



LOUVAIN
School of Management

**UNIVERSITÉ CATHOLIQUE DE LOUVAIN
LOUVAIN SCHOOL OF MANAGEMENT**

EXPLORING THE CONCEPT OF SERVITIZATION

Supervisors:

Professor Benoît Gailly

Professor Christophe Lejeune

Research Master Thesis submitted by

Sébastien Gombault

With a view of getting the degree

Master in Business Engineering

ACADEMIC YEAR 2015-2016

Foreword

I would like to thank Professor Gailly and Professor Lejeune for their insights and advice on the content and the form of the thesis.

Furthermore I would like to thank Benoît Gilson (Hilti), Vincent Dierxcsens (Hilti), Benoît Van Bunnan (Microsoft), Frédéric Van Mallegheem (Cambio) and Damien Dalmagne (Innergie) for taking the time to share knowledge on servitization taking place in their companies.

At last I would like to thank my family and friends for their support.

Contents

| | | |
|----------|--|-----------|
| 1 | Introduction | 1 |
| 1.1 | Motivations | 1 |
| 1.2 | Context | 2 |
| 1.3 | Methodology | 2 |
| I | Literature review | 5 |
| 2 | More than products | 6 |
| 2.1 | What is servitization? | 6 |
| 2.1.1 | Examples | 7 |
| 2.2 | Closely related concepts | 8 |
| 2.2.1 | Services | 8 |
| 2.2.2 | Value proposition | 13 |
| 2.2.3 | Solutions | 14 |
| 3 | Triggers for a servitization process in companies | 15 |
| 3.1 | External drivers | 15 |
| 3.1.1 | Commoditization | 15 |
| 3.1.2 | Customers demand | 16 |
| 3.1.3 | Technology capabilities | 16 |
| 3.1.4 | Environmental | 17 |
| 3.2 | Internal drivers | 17 |
| 3.2.1 | New growth opportunities | 17 |
| 3.2.2 | Increased margins and stability of revenue | 18 |
| 3.2.3 | Knowledge of the customer and settlement in the market | 18 |

| | | |
|-----------|--|-----------|
| 3.2.4 | Servitization can create a competitive advantage | 18 |
| 4 | Servitization, the model behind the word | 21 |
| 4.1 | Products combined with services to create value | 21 |
| 4.2 | Different forms | 22 |
| 4.2.1 | Offering | 23 |
| 4.2.2 | Relationship between products and services | 24 |
| 4.3 | Different stages of servitization | 25 |
| 4.4 | Non-ownership | 27 |
| 4.5 | A change in boundaries of the company | 29 |
| 4.6 | The impact of technology on servitization | 30 |
| 5 | Implications of servitization | 33 |
| 5.1 | New and complex role of the company | 33 |
| 5.2 | Implications on stakeholders | 34 |
| 5.2.1 | Change in corporate culture | 34 |
| 5.2.2 | Managerial motivation and new sales capabilities | 35 |
| 5.2.3 | Convincing the customer of the new value proposition | 35 |
| 5.3 | Implications on the operations | 36 |
| 5.3.1 | Different performance metrics | 36 |
| 5.3.2 | Different pricing and financing | 37 |
| 5.3.3 | Service quality erosion risk | 38 |
| 6 | Findings from the literature | 39 |
| II | Servitization in practice: confrontations, discussions and opinions | 41 |
| 7 | Introduction of the case studies | 42 |
| 7.1 | Case studies with relevant companies | 42 |
| 7.2 | Brief summary of the offered bundles | 43 |
| 7.2.1 | Hilti | 43 |
| 7.2.2 | Microsoft | 46 |

| | | |
|----------|---|-----------|
| 7.2.3 | Cambio | 47 |
| 8 | Confronting the literature review with the case studies | 48 |
| 8.1 | Why are the companies from the case studies enrolling in servitization? . . | 48 |
| 8.1.1 | New growth opportunity | 49 |
| 8.1.2 | Stability of revenue | 50 |
| 8.1.3 | Advantageous position of the product manufacturer | 50 |
| 8.1.4 | Creation of a competitive advantage | 51 |
| 8.2 | How are the case studies adapting their business models in a servitization process? | 53 |
| 8.2.1 | Servitization enables value creation | 53 |
| 8.2.2 | Old model remains in place | 55 |
| 8.2.3 | Type of bundle of the product and service | 56 |
| 8.2.4 | Growing role of the customer | 57 |
| 8.2.5 | Servitization is done in stages | 58 |
| 8.2.6 | Extensive use of the non-ownership model | 60 |
| 8.2.7 | Impact of technology | 61 |
| 8.3 | Implication of servitization in the case studies | 64 |
| 8.3.1 | New and complex role of the company | 64 |
| 8.3.2 | Implications on the stakeholders | 64 |
| 8.3.3 | Implications on the operations | 66 |
| 9 | Opinions and building on the confrontation | 69 |
| 9.1 | Future prospects of services in the case studies | 69 |
| 9.2 | Building further on the confrontation of the literature review and the case studies | 70 |
| 9.2.1 | Usage based models closely related to servitization | 70 |
| 9.2.2 | Expansion of servitization within a company | 71 |
| 9.2.3 | Services are sustainable but hard to get right | 72 |
| 9.2.4 | The impact of technology on the evolution of servitization | 74 |
| 9.3 | Arguments against servitization | 75 |

| | |
|---|-----------|
| 10 Conclusions | 77 |
| 10.1 Limits of the case studies | 80 |
| 10.2 What to explore next | 80 |
| Bibliography | 81 |

Chapter 1

Introduction

This thesis aims to explore the concept of servitization. It is divided into two parts. The first part (chapters 2-6) is a literature review of the concept of servitization and its phenomenon. The second part (chapters 7-10) will analyse three case studies undergoing servitization. After a brief introduction of the case studies, findings from interviews will be confronted to the literature review from part one. We finish this part with some opinions and suggestion of models building on the existing literature and the confrontation with the case studies. Before we dive into the literature review let's discuss the motivations, context and methodology used.

1.1 Motivations

When I buy a physical product I always feel concerned about it's quality. There is nothing worse then to end up with a low quality product that you have to replace sooner than expected. When I heard that this phenomenon, known as programmed obsolescence, was sometimes done on purpose (TheEconomist, 2009a), it left me perplex. Companies, with as core mission to make money, easily figured out that forcing people to buy new products generated more stable and long lasting revenues. Long living products are therefore not in the best interest of the core mission. Light bulbs and printers are two good examples of this programmed obsolescence behaviour.

This strategy uses a lot of resources and generates incredible amounts of waste. Who is there to blame? The companies or the consumer? As an individual I feel rather clueless

on how to help our way out of this impasse. We feel we have no choice but to accept the current environment. Luckily new models have emerged that could offer alternatives. As a conclusion to my studies of Business Engineering I felt the urge to explore one of these alternative solutions or ways forward. I have chosen to explore the concept of ‘servitization’.

1.2 Context

In the last decade research and attention has grown for alternative businesses models. Customers, employees, management are increasingly interested to see companies taking negative and positive social and environmental externalities into account (Sempels, 2014). Servitization could be a first step towards this. Throughout the literature and interviews of managers I have come to realize that the main purpose for a company to dive into a servitization process is rarely environmental or social but rather economical. As pointed out by Mr. Dallemagne (see ??) companies are averse to change and are only willing to change if their current model is under pressure, or if there is a huge potential of another model. These new models can nevertheless have positive effects on the environment.

Servitization is linked to concepts such as product service systems, dematerialization and the performance economy. These concepts are hard to distinguish as they represent a similar phenomenon in the industries but analysed through a different perspective. During the interviews with managers, most never heard about the concept of servitization even though they are very familiar with the phenomenon in practice. Mr Van Mallegheem, director at Cambio, stated that many different concepts exist to explain one reality in practice.

1.3 Methodology

Part I: the literature review

The journey of this thesis starts with a literature review focussing on the concept of servitization. The theoretical definition set by Vandermerwe and Rada (1988) is used to identify the scope of the research (see 2.1). This definition has been widely accepted by

other scientific authors. The scope of the research is based on the content of the definition and not on the word 'servitization'. This was done to make sure important information would not be missed due to a different wording but describing a same phenomenon. With the chosen definition, there will be an in depth analysis of the triggers, business models and implications of a servitization process in a company.

The number of articles written related to the relationship of products and services is abundant. Along the research, major works are identified ,amongst others:

- Vandermerwe and Rada (1988) set the definition and context for servitization
- Oliva and Kallenberg (2003) set the different stages and forms of combining products and services
- Lovelock and Gummesson (2004) explore what services are and its link with the non-ownership model

Following McMenamin (2006) guidelines, these are identified based on the number of times it was cited in the network of articles read. As described by Knopf (2006) this literature review aims to be a "*preliminary stage in a larger research project*". The literature review has been structured around the following questions:

1. **What is servitization?** Definition and closely related concepts
2. **Why is servitization taking place?** Triggers for a servitization process
3. **How is servitization taking place?** Different business models
4. **What are the hurdles & implications?** Implications and hurdles of the transition

In these four different parts, different arguments from the scientific literature are confronted to each other. Throughout the literature review, an effort was done to stay relevant to the initial purpose of the thesis, that is to explore the concept of servitization. As said by McMenamin (2006): "*The golden rule of the literature review , as with all the sections of the thesis, is that it must be rigorously focused on fulfilling its role in the thesis as a whole*"

Part II: Servitization in practice: confrontations, discussions and opinions

In the next part of the journey we will discuss three case studies and their relationship to the concept of servitization. The following companies were chosen: Hilti, Microsoft and Cambio. For these case studies five interviews were conducted: four managers working in the companies and one consultant. The managers helped to gather information, reactions and feedback on what had been found in the literature review. The consultant helped to picture a broader view of the servitization trend.

To study the relationship between servitization and the case studies, we will first briefly introduce the bundles offered by the case studies. Later, we will confront these case studies with the literature review. Again the analysis will be build around the core questions of the thesis: Why? How? and the hurdles & implications? This will help to identify similarities and gaps. The question 'What?' is not discussed extensively as in the literature review it was used to identify a definition and later to choose the relevant case studies. We will further discuss several opinions and suggest several models building on the existing literature review. These models are inspired from a combination of the case studies and the literature review.

Limitations and implications

As will be pointed out in the limits of the thesis in the conclusion, studying three companies to explore the concept of servitization is not enough to be fully representative. Furthermore, several elements pointed out that technological development will deeply influence the servitization process and might question the findings from the literature and this thesis.

The aim is that the implication of this thesis will help set clarity around the concept of servitization. This research has been done as vigorously as possible to increase robustness of the findings. One should nevertheless keep in mind that this research has been done by a student with relatively few experience in the field of scientific research.

Part I

Literature review

Chapter 2

More than products

In traditional manufacturing companies, the core strategy is often to increase the amount of sold goods. In the last century this way of doing business has been very successful. Companies managing to produce the most goods with the least amount of resources turned into success stories. Scale economies, experience effect, specialisation, automatisisation, information and technology management are amongst the features these big companies do best. (Sempels, 2014)

It is nevertheless widely agreed across the scientific literature that companies are more and more focussing on combining products with services. These services are increasingly not just add-ons to the products but part of the value exchange (Chandler and Lusch, 2015; Vargo and Lusch, 2004). Vargo and Lusch (2004) describe this as the transition from a dominant goods centred model to the service centered model. Others, like Oliva and Kallenberg (2003) describe it as a transition from a business based on transactions to a business model based on relationships. They further state that many companies go much further than "*offering better service to sell more products*", this transition is a long process with a lot of hurdles and consequences. These will be discussed further.

2.1 What is servitization?

(Vandermerwe and Rada, 1988) defined servitization as following: "*Modern corporations are offering fuller market packages or 'bundles' of customer-focussed combination of goods, services, support, self-service, and knowledge. Services are beginning to dominate*" This

definition has been recognized in most of the literature (Baines et al., 2009).

Vandermerwe and Rada (1988) stress that companies doing servitization go far beyond repairing and maintaining goods. The relationship between the customer and the firm is much more complex than the traditional selling process consisting only of a product. Services usually start off like add-ons in support of the product (Gebauer et al., 2005), these services can become increasingly important in the value creation of integrated offerings (Baines et al., 2009). Vandermerwe and Rada (1988) point out that some parts of the bundle will be standardized others will be highly customized.

There can be a complex relationship between products and services. They could be a substitution of each other such as e-mails and physical mail. They also can be complementary. Many services need support from products in order to be performed (Vandermerwe and Rada, 1988), as you for example need a computer to access the Internet.

Throughout the thesis, I will use 'servitization process' as the phenomenon where a company is moving towards more services or expanding its bundles of products and services.

2.1.1 Examples

Multiple examples of servitization can be found in practice. As an illustration, we will discuss two examples. These two examples have a large installed base relative to the average annual sales, servitization has shown valuable in these types of industries (Baines and Lightfoot, 2014).

- Xerox: This company is considered as one of the pioneers in servitization (Visintin, 2014). They sell *"product's usage instead of products themselves, the adoption of pay-per-output (pay-per-page) pricing models and the delivery of integrated solutions and outsourcing services"* (Visintin, 2014; Finne et al., 2012; Visintin, 2012) This is, as will be explored further in the thesis, a clear form of a servitization process.
- Rolls-Royce: Rolls Royce aircraft has partly shifted from selling engines to a business model where they sell power by the hour. As stated by TheEconomist (2009b) *"It has deliberately blurred the lines between making things and offering services"*. 50% of their revenues is now generated by services (Baines and Lightfoot,

2014). Amongst others, Rolls-Royce offers a 'Total Care' package where the customer pays for the usage of the engines. Despite being risky, they have shown that risks related to this usage model can be reduced by adding additional services to the offering (Baines and Lightfoot, 2014).

2.2 Closely related concepts

Before we dive into the chapters on why and how companies enable servitization, we will first explore some closely related concepts. These will help us to understand servitization more in depth. Three concepts were chosen. First we will explore the concept of 'services' as it plays an important role in the definition of servitization, while it is a complex and broad concept generating a lot of debate in the scientific community. Second, the concept of 'value proposition' was chosen as it might help to understand the creation of value in offerings of product and services. The last, the concept of 'solutions' will be explored as it, amongst others, focusses on customer needs through a combination of product and services (Davies et al., 2006).

2.2.1 Services

The separation of goods and services was initiated by the economist Adam Smith. His categorization was made on the idea that "productive" labour could be stored in goods, that could be sold for value. While services are "unproductive", even though they can play an important role in the company. *"A service produces nothing for which an equal quantity of service can afterwards be procured, it perishes in the very instant of its production"* (Lovelock and Gummesson, 2004).

Early research have characterized services with 4 features: intangibility, heterogeneity, inseparability, perishability (IHIP). These four characteristics have been under a lot of criticism for their generalisation and simplicity (Wolak et al., 1998; Moeller, 2010). These elements are mainly inspired from personal services or low tech, high touch services (Moeller, 2010) and therefore not applicable to all services. They nevertheless remain interesting to understand the complexity of services as a whole. Let's discuss these four characteristics briefly.

Intangibility: A good is an object, a device, a thing. While services are a deed, a performance or an effort (Moeller, 2010). What is considered tangible and what is considered intangible looks straight forward at first sight but it's actually not as black and white. As explained by Levitt (1981) *"all products, whether they are services or goods, possess a certain amount of intangibility (...) instead of speaking of services and goods, we should speak of intangibles and tangibles"*. It is nevertheless true that the degree of intangibility for services is usually much higher than for products.

