESIGN TABLE FOR QUESTIONS

This design table was used to form the interview questions. The following table consists of interview questions, indication to whom these questions are intended, explanation for each question pair, and the category to which each question pair are intended. The objective explains to what each question pair tries to find answers. The category items are the themes from the framework produced through literature.

	Question is for customer, the service provider, or Both	Objective for each question pair	Main question	Follow-up question
Customer needs				
Increased needs	Customer	Are any needs that Naava has addressed and how those needs have developed	What kind of needs have led into acquiring Naava and how long these needs have existed?	What Naava should change to better fulfill customer needs?
Demands	Both	What kind of demands customers have when they consider a service like Naava	What kind of demands customers have regarding Naava service when considering the purchase of this service?	How has Naava met these demands?
Customer value	Customer	What is the relation between the experienced value and the paid service fee	What kind of value does Naava produce to you and your organization?	How much value do you experience receiving in relation to paid service fee?
Confidence for purchase	Customer	Did service elements increase confidence for purchase	How would you describe your confidence for purchase when you were considering Naava service?	What kind of matters contributed or increased your confidence for purchase?
Organizational needs				
Deliver customer needs	Both	What is the level of customer needs delivery	What kind of needs do Naava's customers have?	How Naava reacts to different customer needs?
Profitability	The service provider	How services increase profitability	How do offered services impact Naava's profitability and why?	How have the offered services impacted Naava's profitability over the past years?
Maintain in competition	The service provider	What is Naava's situation and position in the competition	What kind of competition does Naava have?	How would you describe the competition now and over the years?
Competitive advantage	The service provider	Is Naava in a need for competitive advantage	What kind of matters or changes have provided an edge over competitors?	What makes Naava better than its competitors?
Growth	The service provider	Why is Naava growing, and what are the reasons for growth	How would you describe Naava's growth vision?	What kind of benefits growth enables for Naava?
Transition				
Service orientation	Both	What is the level of service orientation and has it changed	How would you describe Naava's offering and how the offering has changed over the years?	What matters have impacted on Naava's offering?
Change in strategy and business model	The service provider	How has the service orientation changed the strategy and business model	How have Naava's strategy and business model changed over time and why?	How have the increase of services impacted on strategy and business model?
Service co-production	Both	How Naava utilizes co-production and has it evolved	How has Naava involved customers in the development of the Naava service and has it changed over the years?	How have customers impacted on the service development?
Value in-use	The service provider	Is the value created through the product or the service, and have customers impacted this	What kind of benefits Naava service provides to customers?	How has Naava's customers effected on Naava service?
New resources, assets and capabilities	The service provider	How the service orientation have affected on the resources, assets and capabilities	What kind of resources, assets and capabilities are essential for providing Naava service?	How have these resources, assets and capabilities changed over the years and why?
		How technology has impacted on Naava's service	How would you describe the role of technology in Naava service and how this role has changed over the years?	How has technology impacted on Naava's offering?
Solutions				
Customization	Both	Is customization part of the value proposition	What kind of customization is possible if customers desire something else?	What are the key factors for enabling customization?
Product-service systems	The service provider	Does Naava consider their offering as a product-service system	How would you describe the service offered by Naava and what it consists of?	How would you describe the relation of Naava's services and products, and how has the relation changed over the years?
Unique offerings	Both	Can Naava provide unique offering for customers that no one else can	How can Naava offer something unique to a customer if the customer requires it?	What elements guarantee uniqueness?
Operability	Both	Is Naava's service a full-service or is there some sort of self-service needed	What the customer needs to at least take care of for the product to operate properly?	What can the customer do if there is a problem with the product?
Benefits				
Customer satisfaction	Both	How different solutions and service orientation have affected on customer satisfaction	How does Naava fulfill customer needs?	What are Naava's key elements for customer satisfaction and have these elements changed over the years?
Increased value	Both	Are there values that have increased due to the service orientation enabled solutions	What kind of increased values or benefits as a company have you noticed or experienced, for example, when you have worked with customers?	What matters have enabled these and why, and have these values or benefits changed over the years?
Customer insights	The service provider	Has service enabled customer insights and are those insights used for development	How has Naava utilized customer insights and why?	What kind of matters have enabled more profound customer view?
Competitive success	The service provider	Have services and solutions enabled success in the competition	How would you describe Naava's success in the market?	What are the key elements of Naava's success?
Strong relationships	Both	What kind of relationships exist between customers and Naava, and is it better due to the service orientation	How would you describe the relationships between Naava and customers?	How have relationships changed over the years and why?

APPENDIX 6 INTERVIEWS

Customer 1, in-person interview March 15, 2019, Jyväskylä, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Customer 2, phone interview March 20, 2019, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Customer 3, in-person interview March 21, 2019, Jyväskylä, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Customer 4, phone interview March 29, 2019, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Customer 5, phone interview April 4, 2019, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Customer 6, phone interview April 5, 2019, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Customer 7, phone interview April 9, 2019, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Customer 8, phone interview April 11, 2019, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Customer 9, phone interview April 26, 2019, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Customer 10, phone interview June 18, 2019, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Customer 11, phone interview June 19, 2019, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Service provider 1, member of staff, Naava. Video interview January 7, 2019, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Service provider 2, member of staff, Naava. In-person interview January 10, 2019, Jyväskylä, interviewed by Esko Jussinoja. Transcript and recording held by the author.

Service provider 3, member of staff, Naava. In-person interview January 10, 2019, Jyväskylä, interviewed by Esko Jussinoja. Transcript and recording held by the author.