Heterogeneity: As services are performed, it will never be performed with the same settings (time, place, actors, context), this variability makes it difficult for services to have a homogenous output, the more labour intensive the service, the harder it is to uniform (Lovelock and Gummesson, 2004). Services are commonly highly customized to the needs of the customer. Example: If I go to the hairdresser I want to have a customized haircut that fits with my style and looks and not a standardized hair cut. Other examples have shown to put this feature into question as they are able to offer a uniform and homogeneous output. Music streaming services such as Spotify or SaaS (Software as a Services) such as Microsoft Office 365 are examples of uniformed and homogeneous services.

Perishability and inseparability A service is performed at a certain point of time by the service provider (Inseparability). Once the service is performed it vanishes (perishability), the customer can only use his memory or information and technology based communications to save part of it. As technology in communication has drastically improved in the last decade, these last two elements of services have weakened (Moeller, 2010; Lovelock and Gummesson, 2004). Example: A university lecture used to be perishable and inseparable. If the student couldn't attend the lecture he would miss the service, if the teacher didn't show up the service wouldn't be performed. With the technology of today, one can record his lecture, post it on the internet and students can watch it whenever, wherever while never physically meeting the service provider.

As shown in the table below changes in the service sector have pressured the validity of the IHIP features. Lovelock and Gummesson (2004) explain this with several reasons. Automation and quality control have increased the homogeneity of services. Outsourcing,

Figure 2.1: Applicability of "unique characteristics of services" to different types of services

| | <i>Service Category Involving</i> | | | |
|---|--|---|---|---|
| | <i>Physical Acts to Customers' Bodies</i> (e.g., passenger transport, health care, lodging, beauty salons) | <i>Physical Acts to Owned Objects</i> (e.g., freight transport, repair/maintenance, warehousing, laundry and cleaning) | <i>Nonphysical Acts to Customers' Minds</i> (e.g., entertainment, news, education, consulting) | <i>Processing of Information</i> (e.g., Internet banking, insurance, accounting, research) |
| Characteristic | | | | |
| Intangibility | Misleading—performance is ephemeral, but experience may be highly tangible and even result in physical changes | Misleading—performance is ephemeral but may physically transform possession in tangible ways | Yes | Yes |
| Heterogeneity | Yes—often hard to standardize because of direct labor and customer involvement | Numerous exceptions—can often be standardized | Numerous exceptions—can often be standardized | Numerous exceptions—can often be standardized |
| Inseparability of production and consumption | Yes | No—customer usually absent during production | Only when performance is delivered "live" | Many exceptions—customers often absent during production |
| Perishability—cannot be inventoried after production ^a | Yes | Yes | Numerous exceptions—performance can often be stored in electronic or printed form | Many exceptions—performance can often be stored in electronic or printed form |

a. Note, however, that some service industries can explicitly inventory defined units of capacity for sale in advance of production.

(LOVELOCK AND GUMMESSON, 2004)

specialization and communication technology have significantly improved the separability of services.

As these criterion to categorize services have been under pressure, different authors came with other frameworks. We will discuss some encountered in the literature: Lovelock (1983) analyses services on three different aspects, how and to what is the service performed, the relationship to the customer and the amount of customization and judgement that is required from the employees. We will have a closer look at these three sides:

Figure 2.2: How and to what is the service performed

| | People | Things |
|---------------------------|---|--|
| Tangible actions | Services directed at people's bodies, e.g. passenger transportation | Services directed at goods and other physical possessions, e.g. freight transportation |
| Intangible actions | Service directed at people's mind, e.g. education | Services directed at intangible assets, e.g. banking |

(LOVELOCK, 1983)

Figure 2.3: Relationship to the customer

| | Membership relationship | No formal relationship |
|---|---|-----------------------------------|
| Continuous delivery of service | e.g. Insurance | e.g. Public highway |
| Discrete transactions | e.g. Movie subscription (LOVELOCK, 1983) | e.g. Toll highway |

Figure 2.4: Amount of customization and judgement required from the front office employees

| | High cus- tomization | Low customization |
|--|---|--|
| High personal judgement in answering customer needs | e.g. Taxi service | e.g. Preventive health program programs |
| Low personal judgement in answering to customer needs | e.g. Hotel service (LOVELOCK, 1983) | e.g. Public transportation |

While the model of Lovelock is very detailed, it is not easy to use. Mathieu (2001a); Turunen and Toivonen (2011) have separated services in two different categories. The first are the services supporting the products, the second are services supporting the customer. This categorization is based on: the beneficiary of the service, the customization level and the intensity of the relationship between the customer and the company. Sempels (2014) had a similar approach but instead of services supporting the customer he focused on services centered around the value proposition. We will shortly discuss the value proposition further in this chapter. At last, we explore the categorization made by Spohrer et al. (2012), they divided the different services according to their interaction with different actors.

Figure 2.5: Roles of services

| |
|---|
| Service as a product |
| Hotels, telecommunication, IT, healthcare, financial, transportation |
| Customer service |
| Taking requests, answering customer questions, responding to complaints |
| Service derived from a tangible product |
| Autos (transportation service), mobile phones (communication service) |
| Service of product–dominant companies |
| Value added (e.g., repair and maintenance) to solutions (e.g., solving customer problems) |

(SPOHRER ET AL., 2012)

As there is no common agreed categorization of services, the definition set by Gronroos (2000) is very broad but representative: *"A service is a process consisting of a series of more or less intangible activities that normally, but not necessarily always, take place in interactions between customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to customer problems."* This definition can be useful when referring to services.

Exhibit 2.1: Reflection related to the case studies

Throughout our case studies, a subscription business model is often used in the servitization process. It's interesting to discuss this model in this section as it can be perceived as a borderline case. One can ask himself: Is a subscription model for a product considered as a service or not? A subscription to a product is the right to use a product during a defined time and circumstances. When you buy a ticket for a plane, you subscribe to the right to sit in that seat during a certain flight. When you subscribe to Office 365 it gives you the right to use the software over a certain time. When you subscribe to Cambio it gives you the right to have access to a car. The subscription to a product is usually linked to a non-ownership model. This model will be discussed in detail further in the thesis.

Lets take the example of Office 365. When we compare it to the definition of Gronroos, the subscription model increases the intangibility of the offer. The interaction between

the customer and the company also increases as we are switching from a transactional model to a relationship model. The part that is really important in order to determine if Office 365 is considered as a service is if it is still considered as a product or as a solution to customer problems? A subscription model can also open opportunities for a large panel of services linked to the product that were hard to offer before. In this kind of model, *"the function is key to customers satisfaction, product and technology are mere modes of providing function"*(Mont, 2002) With a subscription to Office 365 you are offered space on the cloud, Skype credit and all the new updates of new Office versions.

Now that we have explored some existing models of services, we will look into value propositions that used these services in combination with products to create value.

2.2.2 Value proposition

It is important to fully understand the meaning of value creation in a management context. Value could be separated into two different approaches, the *"use value"* and the *"exchange value"* (Bowman and Ambrosini, 2000). The first is a measure for how the product or service is able to serve the needs of the customer, while the latter refers to the price the customer is willing to pay. These two are closely related when companies want to retain and create value. In order to be profitable exchange value must always be higher than the costs needed to create this value. If not, both producer and customer wouldn't be interested due to value destruction(Lepak et al., 2007).

Chandler and Lusch (2015) define it as following: *"A value proposition invites actors to serve one another in order to attain value, whether it is economic, financial, or social value or some combination of these."* They further state that everyone is offered a lot of different value propositions which they may or may not accept. Chandler and Lusch (2015) argue that the intensity of the value proposition offered by an individual will reflect how relevant this value proposition is for the recipient. Furthermore they state that the commitment of the individual in a value proposition can change over time.

2.2.3 Solutions

We finish this section on closely related concepts by briefly reviewing the concept of solutions. This concept is used throughout the interviews, and needs to be further explored. Tuli et al. (2007) described their findings in the literature as following: *"A solution is a customized and integrated combination of goods and services for meeting a customer's business needs"*. Foote et al. (2001) state that combining and integrating products and services are commonly considered as solutions. These offers are a customized combination of product and services tackling specific needs of the customer (Davies et al., 2006). Solutions are therefore linked to a servitization process, as both are combining products and services to create a customer focused offer. Companies initially offering stand alone products, but switched to offering a solution often went through a servitization process.

Chapter summary

In this chapter we explored the first question: 'What is servitization?'. We started by finding the most appropriate definition. The scientific community seems to agree with the definition of servitization set by Vandermerwe and Rada (1988): *"Modern corporations are offering fuller market packages or 'bundles' of customer-focussed combination of goods, services, support, self-service, and knowledge. Services are beginning to dominate"*. This definition will be used to chose the companies of the case studies and will help us to set the scope for the rest of the literature review.

We continued by exploring three closely related concepts: services, value proposition and solutions. These are important as they will be used throughout the thesis.

Chapter 3

Triggers for a servitization process in companies

The sector of manufacturing is more and more pressured to find alternatives to only selling products. This trend is especially true in developed countries where companies can't compete with the low cost producers Neely (2006). In this chapter we will look at why companies start a servitization process. These reasons are divided into two categories: external drivers that will explore servitization arguments coming from the markets and internal drivers will explore arguments coming from within the company. These two categories of incentives for servitization are nevertheless closely linked.

3.1 External drivers

Traditional manufacturing companies have seen their margins shrunk due to reasons such as globalization and other macro-economic effects. They are looking for new ways to make profit (Martinez et al., 2010). Improving the value proposition by adding and integrating services is a common way to go.

3.1.1 Commoditization

A first driver for servitization in the manufacturing industry is the commoditization of goods. A commodity is defined by the Harrap's and Chambers (2003) dictionary as "*An article of trade*". Commoditization can be explained as "*the way that goods that used to*

be distinguishable in terms of attributes end up becoming mere commodities in the eyes of the market or consumers." (Rushkoff, 2005) As goods are only a trading article, margins and profits shrink. Offering combined products and services, or to undergo a servitization process, is a way to avoid a price war and build a customer-centric organization.(Sytych, 2015)

3.1.2 Customers demand

Customers want everything faster and more conveniently, this pushes the companies to increase their attention to the end-user (Vandermerwe and Rada, 1988). Customer demand for customized offerings with low risk and liabilities can be fulfilled with services and helps companies to be closer to the customer (Mont, 2004). An example of this is the use of the non-ownership model. As discussed further in the case studies, Hilti uses this model in its Fleet management offering.

3.1.3 Technology capabilities

Turunen (2013) separated technology that is embedded in the product and technology assisting products. The first might not offer a long term competitive advantage, while the latter can make an increase in service more available and realistic. Through improvements in information technologies, data management and monitoring new service opportunities are created. For example, the tyre management system used at Michelin would be economically hard to sustain without a centralised information system and CRM.

New technology is increasing intangible value around the product (Ex: data analytics and connected machines). This can create a whole new set of tools to develop business models or increase productivity (Lee et al., 2014).Lee et al. (2014) is also moderating this effect as they point out that most traditional manufacturing companies are struggling to innovatively use these tools.

Additionally Vandermerwe and Rada (1988) already stated that customers will gain transparency through technology. Customers are able to easily compare different offerings and manage their service through technology. Through Internet and other channels customers are much more informed of all the different offerings. On the other side this technology can put the company closer to the customer and his real needs.

3.1.4 Environmental

Sustainability arguments will highlight the lengthening of the life-cycle of products through a commonly used non-ownership model (Turunen, 2013). She further states that these benefits only appear if the product and services are fully integrated. Services enable companies to provide the same or more "use value" to the customers with less resources (Velamuri, 2013). With this companies could leave the volume oriented perspective behind and focus more on the value proposition. It is interesting to keep in mind that environmental concerns are often not a main driver in developing additional services (Zaring, 2001). She further states that when the environment is the main driver it is rare for the business to be profitable.

We have explored four external drivers encountered in the literature: commoditization, customer demand, technology capabilities and environmental drivers. These should help to picture how the industry and economy is pushing companies towards servitization. The next section will explore the internal drivers.

3.2 Internal drivers

At company level or at a more local and strategic level, we have identified a couple of incentives on the road to servitization.

3.2.1 New growth opportunities

In mature sectors companies are looking for new growth opportunities, adding services into the business model can unlock new markets and value (Mont, 2004; Brax, 2005). Many try to benefit from these opportunities, but not all manage to effectively enhance growth. Sawhney et al. (2004) further stress that companies need to "*redefine their markets in terms of customer activities and customer outcomes instead of product and services*" in order to implement successful services that will generate growth. They add that a robust risk assessment of capabilities, market reception and profitability for the different opportunities needs to be done.

3.2.2 Increased margins and stability of revenue

In capital intensive industries, the margin on services can be much higher than the margin from a new product sale (Wise and Baumgartner, 1999). It also increases stability of revenues (Gebauer et al., 2005) as companies will play a larger role in the value chain (Malleret, 2006). She further states that the stand alone products are an one-time transaction, the amount of transactions can vary through time, while services generate recurring revenues over time. Including services will change the cash-flow streams and temper the effects of economic cycles (Brax, 2005; Shankar et al., 2009). Furrer (1997) states that services have a twofold impact on profits. First they generate higher profits than the product and second they indirectly increase demand for the products which will further lead to increased profits.

3.2.3 Knowledge of the customer and settlement in the market

As stated by Oliva and Kallenberg (2003) product manufacturers are already familiar and settled in their industry which will lead to lower customer acquisition costs, lower knowledge acquisition cost and lower capital requirements in their journey to servitization. This might also be framed as disadvantage as companies need to adapt, sometimes deeply, their business model. Oliva and Kallenberg (2003): *"Manufacturers attempting to enter the service market face the challenge managing two tightly-coupled markets. On one hand, increasing service quality and scope might extend the product useful life, thus reducing its replacement sales. On the other hand, increasing the quality and durability of products might reduce future service revenues."* We will talk more in detail about these challenges in the next chapters.

3.2.4 Servitization can create a competitive advantage

Servitization can certainly be used as a competitive tool, we discuss here some of the different ways highlighted in the literature. Depending on the stage of servitization the company is, services are used as a tool for innovation to find business development opportunities or for differentiation (Vandermerwe and Rada, 1988). We will talk about these stages in further chapters. Services can be used as a competitive tool that is sustainable

in time as it is difficult to replicate, less visible and more labour intensive (Turunen, 2013; Oliva and Kallenberg, 2003). There is a switch from competition on cost to competition based on delivered value (Martinez et al., 2010).

Services brings you closer to the customer

Going towards a service centred business model forces companies to take the needs of the customers into account. As companies move closer to the customer, the faster they will know what is going wrong (Tukker, 2004). This form of market research and customer knowledge gathering will help companies to adapt their strategic objectives toward the customers needs and demands (Brax and Jonsson, 2009). They further state that this knowledge serves as a feedback loop for research and development of your products. Services also enable companies to adapt faster in rapidly changing environments (White et al., 1999). This close relationship with the customer enables the company to have a length of advance on the competitors. The complex relationship can create dependency of the customer to the supplier and enhance customer loyalty (Malleret, 2006), which can turn into a durable competitive advantage (Oliva and Kallenberg, 2003).

Tailored offering

In link with the previous point, through servitization companies can improve their knowledge about the customer (Brax and Jonsson, 2009). This information about the needs of the customer will help them to offer tailored offerings (Malleret, 2006; Mathieu, 2001b; Martinez et al., 2010).

Services can make third party and customers dependent

In complex and highly specialized industries third parties and customers can potentially turn into long term partners. By providing them vital information or services companies could make them dependent (Vandermerwe and Rada, 1988). Ex: Car companies gathering information for insurance companies or customers enrolled in the power by the hour engines of Royce Rolls. When products are bundled with services customer satisfaction is enhanced, which will increase repeat sales or renewed contracts (Mathieu, 2001b). Through a better quality interaction between customers and companies, over

time companies can build a quality reputation (Gebauer et al., 2010). Nevertheless, when companies from the industry all switch entirely to services and product-sharing business models it reduces the switching cost for customers between service providers (Porter and Heppelmann, 2014). The effects of servitization on customer retention are therefore not always positively correlated.

Service can help to diffuse new innovation and strengthen corporate image

Vandermerwe and Rada (1988) states that combined with the other advantages, servitization can help you to crash test and improve your innovation. SpaceX is selling the ability to send satellites into orbit for commercial clients, they can therefore improve the technology in order to serve the goal to send humans on Mars. *"Providing certain services helps reinforce the company's image in other fields, for example technological advances, product quality, etc."* (Malleret, 2006).

Chapter summary

In this chapter we explored potential answers to the question 'Why are companies enrolling in servitization?'. We have divided the triggers into external and internal drivers. In the first, commoditization, customer demand, technology capabilities and environmental drivers were discussed. We continued exploring internal drivers such as growth and stability of revenues, settlement in the market and servitization can create a competitive advantage. In the literature, these have shown to push companies towards servitization. With these sets of drivers, we should be able to find answers of why companies are enrolling in a servitization process.

Chapter 4

Servitization, the model behind the word

After having highlighted the different reasons why companies start a servitization process, we will have a closer look at the different models that have been identified in the literature. This chapter has as goal to find answers on 'how' companies are adapting their business models to enable servitization.

4.1 Products combined with services to create value

For the company it's a quest to find the combination of product and services that will generate as much value as possible for the customer. In a service dominated environment value is determined by the "use value" (see 2.2.2) he can retrieve from a service offered by companies, as opposed to a goods dominated environment where value set by the producer (Vargo and Lusch, 2004). In this customer centric approach Velamuri (2013) identified three sources of value creation in product and service offerings highlighted in the literature and his research.

1. **Individualization:** As mentioned in 3.2.4, a tailored offer that fits better the customer needs is attractive for companies. The more the customer needs are fulfilled the more he will value your offer. Velamuri (2013) identified in the literature and his research that an individualized offering can justify a price premium. (Davies et al., 2007) warn that there are limits to the benefits of individualisation, there needs to

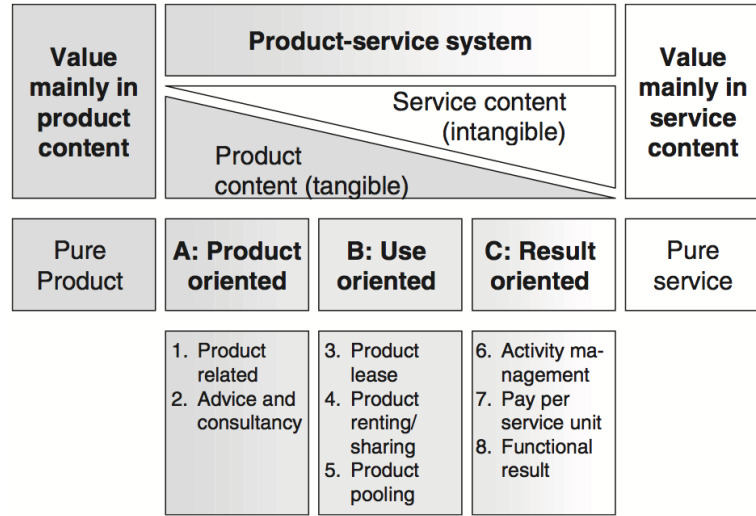
be a right combination of standardisation and customization.

2. **Integration:** As summarized by Velamuri (2013): *"Integration is the degree to which various components of an offering (i.e. products and services) are combined or interrelated to deliver value beyond the sum of the included components"*. He further divides integration into two streams, marketing and operational. The first creating value through integration of decision-making, buying cycle, pre and post sales services, the latter focusing on the creation of value through smooth cooperation of individual products and services (Sawhney, 2006).
3. **Firm-customer interaction:** As discussed in 3.2.4, increasing services will improve your knowledge of the customer needs, this is required in order create value from individualization and integration (Velamuri, 2013). For an effective improvement of interaction, the company needs to move from a transactional based offering towards a relationship based offering (Gebauer et al., 2005; Vargo and Lusch, 2004). White et al. (1999) calls this the transition from the transactional economy to the service economy, you go from buying a car to buying mobility service.

4.2 Different forms

In this section we will discuss some forms that companies take when adding services in their business models. In figure 4.1 Tukker (2004) illustrates the different forms according to where the value is created and the focus of the offering (product, use, result) and the dominance of services.

Figure 4.1: Subcategories of product and/or service providers



(TUKKER, 2004)

To further dig into the different forms we will look at different offerings and analyze the existing relationships between product and services.

4.2.1 Offering

Frei (2008) identified that there is a change in focus when developing services: "*Product designers focus on the characteristics buyers will value, service designers do better to focus on the experiences customers want to have*". Velamuri (2013) has identified the following forms of offerings when combining products and services.

- **Embedded products:** Products are build with digital technologies that can perform service (Velamuri, 2013). "*By freeing the customer of the need to perform those services, the newly configured 'smart' product can save considerable labour costs, which the customer is usually willing to share with the manufacturer*"(Wise and Baumgartner, 1999).
- **Leasing/renting/sharing/pooling:** This model is commonly used with capital intensive products (cars, train, etc.), the product is offered on a rental- or use-basis (Velamuri, 2013). This non-ownership model is very present in our case studies, therefore will explore this model in more details further in this chapter (See 4.4).

- **Mass customization:** The aim here is to individualize offers with which the company tries to capture the highest premium the customer is ready to pay (Velamuri, 2013).
- **Solutions:** As described in 2.2.3, the focus is on the needs of the customer through integrated product and services (Wise and Baumgartner, 1999). These solutions aim to help focus on the clients core competencies (Velamuri, 2013), this approach will redefine the boundaries of the company 4.5.

As pointed out by Velamuri (2013) these clusters can overlap and companies can find themselves in multiple categories, these clusters are helpful to understand the models that exist to create value through combining products and services.

4.2.2 Relationship between products and services

As we have been talking about bundles, it is interesting to look at the different types of bundles that exist. Shankar et al. (2009) have identified the following bundles:

1. *"Flexible bundle"*: Products and services are independent and can be bought separately but there is a huge value creation when they are integrated (Shankar et al., 2009).
2. *"Peace of mind bundle"*: Companies with high quality products will more easily be trusted with services. A strong interaction between the company and the customer will enhance the value of this bundle (Shankar et al., 2009).
3. *"Multi benefit bundle"*: The products and services are so integrated that their individual value is much lower (Shankar et al., 2009).
4. *"One-stop bundle"*: The integration of the products does not create additional value but the customer-company relationship makes it convenient to buy the bundle of product and services (Shankar et al., 2009).

There is a change in the role of goods, when sold through bundles they are not considered as the end products but as mean through which value is created (Vargo and Lusch, 2004).

4.3 Different stages of servitization

Many authors agree that servitization occurs in stages (Gebauer et al., 2005; Oliva and Kallenberg, 2003). There is even tough a debate if a radical change towards servitization would be more effective (Gaiardelli et al., 2015). Servitization has a deep impact on the operations and value delivery. *"It forces organisations to learn about new operations and strategies, such as service contracts, pricing, selling, asset management and risk sharing, in order to propose the promised service: value and experience to customers"* (Gaiardelli et al., 2015).

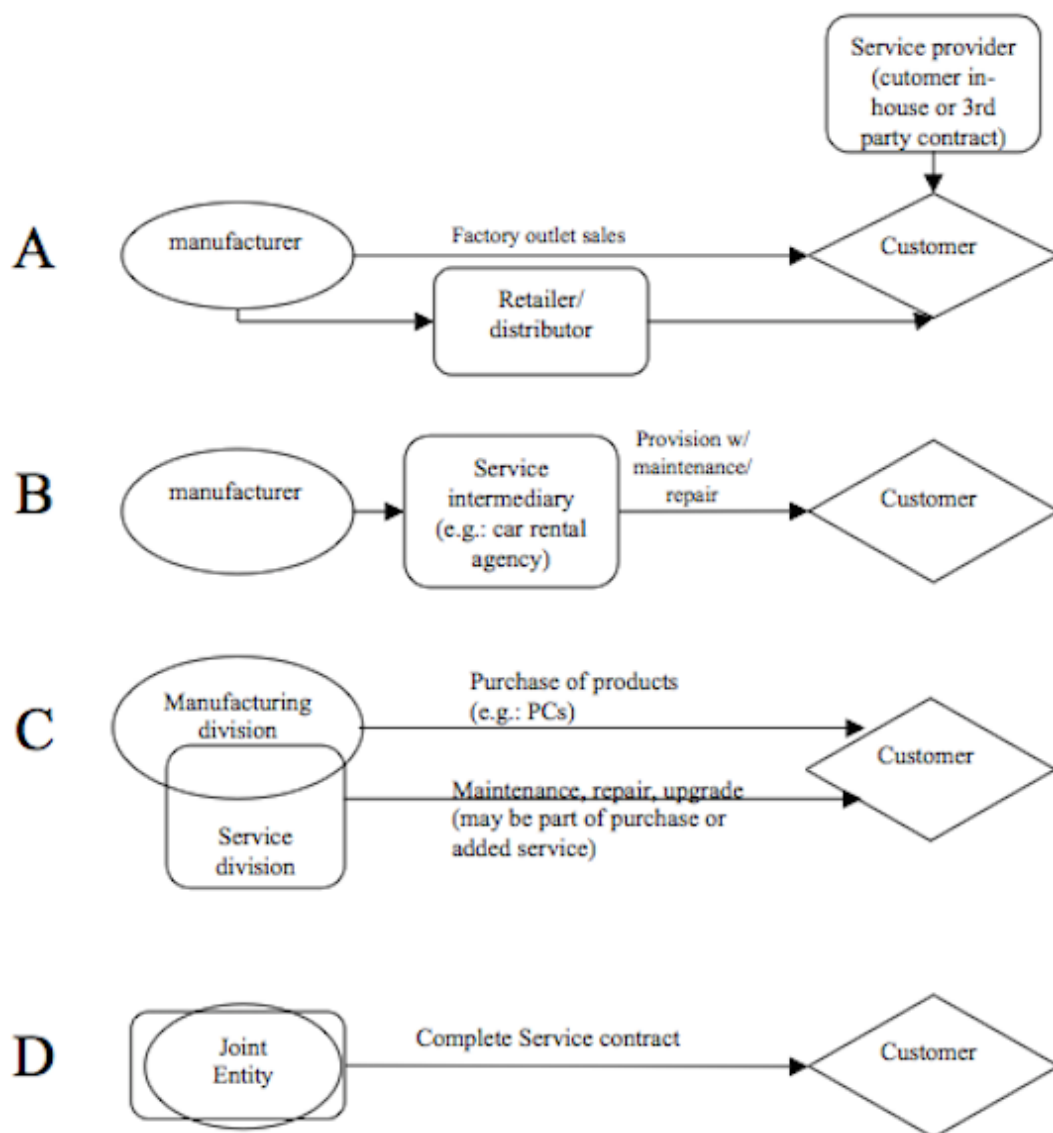
We will discuss three different stages of servitization proposed by Oliva and Kallenberg (2003). The further a company is found in these stages, the more dominant the services are.

1. **Product-related services:** The servitization process in companies usually starts with services as add-ons to products (Chandler and Lusch, 2015). The service is not perceived to add additional monetary value but rather as a way to sell more products Oliva and Kallenberg (2003). They further add that products delivered with services increases customer satisfaction. This is the main driver to improve the efficiency, quality and delivery of the service. Gebauer et al. (2005) considers this market-oriented shift to be driven by the need to obtain more information on the customers needs, an important trigger for servitization (see 3.2.4).
2. **Entering the service market:** Oliva and Kallenberg (2003) noticed that through the first stage the companies come to realize the potential for profitable margins in offering services. In this stage services are expected to increase revenues. There is a need to educate customers and employees of the benefits of services. Different resources can be used such as communication tools between customer and employee, training and empowering sales employees to adapt to the new offering (Gebauer et al., 2005). Oliva and Kallenberg (2003) highlighted two challenges, there is a cultural change needed in the company and a service infrastructure needs to be created in order to deliver the service correctly. We will discuss these two challenges in the next chapter.

3. **Expanding the services offer:** In this phase, Oliva and Kallenberg (2003) make a similar separation as the division of Velamuri (2013) for the firm-customer interaction (see 4.1). Oliva and Kallenberg (2003) subdivide the expansion into two categories, the relationship-based services and the process-centred services. The first focussing on improving the utilization of the service, the latter improving the integration of the bundles. This will affect the way services are priced and sold (Oliva and Kallenberg, 2003).

Figure 4.2 illustrates a similar approach proposed by White et al. (1999) of the different stages of servitization in companies.

Figure 4.2: Impact of the growing importance of services



(WHITE ET AL., 1999), TELLUS INSTITUTE

4.4 Non-ownership

An important factor of differentiation in many servitization models and service-centred transactions is to be found in the ownership rights. As Wirtz and Ehret (2013) state: *"Services are simply transactions without the transfer of ownership rights, in contrast to trading goods for money"*. This model will affect the boundaries of the company as described in 4.5. It is nevertheless a subject that remains under researched (Wittkowski et al., 2013) but it can be used to explain why servitization is taken place (Wirtz and Ehret, 2013). As it is a common used model in a servitization process we will explore it more in detail.

Non-ownership is defined by Wittkowski et al. (2013) as *"the service in which customers acquire some property rights to an asset and are offered a certain degree of freedom in using this asset for a specified period while the burdens of ownership remain with the owner"*. Use related costs have to be taken in charge by the company. Products may be fragile and therefore making the maintenance cost very dependent on how the product is used. Some companies are not willing to take this risk (Mont, 2004). Others argue that the company can manage maintenance requirements better due to their expertise (Mont, 2004). By doing this better they manage to capture more value from the product and its services.

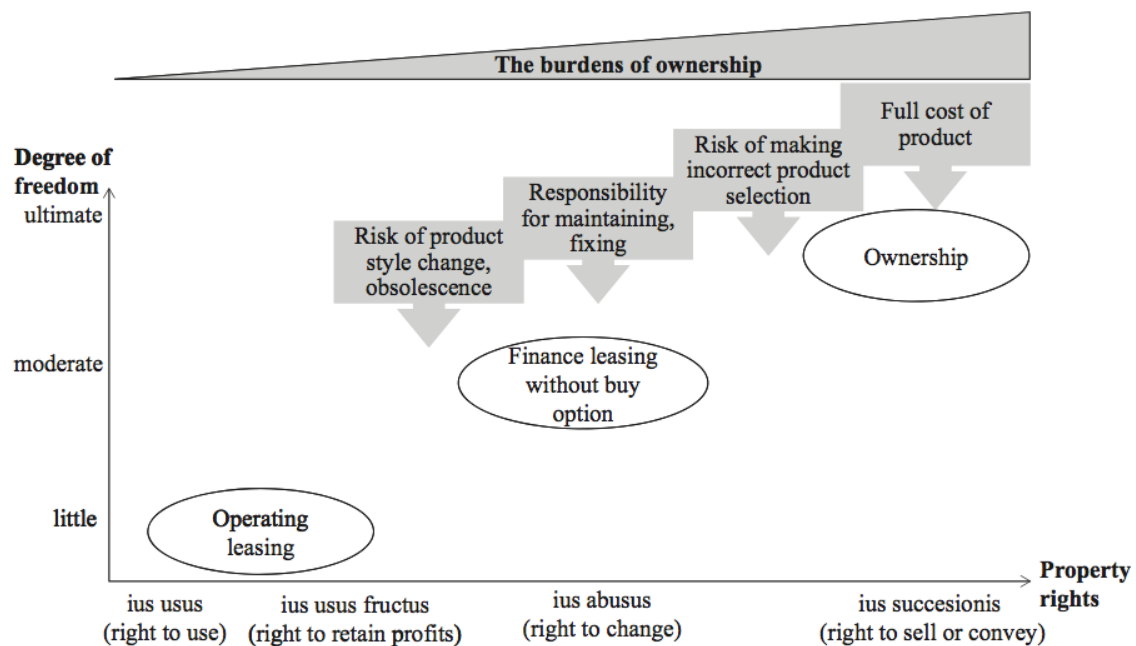
Berry et al. (1973) states that there are four burdens of owning a good:

1. Good's styles tend to change and obsolescence will increase over time.
2. When buying a good, there is a risk it doesn't fulfil your needs as expected.
3. The owner is liable for maintaining, fixing and moving the product.
4. In order to be owner, one has to pay the full manufacturing costs.

In figure 4.3 Wittkowski et al. (2013) illustrates the links between property rights and the degree of freedom an individual has towards a good.

Considering these four burdens of ownership, companies can remain owner of their product and create value for the customer by taking part or all the burdens in charge. Different models exist, we will explore some of them in the case studies discussed further in this

Figure 4.3: Ownership related responsibilities



(WITTKOWSKI ET AL., 2013)

thesis. In a servitization process a common non-ownership model would be a product that the customer is allowed to use for a defined period against a certain price. The product could, amongst others, be a machine, or a room. It is common to integrate these goods with services to create additional value, this will be discussed further. Lovelock and Gummesson (2004) found five aspects that will be deeply be changed with this shift in ownership:

- Goods can be a core element of the service
- Parts of large goods can sold as service
- Services are build around renewable resources: labour and expertise
- Time is central while performing a service
- Pricing needs a new approach (see 5.3.2 for more details)

There are also downsides of a non-ownership model of products, as ownership provides status, image, and a feeling to be in control to the owner (James and Hopkinson, 2002)

Wirtz and Ehret (2013); Ehret and Wirtz (2010) have analysed the value proposition of outsourcing through non-ownership. They have done that around three pillars well known in economics. We will use these in the context of non-ownership

Property right theory: As owner of an asset you have the right to use, change its form and substance, obtain income and other benefits and transfer residual rights of the asset (Wirtz and Ehret, 2013). With these characteristics in mind you have to figure out if non-ownership of your assets is the most efficient solution. Wirtz and Ehret (2013) look at two sources of cost, the measure and the governance costs. The first is the costs generated by the need to measure performance and use of the asset, robust contracts are important here (Wirtz and Ehret, 2013). The latter is the cost you could face if you outsource critical and sensitive parts of your core business. It is smarter to have full control on the assets that differentiate your company (Wirtz and Ehret, 2013). A cost analysis of these two aspects helps companies to assess if non-ownership is worth in their business model.

Resource based view: Amongst others, this pillar focusses on outsourcing assets and activities can free up management that will have more time to focus on the core activities of the company. Wirtz and Ehret (2013) points out that growth is central in this pillar: *"freeing management capacity for the most promising and profitable business opportunities, while delegating the rest"*.

Entrepreneurial theory of the company: Amongst others, this pillar states that outsourcing services may lead to new divisions of labour between firms. This is enhanced by the entrepreneurial mindset of employees seeking for new opportunities to tap into new markets or tackle markets with more efficient business models (Wirtz and Ehret, 2013).

This non-ownership model will affect the boundaries of the companies. In the next section we will discuss how servitization affects the boundaries of a company.

4.5 A change in boundaries of the company

As companies are offering a wider range of product and services, sometimes referred to as 'solutions', they need a robust system integration in order to have efficient bundles. Outsourcing what falls out of the core-business capabilities is one way to take care of the problem. These core-business capabilities can change over time (Davies et al., 2006). This will change the boundaries of the company.

This choice of boundaries is particularly important with technological activities, as stated by Porter and Heppelmann (2014) *"companies should identify those technology layers that offer the greatest opportunities for product insight, future innovation, and competitive advantage, and outsource those that will become commoditized or advance too quickly."* This change in boundaries is important as outsourcing will mean taking services of other companies, while bundles offered will mean offering services to other companies. Due to complexification and rapid change of regulatory, business environments and systems of information technologies, the companies are looking for specialized manpower (White et al., 1999). This pushes companies to revisit their boundaries.

As stated by Sawhney et al. (2004) a risk assessment of the different opportunities is needed. The decision to dive into a servitization process is a strategic matter. Wise and Baumgartner (1999) have developed a set of indicators to assess the opportunities moving down the value chain, such as the profitability of the downstream activities, influence and relationship with the customer, installed units, usage cost etc. One way to go downstream is to add services that create value in the part of the value chain that is the most profitable. Wise and Baumgartner (1999) state that the player close to the end user will have more opportunities to develop downstream services (Dell has a direct link with the customer vs producer having Walmart as main distributor).

Because of this change in boundaries within industries, the boundary of the industry itself is also changing and growing. Porter and Heppelmann (2014) state that increasing capabilities of smart and connected products are responsible for this shift from selling only products to large systems of product and services. Some indirect competitors can turn into direct competitors.

The non-ownership model and the change in boundaries are impacted by evolving technology. In the next section we will discuss the impact of technology on servitization.

4.6 The impact of technology on servitization

We live in an era where technology plays a growing role in companies. The effects of technology on the servitization of companies is yet under-researched but is expected to

have a huge impact in the years to come. We will have a look here at some the impacts of technology.

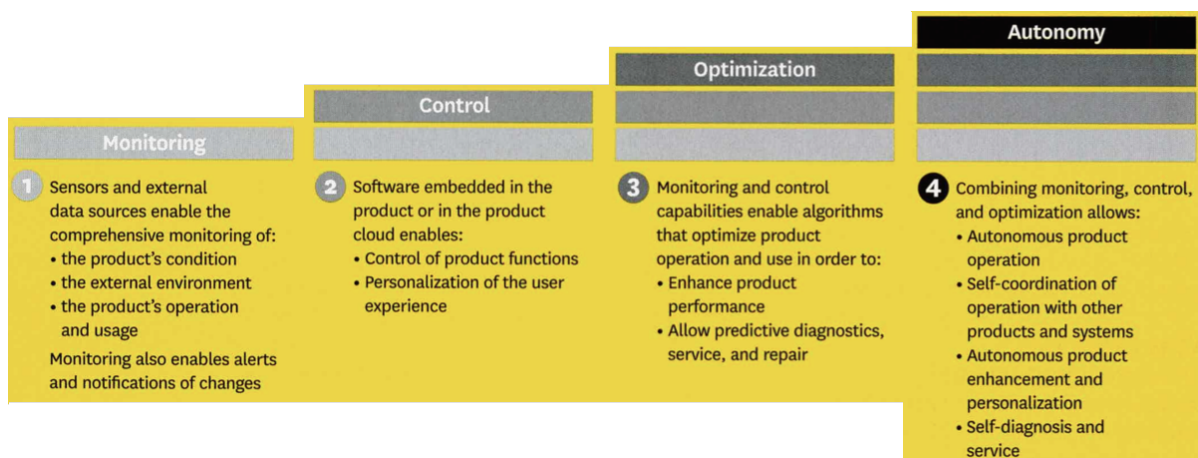
“Every industrial company will become a software company.”

Jeff Immelt, the CEO of General Electrics

Porter and Heppelmann (2014) state that technology in products translates into two important parts, they are 'smart' and 'connected'. The first enhances capabilities, the latter connects products together enabling them to create more value than the physical product. Porter and Heppelmann (2014) explain that these two new features of products are creating new functionalities, improved reliability, higher product utilization and expanded product boundaries. *"IT is becoming an integral part of the product itself"* (Porter and Heppelmann, 2014)

We will study the four capabilities created by these smart and connected products set by (Porter and Heppelmann, 2014). These capabilities build onto each other the more technology embedded in the product. The integrated value discussed in 4.1 is greatly improved the more capable the bundle of product and services. Porter and Heppelmann (2014) go even further, they state: *"physical components can be commoditized or even replaced by software over time."* As further described in the figure below Porter and Heppelmann (2014) consider technology in embedded products in layers build onto each other. The product starts by enabling monitoring and ends up by conducting autonomously different tasks.

Figure 4.4: Future prospects of embedded products



(PORTER AND HEPPELMANN, 2014)

Exhibit 4.1: Exploring two technologies used in the case studies

We chose to explore the literature on remote monitoring and the Cloud as they are used in the case studies and could significantly impact the services offered.

Remote monitoring: Through the Internet of things, sensors placed in products enable real-time monitoring from a distance. In non-ownership and fleet systems this can enable the company to react pro-actively to future deterioration of the product, which can help reducing losses, disruptions (downtime), environmental, safety hazards (Grubic, 2014). There is a incredible amount of data that is generated by this remote monitoring, and can be useful for the company and its environment. Grubic (2014) state the company can know more about the customers needs.

The Cloud: Cloud providers offer use-based access to servers to store and share data. This enables them to offer tailored services to a large range of clients. The product is not delivered physically but is served remotely, the services are replacing goods as the customer never actually sees the product (Sultan, 2014). The cloud provider is able to use the server at its full potential, in the best conditions of maintenance and security. Sultan (2014) calls this a new form of servitization that will disrupt the IT industry: "*a physical product is 'morphed' into a service*".

Chapter summary

In this chapter we have explored the literature trying to answer 'how' companies are dealing with this servitization process. It can sometimes deeply impact the business model of the company. Before we looked at different offerings, we needed to understand where the value is created. We explored the value creation with three pillars: integration, individualisation, firm-customer interaction (Velamuri, 2013). As it likely that servitization will deeply affect the business model, the scientific community agrees it takes place in different stages. Further in the chapter we looked at the often used model of non-ownership. This will change boundaries of the companies and is easier to put in place due to a growing impact of technology.

Chapter 5

Implications of servitization

As mentioned in the previous chapters adding services to the companies offering requires a different approach than selling only the product. Throughout this chapter we will look at the different parts of the company and its environment that will be affected by a servitization process. We will start by setting the frame of the new environment. We will continue exploring the implications separated into two categories, first the implications on the stakeholders, second the implication on the operations.

5.1 New and complex role of the company

Combining products and services is putting the company in a new and complex role within its environment. Some strategic changes have to be made in order to succeed in the servitization of a business. Foote et al. (2001) found four aspects that need to be addressed.

- Build your value propositions around customer needs and not around your existing product
- Work with new and unusual business partners
- Go after the most valuable customers for your new value proposition
- The more risk you take in your value proposition the more the customer is willing to pay for it

Companies, initially offering products, that undergo a servitization process might find it difficult for the customer to understand the new role of the company. This complex role

of the company can be challenging for the marketing department that usually has very limited customer attention (Mont, 2004). This understanding of the customer is nevertheless very important as "*employees and customers are both part of the value-creation process*" (Frei, 2008).

5.2 Implications on stakeholders

We will discuss the implications of servitization on two stakeholders in particular: the employees and the customers. These are the stakeholders that are more likely to be confronted to changes. We start with the implications on the employees and close this section with the implications on the customers.

5.2.1 Change in corporate culture

Oliva and Kallenberg (2003) argue that a transition towards more services in the company will impact the corporate culture. They state that it is a process of learning to value, sell, deliver and bill services. This new approach will affect the basic assumptions as the problems faced will be different when offering new services.

Let's first have a look at the definition of corporate culture: "*A pattern of basic assumptions - invented, discovered or developed by a given group as it learns to cope with its problems of external adaptation and internal integration - that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems*" (Schein, 2010). Schein (2010) further states that corporate culture is build around three pillars: artefacts (buildings, dress code, founders), values put forward in mission, behaviour and assumptions in ways of working and handling.

Oliva and Kallenberg (2003) have identified that creating a separate business unit with profitability requirements can be efficient to deal with these cultural challenges. This way, the basic assumptions from the organization can be questioned and adapted more easily. Dubruc et al. (2014) state that transformation of corporate culture has to focus on three parts: the contract, the knowledge of the customer needs, being patient. Dubruc et al. (2014) stress the importance of the contract that will fix the intangibility of services

in a tangible artefact. They add that clients need to be included in the different steps of design, production and consumption to improve the relevance of the offer. Creating a service culture is not a 'big bang' change and will be spread over a long period of time, the transition is slow (Oliva and Kallenberg, 2003). As explained by Gebauer et al. (2006): *"A service culture in manufacturing companies must be nurtured continuously and grows over several years on the basis of appropriate service awareness"*.

5.2.2 Managerial motivation and new sales capabilities

"From a behavioural point of view, in order to deliver service efficiently, people need to be trained and empowered. Thus servitization requires a shift in people's mindsets and this shift has to be encouraged by the managers" (Dubruc et al., 2014).

Gebauer et al. (2006) argue that services should not be considered as add-ons but fully part of the value creation. Managers need to believe in the economic viability (Gebauer et al., 2005; Dubruc et al., 2014) and have a thoughtful strategy to integrate services, these challenges tend to make the transition careful and slow (Oliva and Kallenberg, 2003). Implementing new services is perceived as risky and will influence the managers ability to assess opportunities (Gebauer et al., 2005) and services are thought to be not in the competencies of product manufacturers (Oliva and Kallenberg, 2003). This negative mindset towards services can be explained by an *"overemphasis on obvious and tangible environmental features"* (Gebauer et al., 2005).

Not only is managerial motivation needed, companies also have to acquire new sales capabilities. In this environment with complex customer needs and value propositions, the sales force plays an important role in the success or failure of new services (Kindström et al., 2015). The skills required for the sales function are more demanding selling a service than a product. Amongst others, Kindström et al. (2015) stated that *"Salespeople need a better and broader understanding of their customer business"*.

5.2.3 Convincing the customer of the new value proposition

The previous implications all concern the activities and people within the company, this section will focus on customers that also have to adapt to the new value proposition. The

value proposition needs to be adapted from a product efficacy to a products efficiency (Oliva and Kallenberg, 2003). A transition from a product that is able to do things, *"whether the product works"* (Oliva and Kallenberg, 2003) (efficacy) towards a product that is relevant for the end-user within a solution (efficiency)(Oliva and Kallenberg, 2003). Efficacy of the product are the capabilities of the product independently of the customer needs, while efficiency are the capabilities of the product to fulfil the customer needs.

Levitt (1981) further states that it is harder to retain customers the more intangible the good or service you sell is. Customers are less likely to trust intangible parts, as they are harder to grasp and understand. *"Once a customer for an intangible product is sold, the customer can easily be unsold as a consequence of the under-fulfilment of his expectations. Repeat buying suffers. Conversely, a tangible product, manufactured under close supervision in a factory and delivered through a planned and orderly network, is much more likely than an intangible product to fulfill the promised expectation"* (Levitt, 1981).

5.3 Implications on the operations

Now that we have looked at the implications of servitization on different stakeholders, we will look at implications on the operations of the company. We start with the analysis of the impact servitization can have on the performance metrics.

5.3.1 Different performance metrics

The metrics for profit may not be the same for products as for services. *" The old metrics - market share, cycle time, and quality levels - tend to focus solely on the product. Managing downstream businesses requires looking at new variables such as profit per installed unit, share of customer's total downstream-activity spending, and total customer return over the product life cycle."* (Wise and Baumgartner, 1999). It is a challenge for top management to define and accept new measures to assess the performance of the company. These metrics need to decouple their measurements away from volume (White et al., 1999).

The tiny profit margin made on products are no longer the only revenues. Services are where good margins can be made. This is especially true for capital intensive goods like

trains, planes, printers, cars. For these goods, the total expenditure is much larger than the product cost (Wise and Baumgartner, 1999), due amongst others the high maintenance costs. Besides different metrics, cash flow entries will be very different. If the ownership of the products stays in the company, the cash flow will be spread over a long period of time, unlike when the ownership is transferred to the customer. Some companies are not willing to take this extra risk (Mont, 2004). Gebauer et al. (2005) found that service development are often expected to happen at a non credible rate. They add that these unrealistic objectives can have a negative impact on the employees, they should therefore be decided with the employees to improve their involvement and make them achievable.

5.3.2 Different pricing and financing

Pricing a service is a lot harder than to price a product. In this section we will discuss some of the implication of servitization on the pricing and financing. Mathieu (2001b) attributes part of it to the cost structure of services, explaining it as following: *"costs are fixed rather than variable and indirect rather than direct"*. Pricing for services differs from products because they are not based on transaction but rather on a bundle of things valuable for customers or a model based on subscription Frei (2008). She adds that customers will not retrieve the same amount of value for a same amount paid.

It is common for new services not to have an immediate positive impact on the revenue. Some of the ratios used may even be negatively impacted (Oliva and Kallenberg, 2003), this may worry the shareholders. Many struggle to translate the financial potential of services into new sources of profitability (Gebauer et al., 2005). Throughout a study Malleret (2006) found that: *"the development of organised and profitable services in companies is not immediate. It spreads over time and service activities become profitable only when specific thresholds have been passed, both in terms of volume and of organisation"*. As stated by Oliva and Kallenberg (2003) creating a separate business unit for services can help manage the profitability (see 4.3).

Especially in result oriented services and non-ownership models you need a robust financial model that should take unexpected costs into account (Hou and Neely, 2013). In these models the provider has to include the equipment operating risk into their pricing (Oliva

and Kallenberg, 2003). As labour intensity is likely to increase with new services, many companies can't keep prices low due to high labour cost. The more labour intensive repair and maintenance are, the harder it is to offer more services (Mont, 2004). Some companies struggle to show the added value of their service to the customer which is directly linked to the price he is willing to pay Malleret (2006).

5.3.3 Service quality erosion risk

As explained in 2.2.1, services are hard to replicate due to their heterogeneity. As companies want to offer good services, keeping a high standard of services isn't always as simple. Gebauer et al. (2005) highlights this phenomenon as the service quality erosion risk. They attribute this to a lack of resources in manpower to perform the service. (Frei, 2008) states that an efficient employee management system in line with the customer is a must to keep your service quality high.

To counter this continuous improvements are needed, Gebauer et al. (2005) suggested two important set of improvements that need to be addressed: *"First-order improvements entail combating symptoms in the daily service business (e.g. low customer satisfaction, low fit between existing service offerings and customer needs and so on). Second-order improvements are structural changes eradicating causes leading to fewer symptoms."* It is hard for companies to transfer knowledge across the whole company needed to perform services, as explained by Oliva and Kallenberg (2003) it is a trade off between *"transferability of services across markets and customization for individual end-users"*.

Chapter summary

In this chapter we looked at the different implications and hurdles servitization can have on companies. Combining products and services will increase the complexity of the offering. We further analysed the implications around two pillars, the implications on the stakeholders and on the operations. The first tackled implication on the corporate culture, managers and the sales force. Furthermore the customer will also have to adapt to the new offering. Second we explored implications on the operations such as the performance metrics, pricing and financing of the company and service quality erosion.

Chapter 6

Findings from the literature

As explained in the methodology, we looked for answers to four questions. These questions helped to structure our research on the concept of servitization. Let's recall the main elements identified in the literature for each question.

What is servitization?

We started the literature review by choosing the definition of servitization written by Vandermerwe and Rada (1988). It has been widely accepted by the scientific community and goes as following: *"Modern corporations are offering fuller market packages or 'bundles' of customer-focussed combination of goods, services, support, self-service, and knowledge. Services are beginning to dominate"*. In order to understand what is at stake, three related concepts are studied in further detail. First, we explored the concept of 'services', as it is a large concept, different categorizations from the scientific community were required to understand the concept. The second, 'value proposition' helped us to better understand the relationship of product and services in the creation of value. The last, the concept of 'solutions' was explored as it focusses on customer needs through a combination of product and services (Davies et al., 2006)

Why is it happening in companies?

The triggers for a servitization process are divided into two categories, the external and internal drivers. The first is related to the situation of the industry in general, factors such as commoditization, customer demand and technological capabilities were identified.

The second is related to the situation of the company within its industry. Factors such as a need to increase growth, competitiveness, customer loyalty and revenue were found. Others highlighted the need to come closer to the customer through tailored offerings of their needs. Companies are driven by a mix of these internal and external drivers towards a servitization process.

How are companies undergoing a servitization process?

We started this part by exploring the three value creating sources identified by Velamuri (2013): individualization, integration and firm-customer interaction. These value creating factors are useful to explore and understand the different forms and stages further identified in the chapter. We discussed the different forms highlighted by Tukker (2004). The section on the different forms consisted of two parts. First we explored four different offerings: Embedded products, leasing/renting, Mass customization and solutions (Wise and Baumgartner, 1999; Velamuri, 2013). In the second part we discussed the relationship between products and services (Shankar et al., 2009). Most of the scientific community believes servitization is done in stages, we explored the stages identified by Oliva and Kallenberg (2003); White et al. (1999). These different forms and offerings put to light three factors that have a large influence on the business models discussed. First, the non-ownership model is widely used as services tend to dominate the bundles. Second, we explored that the boundaries of the company can be affected significantly. At last we discussed the increasing influence of technology on the servitization process.

What are the hurdles and implication of servitization?

Due to servitization, companies have a more complex role within its environment. We separated the implications on the stakeholders and the implications on the operations. In the first category we looked at impact of servitization on employees and customers. We found that services can significantly impact the corporate culture, the sales people, managers and the value proposition given to the customers. In the second category we found that servitization can have an impact on pricing, financing and that when scaling up services, quality can be hard to sustain.

Part II

Servitization in practice: confrontations, discussions and opinions

Chapter 7

Introduction of the case studies

7.1 Case studies with relevant companies

As explained in the methodology I've spoken with four managers and one consultant that have experience in the servitization process through their companies or projects. Here is an overview of the specifics of the case studies:

Figure 7.1: Overview of case studies

| Com-pany | Size | Industry | Most integrated 'bundle' |
|-----------|-------------------|------------------------------|----------------------------|
| Hilti | Large corporation | Small construction machinery | Fleet management |
| Microsoft | Large corporation | Computer software | Office 365 and Cloud |
| Cambio | Small business | Transport | Private transport solution |

These companies have been chosen for the following reasons:

- **Three different sectors:** Servitization is a very wide concept that, as will be shown in the case studies, can vary significantly from industry to industry. It was therefore interesting to look at different industries and highlight the differences and similarities between the sectors. One have to keep in mind that this analysis is in no regard a complete overview, as the concept stretches over almost all industries. This thesis is only exploring three of them.

- **Three different business models:** These companies or industries all fit into the servitization definition of Vandermerwe and Rada (1988) used in this thesis (see 2.1). They are all selling bundles of products and services. The business models are nevertheless very different and evolved from different market conditions.
- **Clear servitization process taking place in the company and/or industry:** Although different, these three companies are undergoing a servitization process. The servitization process at Hilti is clear, amongst others, an initial tangible product is now offered as an integrated 'bundle'. At Microsoft we find a different form: a software is now sold as a subscription or through usage based contracts. Under this form clients don't buy a product but a software as a service (SaaS). These SaaS are sold in bundles with additional services. The last case study is a little different, I chose Cambio not for its internal servitization process but for the servitization process the industry is going through. Cambio is the final stage of servitization with a fully result oriented and integrated bundle. Cambio can't be used to analyse internal adaptations of the business model. I nevertheless think it's interesting to reflect on the opportunities for start-ups to insert themselves into the value chain through servitization of an industry.

7.2 Brief summary of the offered bundles

Before we dive into the confrontation between the case studies and the literature review, it's important to understand the different bundles of product and services sold by the case study companies.

7.2.1 Hilti

Hilti is a manufacturer of small machinery in the construction sector, they develop and produce their own products. There are two groups of products sold: the machines and the consumables. An important feature of Hilti's strategy is to stay as close to the customer as possible. It is reflected through their direct sales in the different selling points (stores, website, local representative, call center), these four selling points are linked to each other through a strong CRM (Customer Relationship Management). The

aim is to make the client feel comfortable and important while expecting to enhance loyalty towards Hilti. The stores only sell Hilti products, the sellers are well trained on the specifics of the services and products sold by Hilti. As the bundles offered by Hilti are relationship based and rather complex they rely and will continue to rely on the sales representative as an important selling point. These four selling points are a first panel of services offered by Hilti. Besides small complementary services such as calculation software, consulting services and support services three bundles caught my attention due to their close relationship to servitization:

Life warranty

With this warranty all problems related to manufacturing are covered during the entire life cycle of the product. On top of that Hilti covers all costs for any problem to the machine for period of two years. These reparations are done within three days, which is considered short for the industry. After these two years there is a limit on the costs paid by the client. This agreement has been very clearly outlined, Hilti thinks it is important for the customer to know exactly what they can expect from this service. This standardisation smoothed and enhanced the procedure. As an ex-manager said: *"The customer is not buying the product, but a complete package of product and services from a partner on which he can count."* Hilti is a premium product and more expensive than their competitors. *"This price is justified by the quality and long lasting products, which is directly linked to the maintenance and reparation services offered."* With this bundle he concluded that, Hilti is expensive to buy but cheap to use.

Fleet management

This life warranty bundle enabled Hilti to calculate the total cost of ownership, which helped them to develop the Fleet management concept. Hilti is offering a solution to completely manage the machinery of the client. In this concept Hilti remains owner of the products and offers the use, financing, maintenance, insurance, machinery management, labelling, etc. This Fleet management is offered against a monthly fee paid by the customer. At peak needs the customer can ask for extra machines, when a machine is broken it is repaired and the client gets a replacement machine. This feature is valuable

as minimizing downtime and high flexibility is important in the construction sector. The Fleet management can be tailored to the customers needs, and customer experience is improved.

It took Hilti about ten years to put this system in place, a strong CRM system helped to standardize prices and processes which was required for such an offering. Hilti stresses the fact that the Fleet management is a concept not a simple leasing as it is linked to many additional services. To prevent any misunderstanding, the Fleet management is mainly sold through sales representatives. It is a concept that needs to be promoted in a 'face to face' meeting. The sales representative will first talk about the problems and issues faced by the entrepreneur before talking about the Fleet management concept. The contracts are running for a period of four years, after which the products are replaced by a new generation. The old products are destroyed and recycled whatever state they are. There is no second hand use or buying option at the end of the contract. This way clients always work with top notch products.

Asset management

This is a new bundle that will be launched in January 2016. It will be a concept that entrepreneurs will help to manage their assets better. Through a labelling and scanning system the entrepreneur will be able to manage more easily its assets. These assets can be all his tools, but also other assets such as chairs. Through advice from Hilti, he will label what is relevant for him. This service can even be offered to clients without any Hilti products. Through a software the entrepreneur can organize its assets more efficiently. It is a bundle where services are more dominant than the products.

There are various relationships to be found between products and services offered at Hilti. In bundles such as the Fleet management and life warranty the products and services are complementary and dependent. Other services such as consultancy, asset management and calculation software are independent from the product. They are nevertheless proposed as a promotion of Hilti's capabilities. This serves as an introduction to Hilti, hoping the client will enrol with more products and services. Clients can nevertheless benefit from these services without owning any Hilti products.

7.2.2 Microsoft

There are four poles of bundles sold by Microsoft, lets briefly describe them:

1. **Bundles with partners:** Microsoft sells the operating system (OS) to Original Equipment Manufacturers (OM), Ex: Dell, HP, Lenovo, who sell the Microsoft OS packaged with hardware. These products will be packaged and sold to companies with complementary services such as: tagging, tracking, format, support, etc. All these services are linked to the product and support the product. They are used by OM and partners to differentiate themselves on a market largely dominated by Microsoft operating systems and commoditized hardware.
2. **Bundles for a customer need:** This bundle goes a little further than the previous one. It is sold as a solution, the client has a specific need, ex: 500 workers that need a computer with excel to work. The solution provider commits to full fill over a certain period the needs of the customer. It is a model of everything as a service.
3. **Bundle based on usage:** The new version of office will partly be sold as Office 365. This means that customers don't buy a perpetual version but a right to use the software for a given period. They will therefore benefit from the last updates and improvements. Besides this software as a service, related services are offered such as Skype call time, cloud storage space, etc. This system switches from a perpetual licence for each machine to a licence to use for one user on all his machines (phone, tablet, computer). This bundle is different from the previous one as it is related to the product, the software of Microsoft itself, and not the package through which it is sold. The client is buying the service provided by the software, not the software itself.
4. **The Cloud:** This service is related to the servers (see 4.6). This is an important part of the information systems in companies as it gathers and manages various data. Many companies struggle to keep up the pace with the rapidly changing technology and keep their data centres and servers secure. This is especially true for small companies. With increasing internet speed, the cloud service can replace these individual servers by high performance and secure servers located in the different

data centres of Microsoft. This service is result oriented, customers pay for usage. This can be very interesting for companies that need big server capacities for short periods (Ex: 20 km of Brussels, Concerts,...). This service can be highly customized, it is available under three forms: everything located in the company, data partly located in the company servers and in the cloud and everything in the cloud.

7.2.3 Cambio

As explained above Cambio is a small company that did not undergo a servitization process internally. They saw an opportunity to servitize the car industry. The bundle offered is complementary to the other public transportation (train, bus, subway). They don't see themselves as a car renting company but as a solution provider that enables comfortable private transportation without owning a car. Their mission is to make people realize all the struggle it is to own a car in the city: no parking spots, most expensive way of transportation, traffic jams, maintenance, insurances, etc. Similarly to Hilti it is a concept and not a simple leasing service, many other services are included. They go much further than the leasing companies, with an access card you can book any time of the day a car just for the time you need it. The member pays a fee according to his usage time and a price per km driven during the renting period. With this comes a whole set of other services: maintenance, reserved parking spot, etc. Cambio is currently active in 30 cities and has about 17000 reservations a month. It is a model based on the 'pay as you go' generating small margins. They also operate in the B2B market where they target companies for who a company car is not necessity as they are located in cities.

Chapter summary

In this chapter we discussed the choice of the different case studies (Hilti, Microsoft, Cambio). There is a large diversity as the three companies come from different sectors and use different business models. There is nevertheless a clear servitization process taking place and should help us to picture a broad view of the concept in practice. We further detailed the different 'bundles' of product and services sold by the case studies. These different offerings are important to understand for the confrontation of next chapter.

Chapter 8

Confronting the literature review with the case studies

As explained in the methodology we have explored four core questions on the concept of servitization: what, why, how and the implacations. Throughout the literature review we have structured the different opinions and analysis of the scientific community around these four questions.

In this chapter we will explore why the companies from the case studies enrolled in a servitization process, how they do it, and what are the hurdles faced. The interviews were open interviews but nevertheless focussed on finding answers to these core questions. The question about 'what' is servitization will be less discussed as the case studies were chosen based on the used definition of Vandermerwe and Rada (1988). The usual chapter summaries are replaced by tables after each section summarizing the findings from the confrontation.

8.1 Why are the companies from the case studies enrolling in servitization?

Similarly to the literature review, we looked for internal and external drivers pushing the companies from the case studies towards servitization. Several external drivers identified in the literature were highlighted in the interviews. Factors such as increasing technological capabilities, environmental awareness and commoditization of the products were

nevertheless not raised explicitly. As they are closely related to other discussions some factors such as technology will be addressed in the 'how' question. Internal drivers were abundantly expressed by the case studies, we will compare them to what has been found in the literature throughout the following sections.

8.1.1 New growth opportunity

Throughout the different interviews all agreed that servitization can lead to growth. Microsoft can now through Cloud services tap into a new market of small companies that couldn't afford their services previously. As for Hilti, clients that previously had a series of machines from different brands are through the fleet management now only using Hilti gear. This led to an increase in market share for Hilti. As said by Mr Gilson from Hilti: *"Adding services is a good way to increase product sales. With services a real partnership with the client is created which further opens doors to sell more products"*. Cambio has been operating in the car sharing business for 15 years. They are a profitable company that demonstrated the potential of their business model.

At Microsoft they noticed that clients not using the latest software version could hamper revenue growth for two reasons. First, clients use their version for much longer than expected, this lack of renewal can turn into a loss of revenue. Second, when eventually they have to buy an upgrade, using the outdated version as benchmarking reference could harm the image of Microsoft products. Clients could switch to the competitors. For Hilti, servitization was more a reaction to the growing pressure on the margins, as they at all costs wanted to avoid a price war with their competitors. Mr Dierxcens, previously working at Hilti, thinks *"profitability calculations are complex for the Fleet management. On a purely financial basis, the Fleet management is less profitable as there are a lot of additional costs. It nevertheless allowed Hilti to remain competitive in a environment where its market share was in danger"*. The case studies confirmed the findings from the literature, servitization can create value and enable to tap into new markets. Potential for growth has been highlighted in both the literature and the case studies

8.1.2 Stability of revenue

As highlighted in the literature stability will be increased due to recurring revenues, similarly the case studies stressed this factor but focusing more on the predictability of demand. Bundles such as Office 365 from Microsoft and the Fleet management from Hilti are much more predictable, the company knows exactly when there will be new demand for the product. The company can prepare herself according to the amount of renewals with appropriate production and communication.

Hilti is focusing on robust and quality products, their prices are therefore considerably higher than the competitors. As a result of fierce competition, the pressure on the margins increased. Instead of decreasing their prices, Hilti worked on the services offered. It was a way to retrieve more value out of the product. Through services such as Fleet management and life warranty, customers are getting more value than they would with Hilti's competitors products. As long as this last they will be willing to pay more. Retaining interesting margins has been identified in the case studies and the literature.

8.1.3 Advantageous position of the product manufacturer

As described in 3.2.3 of the literature review, companies initially selling products have important insights of the market and customers. These are useful to develop a successful servitization process. Their access to knowledge of the customers and the products can form an entry barrier to other actors in the market. These barriers of entry have been confirmed by our case studies. They stressed the skills needed to perform the service were not necessarily complicated to perform but that their ability to understand and solve the customers problems was a great hurdle for companies new in the industry. Additionally a relationship of trust already exist between the customer and the company, this will most probably also play in favour of settled manufacturers. Both Hilti and Microsoft also highlighted that the products used in the bundles are part of the value creation and can be hard to copy by potential entrants.

This doesn't mean that there is no risk for potential entrants in the market of their bundles. Boundaries of companies change (see 4.5), companies can therefore be threatened

from various, sometimes unexpected, new competitors. As shown in the Cambio case study, even start-ups manage to insert themselves into the value chain.

8.1.4 Creation of a competitive advantage

The case studies highlighted similarly to the literature review that a servitization process is a good way to create a sustainable competitive advantage over time. We will discuss the ones highlighted in the interviews.

Services brings you closer to the customer

As stated in 3.2.4 from the literature review, bundles bring you closer to the customer and companies can better adapt the offer to their needs. Through bundles using a non-ownership model, the case studies all pointed out that getting closer to the customer is highly beneficial. As said by Mr Dierxsens, an ex-Hilti manager: "*This interaction with the client enables Hilti to adapt the offer in line with the real needs of the client*". Mr Dallemagne is convinced that a successful servitization depends upon if the offer is relevant for the customer. Offering tailored offerings is a way to be more relevant for the customer. A good example is the Cloud offering of Microsoft, with which it is capable to offer customized solutions that fit the customers needs while being cheaper.

Creating dependency of the customer

In the case studies, the interviewees stated that the closer you are to the customers real needs, the more value it represents for the client. Services are a great way to better satisfy the clients needs, therefore decreasing the risk for the client to switch. It is a transfer barrier for the client as he is used to the service and procedures of the provider.

The aim of Hilti is to make customers loyal, they prefer to work in depth with a few clients then to work superficially with many of them. As said by Mr Gilson: "*Services enable Hilti to be more relevant for the client as a partner and not only as supplier*". When his contract will come to an end, the customer is unlikely to change and lose these benefits. Contract renewals at Hilti have shown to be high. This phenomenon of repeat sales and renewed contracts identified by Mathieu (2001b) in the literature review is therefore confirmed by the Hilti and to a lesser extend by Microsoft.

Service can help to diffuse new innovation and strengthen corporate image

The operating system and Office have for long been sold by Microsoft on a perpetual basis. They realized that most of the clients, especially smaller entities or public entities, with low budgets would not upgrade their version until really necessary. When they came to the point of buying a new version, they would compare the old version with the actual version of competitors. The risk is higher that they will switch when looking at this distorted view. By offering Office 365, a subscription to the software, clients would always have the latest version and compare it with other software on an equal level.

As Microsoft is operating in a high technology sector, confronting your customer with the latest products can be a game changer to diffuse new innovation, this should increase Microsoft competitiveness. As stated by Mr Van Bunn from Microsoft: *"If you sell an offer fixed in time, you can't adapt to the changing needs of the customer. It is therefore important to have a competitive offer at the decision point of the user but also to be competitive all along the life cycle of the product"*. The same phenomenon applies to Hilti but to a smaller extent as product research and development is changing at a slower pace.

This confirms the findings of Malleret (2006) and Vandermerwe and Rada (1988) that the service can help to diffuse new innovation and strengthen corporate image have been generally confirmed, some factors are more present in certain case studies than others.

Section Summary

In the following table we discuss the different take-away's confronting the literature review and the case studies. This first section tackled the following question: 'Why is servitization taking place?'.

Figure 8.1

| Reasons identified in the literature | Hilti | Microsoft | Cam-bio |
|---|---|--|---------|
| New growth opportunity | yes, directly and indirectly linked to service | yes, directly and indirectly linked to service | yes |
| Stability of revenue | yes, increased predictability & reduce pressure on margins | yes, increased predictability | - |
| Settlement in the market | yes, advantageous knowledge of the customer | yes, technological knowledge | no |
| Brings you closer to the customer | yes, as it leads to knowledge of the customers needs & tailored solutions | yes, tailored solutions | - |
| Dependency of the customer | yes, facilitates transition between product generations | yes, idem Hilti | - |
| Diffusing innovation & strengthen corporate image | yes, but to a small extend | yes, to high extend | - |

8.2 How are the case studies adapting their business models in a servitization process?

In this section we will confront the finding of the literature and the case studies trying to find answers on 'how companies adapt to servitization?'. For the best clarity of the reader, we followed the same structure as in the literature review of the thesis.

8.2.1 Servitization enables value creation

As described in 4.1 of the literature review, combining products and services enables individualization, integration and firm-customer interaction Velamuri (2013). These generate considerable value for the customer and the company. They have been identified in the three case studies, lets take a closer look.

Hilti

As Nowak (2014) from Hilti states: "*By working in close partnership with our customers, we are able to develop our products and services in line with their individual requirements. I am impressed how this enables us to come up with ever better solutions*". The core feature of Hilti's strategy is to have direct contact with the clients. The firm-customer relationship has always been important and a differentiation factor. The life warranty and the Fleet management offerings were able to be deployed through this close firm-customer interaction. The competitors are all working with intermediate suppliers and miss this direct link to the customer, this is a barrier for them to develop a similar offering. It is nevertheless clear that offering bundles such as the Fleet management further improved the firm-customer relationship and individualization possibilities which in return creates a lot of value.

Through a non-ownership model companies can provide customers with their exact needs, not more not less. Hilti can provide construction workers with the exact machinery they need on a daily basis. These combined value creation aspects enhance flexibility significantly. It is important, as said by Mr Gilson, that it is a firm-customer relationship and not a sales representative-customer relationship that generates value. It is a common error to think that the value comes from the representative but as there is a lot of job rotation and the customer is represented by different parties (finance, CEO, front office employee,...) the value is generated by the relationship Hilti - customer. This contact at different levels with the customer, enables Hilti to customize services for the needs of these different levels.

Microsoft

What has been a game changer at Microsoft is their ability to individualize the offer. Microsoft traditionally sold the product without caring much about its usage, there was no follow up once the product sold. Due to their comfortable dominance on the market, this model worked for a long time. With the rise of other operating systems and improved capabilities in technology the model is shifting. Microsoft is now interested on how the product is used by the customer and seeks to capture value from individualized offerings. The Cloud is a good example of individualization, Microsoft can provide their clients with fluctuating capacity needs with a highly customized offer. A server can be used for

more than one client, there is an increased usage, Example: The servers of the 20km of Brussels need a very high capacity during the very busy days of booking, the rest of the year they need relatively small capacity. With the cloud, Microsoft can provide this service. This service is very interesting for the organization as it doesn't have to invest in costly servers that are rarely used at full potential. This individualization leads to a closer firm-customer interaction, which could be used in future business developments such as value creation of the data generated.

Cambio

Cambio provides a service of personal transportation that fits the exact needs of the customer. This has two important consequences, the customer pays for its use and not for the product and Cambio can increase product usage. For the company, integration of the product and the service is triggering value creation. This integration of the bundle enables to offer price competitive offers to the customer in terms of mobility. Cambio is a proximity product, firm-customer interaction is a necessity, but it is the bundle integration that triggered the value creation process. Mr Van Mallegheem stressed that the offering is a concept and much more than a simple leasing model, it is the missing link in terms of inter-modality. Cambio is aiming to offer to their customer to have the same or better life quality without owning a car.

The three value creating aspects identified in the literature (Velamuri, 2013) are all present to different extends in the three case studies. We suggest a dominant value creating aspects for the three case studies: at Hilti the dominant feature appears to be the firm-customer interaction, at Microsoft it was the new ability to individualize offers, at Cambio it was the integration of the bundles that triggered a value creating process.

8.2.2 Old model remains in place

In the literature review we explored a lot of research on the different offerings and relationships between products and services. There was less to be found on the advantages to keep the old model in place. This last fact was especially highlighted at Microsoft and Hilti.

Through the interviews they all agreed that the old system of selling the product with no or few added services will continue to exist due to demand for it. They added that it is unlikely that this business model will completely be replaced by fully integrated bundles in the close future. This process is dependent on technological possibilities as a mean to develop further integrated solutions. Cambio, for example, expects the autonomous car to reach the markets in a not too far future, this will have a huge impact on the business and industry of Cambio, who knows integrated solutions might then be the only remaining market. The design of the Fleet management at Hilti is such that it will only be interesting for entrepreneurs with certain needs (usually clients with many employees and machines), others will not benefit from the surrounded services and will find the bundle too expensive for what they get in return (usually clients with few employees and machines). Another reason highlighted by Hilti is that the client must be financially sustainable. Hilti has to keep a reasonable credit risk. In case the bundle is not the appropriate solution for the customer Hilti wants to offer these clients the traditional product solution.

Best practices in other industries

Noticing best practices in other industries and adapting into the business model is common. Mr Van Mallegheem said that external monitoring of other industries and other parts of the world is an important driver to get inspired for new innovations in your industry. To develop the Fleet management, Hilti inspired its model, amongst others, from the car leasing industry.

8.2.3 Type of bundle of the product and service

As identified by Shankar et al. (2009) in the literature review different types of bundles exist. These differ with the relationship between the products and services. We have applied the different bundles to the case studies.

- **Hilti:** Their bundles are flexible as products and services are independent and can be linked together according to the needs of the customers. Bundles are also the so called 'peace of mind' by Shankar et al. (2009) as Hilti sells high quality products and has a good reputation
- **Microsoft:** Similarly to Hilti Microsoft bundles are flexible and 'peace of mind'.

- **Cambio:** Here the products (car) and services (access to the cars) are so integrated that the individual value of each component is lower, we suggest it to be characterized as a multi benefit bundle.

8.2.4 Growing role of the customer

The case studies showed that the role and importance of the customer within the company is growing. As described in 4.1 by Vargo and Lusch (2004); Gebauer et al. (2005) this is due to the transition from a transactional based model towards a relationship based model. In some cases the old transactional model remains in place, this transactional model is kept for a certain group of customers that were also identified with the central role of the customer. Let discuss two aspects that were found in the case studies.

Clients turn into partners

As identified in the literature by, amongst others, Oliva and Kallenberg (2003) companies are not looking to sell volume but to fulfil a need. This mindset will turn a client into a partner. Instead of pushing the volume of sales, companies will push efficiency. Microsoft is not interested to sell the largest volume servers and needed software, instead they are more interested offer the best solution for the clients needs. Similarly Hilti is more interested in providing the client with the right machine at the right time, than to sell the machines. Amongst others, Mr Dallemagne highlighted two aspects that are needed to build a partnership, the company needs to figure out where it is competent to help the client and trust needs to be build. The company needs to help clients to use the product more efficiently, in return the client and partner will agree to pay for the service. As the interests between the company and the client are aligned, they are building an efficient ecosystem. Intangibles are getting more value through this approach.

As there is a complexification of the model, Mr Gilson from Hilti highlights that it can also lead to some benefits. Because there is a long-term commitment with the client and not only the one-time transaction, Hilti has access to discussions with people that have a larger scope of responsibilities within the client company. Mr Gilson adds that discussions with the clients will be much more constructive and deal with the their problems in depth.

With this close partnership Hilti is able to sell a larger set of products. This will further increase Hilti's knowledge about the needs of the customer.

Clients involved in promotion

This feature has not been explicitly encountered in the explored literature. They have nevertheless been highlighted by two case studies as being important.

As bundles are more complex to understand for the customer, Hilti and Cambio both rely on face-to-face discussions with the clients to promote their new bundles. It's important for them to start the good customer-firm interaction as soon as possible. Hilti acknowledges that the best way to promote a product is to let other satisfied clients share their experiences with potential clients. Through events such as sports Hilti is working to improve this selling method.

At Cambio they prefer to call the clients members as they are seen as promoter and ambassador of the concept. As the concept is based on proximity and networking, clients promoting the projects to others is seen as the most efficient way to find new clients. Mr Van Malleghem estimates that 60-70% of their new clients are brought in by other clients. Cambio is organizing different events where employees get together with clients and future clients. At these events clients can have a reassuring discussion with experts.

8.2.5 Servitization is done in stages

We have seen in the literature review that the majority of the scientific community thinks that servitization is done in stages. We will look at two aspects of these stages highlighted in the interviews and encountered in the literature. First the creation of a business unit was done in the three different case studies, second we will look at how the companies transit from one stage to the other.

Creation of a separate business unit

All companies from the case studies created a separate business unit to handle the newly offered bundles. The creation of a separate business unit was highlighted in the literature review by Oliva and Kallenberg (2003). At Microsoft there has been a reorganization

around the strategic pillars, this way resources are allocated as efficiently as possibly. This reallocation of resources led to the creating of the Cloud business unit. At Hilti as bundles are a radically different way of working (finances, logistics,...) a new business unit was created to assure the good quality of the offering. Besides creating a special business unit, Mr Gilson highlights that bundles forces Hilti to work in task forces rather than in the traditional linear structure. In these task forces you bring people together from different departments and with different experiences. This leads to enthusiasm within teams. Cambio went even a little further in their new solution, focussing to offer a substitute to the company car, they created a new entity. This for particular reasons, first it would be too risky for Cambio to expose the existing profitable business, second a separate company was created to enable innovation in the model and prevent to be too much linked to Cambio's way of working.

Transition between stages

Throughout the case studies, decisions for transitions are made at a strategic level. They are nevertheless using information gathered on the field in order to be close to the customer. At Microsoft decisions are made through a centralized structure, different methods are in place to collect the information from the market and adapt the strategic vision in consequence. As said by Mr Dallemagne support from top management is needed and can be a challenge. Similar findings were found in the literature.

At Microsoft, a worldwide corporation, changes need to be tested before being implemented. A radical change towards more services is therefore too risky. Mr Dallemagne highlights that it is common for companies to first try new business models under a pilot project. This system is used at Hilti, Mr Gilson from Hilti argues there wasn't a complete change in business model during the servitization process, the core business model stayed the same, a model selling directly to the client. Services are a way to improve this and can offer a solution to wider angle of problems faced by the customer. The situation is different at Cambio as the size of the company is rather small. They cannot afford to work with large pilot projects, Cambio has nevertheless to adapt to the rapidly changing environment in order to remain successful.

8.2.6 Extensive use of the non-ownership model

Similarly to the literature review, we found that the non-ownership model is extensively used. We will discuss some of the features of the models used in the case studies. Different forms we found:

1. At Hilti, the product (machines) is physically used on an individual basis by the customer.
2. At Cambio, the product (cars) is physically used by the customer. The product is shared by multiple customers.
3. At Microsoft the product (servers) is virtually used by the customer. The product is shared by multiple customers.

At Microsoft they use the non-ownership model for the Cloud offering. It is a very interesting model as Microsoft assures the needed capacity and safety for its customer without any investment for the customer. Security is an important point as many companies work with very sensitive information (especially in health care and international organizations such as OTAN and the EU). This has been an important barrier, Microsoft is doing everything to reassure their clients.

In this model there is a better use of resources, as stated by Mr Dallemagne: *"As the producer stays owner of the product it is in his interest to build a sustainable good (the re-use, recycle, remanufacture model)"*. This can affect how the product is designed. The sustainability of your good can influence the profitability of the model. Hilti is able through a premium product to limit reparation and maintenance costs. For other players in the market with a lower quality product this might be a barrier to the model. Mr Van Mallegheem nevertheless tempers the argument: *"Companies are rarely interested to invest with an environmental mindset, if they do it is for economical reasons"*.

As the user of the product is not owner of the product, there is a risk the client will use the machine on a abusive and non-respectful way. This risk is supported by the company and can be seen as a selling argument. Hilti designs their products to be robust and resist to the worst situations. For small damages that are repairable Hilti doesn't care if it was done on purpose. They have nevertheless set rules that a machine can be considered

unrepairable due to abusive use. In that case the client will have to pay the residual value. According to Mr Dierxcens this doesn't happen very often as a good relationship prevails above one machine. If machines are often brought back broken the client will be re-evaluated and he might be kicked out of the Fleet program.

Similarly to the literature review, the non-ownership model enables the companies to play with the burdens of ownership (see Figure 4.3). A robust model can unleash different opportunities for new services to create value.

An interesting point was made here by Mr Van Bunnan, Microsoft faces resistance from clients to switch entirely to the cloud for making the IT department obsolete. The IT department fears that its added value will disappear. To counter this resistance, Microsoft tries to show the client it can free management and employees to focus on other tasks, such as user friendly apps, support, etc. Microsoft uses the resource-based view argument of Wirtz and Ehret (2013), we discussed this argument in 4.4. These other services can have more added value. Clients have to realize the opportunity cost there is in the Cloud. As said by Mr Van bunnan: *"there is a change in the boundaries of companies, some people are not yet aware of this imminent change"*.

Change in boundaries

As seen in the literature review a consequence of the non-ownership model is that it can change the boundaries of the company. The three different case studies have seen there boundaries grow with the non-ownership model.

Mr Dallemagne, consultant at Innergic, stated that: *"Many companies are squeezed in the value chain. They retrieve relatively small value compared to what produce."* To illustrate he used the example of the proximity sensors on the back and the front of the cars, they innovated and created a new product while it is the car manufacturers that take most of the profit. Having powerful players in the value chain can be problematic to go downstream as explained in the literature review.

8.2.7 Impact of technology

At Cambio and Hilti, technology is considered as a mean but not an end. Mr Dallemagne, a consultant at Innergic, thinks that technology doesn't usually trigger a servitization

process but that it is rather a useful tool (ex: monitoring). Servitization was made possible through technological advancements such as CRM software for Hilti or magnetic cards for Cambio. The success of bundles such as Fleet management are dependent on how effective information is shared. It is different for Microsoft as technology is at the center of the company, technology is a competitive advantage. As highlighted by Mr Van Bunnem: *"There are only three companies capable of offering large scale cloud services: Amazon, Microsoft and Google. This is a competitive advantage for these three players which will be hard to catch up for others"*. We can see that as described by Turunen (2013) (see 3.1.3) in the literature review technology has a twofold impact on servitization. It can or be embedded in the product like at Microsoft or assisting the product like at Hilti and Cambio to enhance a servitization process.

It was confirmed by the case studies that the internet of things is likely to create opportunities in servitization such as described by Porter and Heppelmann (2014) in the literature review. Through monitoring huge amounts of data are produced, this data could be valuable if it is well used. Microsoft uses a lot of this data to improve their own products. In the future they could also help other companies to collect, use or sell this data through a service offering. Microsoft is separating the data generated by themselves and data generated by their clients. On the data created by their clients there is a huge potential to offer services on how extract value from the data. It is important here to figure out how third party partners can use this data. Data generated by Microsoft can also have value when used to improve their services. With the large amount of Microsoft users interesting statistics can be generated.

Services will be more dominant in the future but product will always be the one generating data, thus remaining a key element. As highlighted by Mr Gilson the internet of things and connected products will become a dominant factor in future product developments. Prevention is an example that could radically be improved by the internet of things, eventually Hilti could warn their clients that a machine would default, therefore repairing it before it happens and reducing downtime close to zero.

When looking at Figure 4.4 in the literature review, Porter and Heppelmann (2014) describe the future prospects of embedded products. As discussed, the case studies are

already using the first two stages: monitoring and controlling. The case studies, especially Hilti and Microsoft, are working on extracting value out of the optimization function, such as prevention of repairs.

Section Summary

In the following table we discuss the different take-away's confronting the literature review and the case studies. This second section tackled the following question: 'How do the case studies adapt their business model to servitization?'

Figure 8.2

| Models identified in the literature | Hilti | Microsoft | Cambio |
|--|---|---|---|
| Dominant value creating factor | Firm-customer interaction | Individualization | Integration |
| Type of bundle offered | Flexible, peace of mind | Flexible, peace of mind | multibenefit |
| Clients turn into partners | Seen as very important | Briefly mentioned | Seen as very important |
| Servitization is done in stages | Expanding service offer, creation of a separate business unit | Entering the service market, creation of a separate business unit | Expanding the service offer, creation of a new entity |
| Use of the non-ownership model | Yes, only for certain customers and bundles | Yes, degree dependent on choice of the customer | Yes for everyone |
| Impact of technology | Low but increasing | Very high, core of the business | Medium, likely to increase |
| Specific to the case studies | | | |
| Old model remains | Yes and likely to remain | Yes, remaining as long as there is demand | - |
| Promotion by clients | Yes, likely to be further developed | Not mentioned | Core of the marketing strategy |

8.3 Implication of servitization in the case studies

In this last section will confront the implication found in the literature review to the case studies. After discussing the new and complex role of the company, similarly to the literature review we divided the implications into two categories (stakeholders and operations).

8.3.1 New and complex role of the company

As highlighted in the literature review servitization tends make the offering complex and the role of the company can get fuzzy, this phenomenon was confirmed in the case studies. At Hilti, they noticed that having a simplified and clear explanation of the program was vital to educate the client for him to enrol in the program. This change was very important as it made the bundle scalable. Before clients are granted to enrol in a full Fleet management system, the client must be financially healthy and must prove themselves worthy. As described by Foote et al. (2001) in the literature review, Hilti is focussing on the most valuable clients.

8.3.2 Implications on the stakeholders

Similarly to the literature review, we found that the most affected by servitization are the employees and the clients. We discuss some of the arguments highlighted in the interviews.

Impact on the sales people

In the literature we identified that managerial motivation and the right sales people were required for a successful transition towards services. A slightly different focus was noticed in the case studies. They did not deny the importance of managerial motivation but stressed that the focus should mostly be on the sales people. They are the ones that need to sell the bundle to the customers, to keep them motivated and fully convinced by the new bundle. These sales employees are the contact-point with the client. As the relationship with the client gains in importance, the companies in the case studies find it vital to provide support these front-office employees. Besides, these sales people are also at the source of strategic changes, as they could identify the changing needs of the

customer. This information is then analysed at a strategic level and can result into a new bundle.

As highlighted by Kindström et al. (2015) in the literature review, the front office employees need to adapt their habits and references which might lead to internal resistance. At Hilti their new model was considerably more complex, as long as the front employee did not understand the model in detail there was resistance. Some of them struggle to understand the added value for the new model, they need to move away from the volume centric mindset. To assure a smooth adaptation for the sales force, the old model is kept in place. Hilti and Microsoft did not face internal resistance at strategic levels as the model economically made sense.

Convincing the client

As the model tends to get complex, the studied companies all stressed the fact that there was a need to have a clear and as simple as possible offer. This switch from a transactional model to a relationship model can scare the client, the more straight forward the benefits the more likely he will be ready to switch. Hilti and Cambio nevertheless highlight that the relationship is much more than the contract. The contract is the backbone but a relationship of trust needs to be build between the company and the client. This trust starts by the client fully understanding the implications of the new model.

There can also be resistance from clients that want to remain owner of their products, sales representatives have to convince him with hard facts and calculations that the Fleet management is more interesting. At Cambio they identified different groups of clients that need to be convinced with different arguments. Mr Van Bunn, from Microsoft highlighted that services have to be sold with a different follow up: *"We have to make sure the product is used correctly, there is nothing worse for a company to sell a product that is not used at its full potential. The client would not capture all the value available for its investment"*. At Hilti, sales representatives have to adapt from selling a product to selling a concept.

In the literature Levitt (1981) argued that the intangibility of the offer could hamper the loyalty of the customer. The case studies seem to have a limited impact of this implication

while the intangibility of their offering is growing. They rather see services as a way to build trust and loyalty.

8.3.3 Implications on the operations

In this second part of the implications, we discuss different arguments highlighted in the interviews concerning the operations of the company.

Different performance metrics

In the literature review we discussed the arguments of Wise and Baumgartner (1999); White et al. (1999) stating classical performance metrics based on volume and material measurements need to be adapted towards measuring more intangible features. This was confirmed by the case studies, in an interview one highlighted an example: "*Trust is hard and painful to measure. The best metrics are found through experimentation and 'trial and error'*". Another added that some intangible features are just not possible to measure. At Microsoft KPI's are adapted all the time, there has been an impact on the performance metrics with the new Office 365. Instead of measuring the amount sold, Microsoft is interested on how the product is used, where does the customer find value and if he uses the product at his full potential or the right way. Cambio is using a lot of their monitoring data to create new performance metrics.

Change in financial structure and pricing

Following the different arguments explored in the literature review, the case studies have confirmed that servitization can have a temporary negative impact on the revenues. This will have different implications on the company, we explore some highlighted during the interviews.

Two different aspects were highlighted as a consequences of a change in financial structure. Hilti's revenue model is changed from a model where products production cost and margin were paid in one time to a model where it is paid over the life-cycle of the product. During the transition between the two models there was an increased financial pressure. This is one of the reasons why it took about ten years for the model to be effectively put into place. For such models you need to be very strong financially or benefit from support

as you have to wait longer for positive cash flows. As financing has to be increased it is not available for everyone and can form a barrier to servitization. At Microsoft, they are influenced by what the market thinks of the new model. Mr Van Bunnem said that when switching to the Office 365 and a subscription to the OS, Microsoft had to explain carefully the new financial model to the market to assure a smooth transition. As the model is more predictable it has been well received by the market despite a little risk in decreasing revenues at the launch. As Cambio started as a start-up to offer bundles financing was a serious barrier to the development of their company. As the model was fairly innovative, Cambio had to prove itself to gain trust from financial suppliers. They solved this issue by starting small with a robust business plan and had to look for solid partnerships with other organizations.

Similarly as the arguments of Mathieu (2001b) from the literature review, Mr Gilson from Hilti confirmed that the pricing method is significantly different and harder for services than for products. He states that the pricing is defined by three elements:

1. Contrarily to a product it's hard to define where the product start and ends, to define the exact costs of a performed service
2. The level of expertise will determine the price of your service, low level (Ex: operational tasks) versus intellectual (Ex: consulting)
3. The pricing will depend if the company outsources the performed services or not. At Hilti they rely mostly on in-house provided services as it is more secure and sustainable in time. When outsourcing, the companies added-value could be questioned.

Mr Gilson explained that not all services have a price tag, the sales representative has the freedom to offer add-on (Ex: delivery) services for free for certain clients.

Quality erosion risk of the services

The quality erosion risk identified by Gebauer et al. (2005) has been identified at Hilti and Cambio. The reasons for erosion are nevertheless different. Hilti as a large corporation implements their services on a large scale. These services need to be adjusted, improved and scalable to improve its quality. Hilti is therefore in a constant upgrade of the services.

The situation is different at Cambio, they offered an outstanding service in the beginning but struggled to keep up while growing. Mr Malleghem states that the best way to avoid quality erosion is to base the model on a customer and relationship centric approach.

One can note that Hilti and Cambio have their business model based around a physical product. Whereas at Microsoft the model is centred around a software. The implications are therefore less straightforward as the it doesn't need to be physically transferred. For example, they did not mention facing quality erosion of the service, arguing it's possible to provide a homogeneous bundle (see 2.2.1).

Section Summary

In the following table we discuss the different take-away's confronting the literature review and the case studies. This third section tackled the following question: 'What are the implications and hurdles of servitization?'

Figure 8.3

| Implications identified in the literature | Hilti | Microsoft | Cambio |
|--|--|--|---|
| Clear & simplified contract offering | Enabled scaling up services | Not mentioned | Backbone of trust relationship |
| Impact on the sales people | At the center of the bundles, increased responsibility | In depth understanding of the new offering | Selling according to background of client |
| Convincing the client | Understanding of the complex offering | Focus on right product usage | Education according to background client |
| Performance metrics | Growing focus on intangible measures | Focus on how the product is used | Growing focus on intangible measures |
| Financial structure | Impact on the revenue streams | Need to reassure the shareholders | Gain trust of financial suppliers |
| Determinants of service pricing | Fuzzy boundaries, level of expertise, outsourcing | - | - |
| Quality erosion of the service | At launch of service | Not mentioned | When scaling up the service |

Chapter 9

Opinions and building on the confrontation

This chapter starts with the opinions of the interviewees on the future of servitization within their companies. We will continue by identifying some missing links and gaps between the literature review and the case studies. We will propose some models to further understand the concept of servitization. We will close this chapter identifying some possible reasons why companies would not enrol into a servitization process. These reasons were retrieved from an analysis of the case studies and the literature.

9.1 Future prospects of services in the case studies

As a customer focused organization Microsoft will continue to adapt its bundles to the needs of the market. These needs can change quickly, Mr Van Bunnan could therefore not predict if services would continue expanding. He nevertheless expected it to go into that direction. As said in 8.2.2 as long as there is demand for the old model it will stay in place. As said by Mr Van Bunnan: *"We can innovate and educate the market towards new solutions, but we have to be careful not to remove products from the market that still have demand or can be more interesting to use under its old form"*.

Mr Gilson stressed that the strategy at Hilti is to remain a product manufacturer and not to focus only on services. *"Services are always developed with in mind to offer new opportunities in the development of our products"*. There is nevertheless still a huge

potential of services linked to the product and beyond that Hilti will continue to develop. As already mentioned, Hilti has a close relationship to its clients and is therefore in an excellent position to offer relevant bundles of product and services.

Mr Van Malleghem pointed out that car sharing services such as Cambio will continue to grow. Inventions such as the autonomous cars and smart cities are coming sooner than everyone expects and will have a huge impact on Cambio. This digitalization process will enable to build many new different business models, this will be a challenge but can also be an opportunity for Cambio to keep service quality high. The company needs to be very reactive if it wants to survive. Mr Van Malleghem stresses considering the size of his company, missing a technological improvement could be disastrous. Political support towards stricter regulations for company cars is also important for the development of the Cambio model.

9.2 Building further on the confrontation of the literature review and the case studies

In the following section we will discuss possible models building onto the confrontation of the literature review and the case studies. One should keep in mind that these models were based on my personal analysis and opinions. This will lead to several limitations and risks of the robustness the models.

9.2.1 Usage based models closely related to servitization

When a company sells a product on a usage base rather than a one time transaction, is it enough to call that a servitization process? We have identified that the non-ownership model is largely used in our case studies. In this issue, the core question is if selling usage of a product is considered as a service. Is the basic leasing model considered as servitization of the company? The models of Tukker (2004); Wittkowski et al. (2013) are confusing when trying to answer this question. According to the case studies a simple non-ownership model or leasing isn't considered as a bundle. At Hilti they even stress that it is not how they want to be perceived, they want to be perceived as selling a concept.

Where is the border and limit between a sole leasing system and a concept? As non-ownership models enables to easily perform additional services related to the product, a reasoning could be that when additional services are proposed it could be considered as a concept and therefore be a bundle.

These additional services increase the value of the bundle significantly. In order to find the services with the most value, the company must be customer centric and maniacal about his needs. These needs change over time and the company will have to adapt, not with the non-ownership model, but with the services proposed. We can state that selling a concept is much more than a different financial structure offered by non-ownership.

9.2.2 Expansion of servitization within a company

As discussed in the previous chapter, companies keep a mix of the old model (before servitization) and the new model (after servitization). The following categorisation, based on the type of good sold, could help to explain the mix between the old and the new model. These categories are not mutually exclusive. I did not include the case of a start-up. As the case study of Cambio doesn't sell any good, a category couldn't be suggested.

1. **Capital intensive goods:** The most famous examples of Servitization come from companies selling capital intensive goods. Companies such as Xerox, Rolls Royce have been selling bundles for a long time. This group uses the non-ownership model as core element of the sold concept (see 9.2.1). The Hilti case study highlighted that there was a limit of expansion of the model within one company. First, not all potential customers fit into this non-ownership model as the credit risk for companies would be too important. Second some clients might still justify to choose for the traditional ownership model as it might be the best fit with their needs. Therefore not all clients fit into a fully servitized model, the old model will always stay relevant for a certain group of customers.
2. **Unstable goods:** Some goods quickly turn obsolete and therefore won't fit the needs of the customers over a long period. High technological goods are an example of unstable goods. If you own a computer or server, the difference over a few years

can be huge. Through non-ownership models, companies can assure customers their needs will be fulfilled all along the life cycle of the product. Offering products in an intangible form is for example a great way to work in this rapidly changing environment. Products that used to be distributed to the client remain entirely in the company. The client uses the product while actually never seeing the physical product, this is made possible by using Internet as a mean to reach the user. The Cloud is an example of this situation. Companies managing to intangibilize their goods completely make it possible to servitize their offering completely and could eventually drop the old model.

3. **Goods as support to perform the service:** Some goods may not be capital intensive but play a prominent role in performing the service. An example is the asset management concept offered at Hilti. The only goods used are the scanner and the tags. These are needed to perform the service, the product and services are dependent. As opposed to the Fleet management where the product is not performing the service, the product and service are complementary. If there is a bundle where goods are required to perform the service, barriers towards a full servitization will be smaller and most of the customers could be served with the bundle.

This categorization will help us to answer the following questions: Is there a limit of efficiency upon which companies are not willing to further develop bundles? What is required to reach a fully servitized offering (only services are remaining) as described by (Tukker, 2004; Oliva and Kallenberg, 2003)? A Larger market research should be done to complete this categorization for a reliable answer to these questions.

9.2.3 Services are sustainable but hard to get right

Throughout the literature review and the case studies services are pictured as the perfect asset to maintain a competitive advantage over time. Services are put together by multiple actors within the company in an orchestrated combination. Most of this is realized within the company and are therefore harder to be copied with reverse engineering. As they are harder to copy for the competitors they are also much harder to implement than selling only products.

I have set a list of encountered requirements for a successful service implementation, this list is in no mean a complete list and are taken from a combination of scientific literature and case studies.

1. **Know the needs of the customer:** This is an important switch in mindset, companies need to focus on the client not the product capabilities. Different ways exist to get to know these needs, often by analysing the problems of the customer. As the customer will not clearly outline his needs, it's the company's role to get closer to the customer and build a relationship.
2. **Value creation through solutions for your customers needs:** As described above, services are great to satisfy these customers needs, often much more efficient than sole products. This will create value for the customer and the company can capture this value by wrapping bundles around the needs of the customer. Depending on the industry these needs can change rapidly over time.
3. **Thoughtful offering:** Knowing the needs of the customer is the first big hurdle for the company, the second is to implement successful services. Many factors need to be set right and the process might take time. As shown in the literature review and through the case studies services will have a big impact on the financial structure and organizational structure. Services are priced and structured differently than products. In the case studies, they stressed that sales methods are different between product and services. As customers are reluctant to change, they need to be convinced that the new offering is better than the old transactional model. In the case studies, managers explained that benchmarking of other industries or other regions in the world are great ways to be innovative.
4. **Quality erosion is a constant threat:** As described in 2.2.1, it is much harder to assure the quality of a service than from a product. As services are intangible, quality can rapidly decrease. When defining the service companies should make sure the service is scalable. Different aspects have been identified during this thesis, amongst others, there is a need to have a clear offering through transparency in the contract and prices.

9.2.4 The impact of technology on the evolution of servitization

Throughout this thesis, in the literature review and the case studies, the role of technology has been studied. The scientific attention exploring the role of technology in servitization is fairly small. We will try to explore its effects with support of the case studies and building on the findings of Turunen (2013) (discussed in section 3.1.3 of the literature review). She argued there were two different technologies, the one embedded in the product and the one assisting the product. We have noticed that these two forms can be identified in two stages.

1. **Technology, facilitator of servitization:** In this first stage technology is not seen as a key element in the servitization process. Some bundles such as the Fleet management of Hilti are said to be possible without technology. Technology nevertheless plays a role as facilitator, an integrated CRM system significantly increases the efficiency of the bundles. This technology is not related to the product. They are often not high technological skills but rather technology accessible for everyone.
2. **Technology, at the center of servitization:** In this second stages, technology plays a central role, technology is enabling the servitization process. With the rise of the Internet of things this stage will become dominant. As described in 8.2.7 and by Porter and Heppelmann (2014), technology could through remote monitoring play an important role in prevention. Products could for example be repaired before it is even broken. As technology gets increasingly embedded into the product. Products can turn into high technological products.

The companies from the case studies are in the transition between these two stages. They are showing more and more features of the second stage, the use of smartphone applications for example are found in most servitized companies. This technology fits in stage two as it might unlock new services impossible without technology. As argued by Porter and Heppelmann (2014), companies will more and more tend to find themselves in the second stage, amongst others, with the use of the Internet of things.

9.3 Arguments against servitization

During this thesis we have explored three case studies. As already mentioned, this is not enough to represent the brought concept of servitization. Furthermore the three case studies were rather successful in their servitization process. It was therefore hard to identify the reasons not to enrol into a servitization process. Besides a failed servitization process is not something companies want to talk about, this might complicate the process to identify such companies. Based on the literature review and case studies we identified several reasons for a company to stay away from services and product service bundles.

1. **The client is hardly reachable:** It can happen that the customer and the company are separated by a series of intermediaries that are hard to by-pass. To enter into a relationship with the customers and to know his needs can then turn out to be an impossible mission. This is the situation the competitors of Hilti face, a close partnership with these intermediaries could be a solution. But as described in 9.2.3, services are already not easy to implement in a single entity, offering bundles with partners could add an additional layer of complexity. Development in Internet technologies could offer a solution to by-pass intermediaries with who the company doesn't want to work with.
2. **Non-ownership model doesn't fit:** For some companies, the product quality is too low for a non-ownership model. It can therefore be harder for the company to offer services that create value(see 4.1) as individualization, integration, and firm-customer relationship are not always possible. These companies could rise their product quality or target customers for who the non-ownership model doesn't fit their needs. (ex: clients with a too high credit risk)
3. **Company is not pressured to change:** As Mr. Dallemagne, a consultant at Innergic highlighted, companies will only change when they are forced to. Throughout the thesis we found that offering bundles can have a deep impact on many parts of the company (ex: organizational, financial, etc.). Companies that don't see the benefits of these bundles are not likely to implement more services as it generates a lot of change.

4. **Concerns mainly companies selling products:** If we look at the definition of Vandermerwe and Rada (1988) used in this thesis, it has as hypothesis that servitization is only applicable to companies initially selling products. Thus not by companies exclusively selling services with no relationship to products. This hypothesis was supported by Mr Dallemagne, a consultant at Innergic.

Chapter summary

We started this chapter with the opinions of the different interviewees on the future developments of servitization in the companies. We continued by looking how we could build further on the confrontation of the literature review and the case studies. Different models and ideas were suggested:

- There is a close link between usage based models and servitization. Based on our research we found that usage based models are commonly used in servitization but that other elements need to be met before one can talk of servitization of the company.
- Companies often keep their old model in place. In an attempt to understand why, we have noticed four groups of products: capital intensive goods, unstable goods, goods as support to perform the service and start-ups. Depending on the group the bundle is corresponding to, different trends have been observed on what is done with the old model.
- Throughout the thesis we noticed that services can be a good competitive advantage as it is hard to replicate. This also means it is hard to implement. Different suggestions are formulated that companies should keep in mind during a servitization process.
- As technology is likely to become more important in servitization, based on the case studies we have found two different stages of technology: as facilitator of servitization or at the center of servitization.

To conclude the chapter I suggested some reasons why companies are not enrolling into a servitization process. Reasons such as no direct contact with the clients, non-ownership issues or no pressure to change are explored.

Chapter 10

Conclusions

This thesis aimed to review the concept of servitization. To do so, we based our research around four questions. Lets recall some takeaways from the literature review and the confrontation with the case studies.

What is servitization?

Based on the content of the definition set by Vandermerwe and Rada (1988) the concept 'servitization' was explored. Different closely related concepts were discussed such as services, solutions, value proposition. This was required to fully understand the scope and terms used throughout the thesis. The choice of the companies serving as case studies were chosen based on the chosen definition. Some bundles such as Office 365 of Microsoft and the Fleet management of Hilti are great examples of servitization.

Why companies enrol in a servitization process?

In the literature review, we identified the triggers for companies to increase their service and bundle offering. Four external drivers were found: the commoditization of the products, customer demand, technology capabilities and environmental motivations. These external drivers are out of control of the company, which can force them to start a servitization process to keep up with market requirements. We continued by highlighting the different internal drivers. First, companies might want to improve their position on the value chain or in the market. Second, services have been found to be a great source of growth that can lead to increased revenues and margins. As bundles are not a one

time transaction but recurrent they can stabilize revenue streams. Furthermore product manufacturers are said to be in an ideal position to offer services as there knowledge of the market and customer is already established. The most important internal driver for servitization is that it enhances competitiveness. As adding services to products brings the company closer to the customer and his needs, through a tailored offering loyalty and long term relationships between the company and the customers are often build.

In the confrontation between the literature and the case studies we couldn't explicitly identify the external drivers or they are related to other subjects such as technology in the 'How' question. We could nevertheless identify many internal drivers such as settlement in the market or that servitization enables growth and can be used to create a competitive advantage. All the identified reasons in the literature could to some extent be found in the case studies.

How do companies adapt to servitization?

In the literature we identified different models. We started by exploring value creation factors proposed by Velamuri (2013): individualization, integration and firm-customer interaction. These enabled to clarify several questions on how a servitization process is started in a company. We continued by an overview of the different forms through an analysis of the different offerings and the relationship between products and services. We further discussed why servitization is a process done in stages that may take several years to complete. The non-ownership model and its impact on the boundaries are also discussed. The literature review on this question was closed with an exploration of the impact of technology on servitization.

In the confrontation most of the findings in the literature were confirmed by the case studies. Findings such as the extensive use of the non-ownership, servitization is done in stages, different value creating factors and the impact of technology were discussed in the confrontation. We further identified features specific to the case studies. These were to a lesser extent mentioned in the literature or under a different form. Here we identified that the case studies keep the old model in place, that the clients are involved into promotion and turn into long term partners.

What are the hurdles and implications of the transition?

To conclude the literature review on servitization, the implications and hurdles of servitization were explored. We have found that adding services to bundles will affect different parts of the company, we separated them into two categories. First we looked at the implications on the people, here we discussed the impact on the corporate culture. Furthermore, Servitization increases the complexity of the company's model and managers and sales people need to adapt to the new model. There might also be resistance from the customer. In the second category we look at the implications on the operations. Here we discussed how pricing and performance metrics will have to be adjusted to a relationship model with the client and move away from the traditional transactional model. At last, the ability to scale your services have been found by Gebauer et al. (2005) to be important to keep a high standard of quality.

The different implications found in the literature review are identified in the case studies. Every case study is impacted by these implications to different extends. At Hilti and Cambio the different implications are easier to identify as they have a more classical profile of servitization. Their business model is based around a physical product. At Microsoft the product is a software and the implications of the literature are not always relevant.

In the last chapter of the thesis, I suggested models based on the findings and confrontations from the literature review and the case studies. Different aspects were discussed such the relationship between usage-based models and servitization, the expansion of servitization within a company, the impact of technology. Throughout the thesis we discussed that services can create a competitive advantage sustainable in time due to its complicated implementation. It is therefore interesting to highlight the different challenges the case studies face to implement these services. The chapter is concluded with some suggestions on reasons why companies should not enrol into a servitization process.

The journey exploring servitization ends here. I hope my work contributed to some extend to the scientific research and will be used for further research.

10.1 Limits of the case studies

1. **Limited number of interviews:** due to restricted access and time constraints, every company has been represented by one or two interviewed managers. For a better view there should have been more. This might weaken our conclusions and findings, further studies might be required to confirm or contradict the findings of this thesis.
2. **Global view:** I have chosen on purpose to interview companies coming from very different industries as the purpose of the thesis was to have an overview of the concept servitization. This has also a downside as these companies are, at best, representative of their sector. A lot of industries were left out of the analysis.
3. **Chosen definition** The literature review and the interview questions were based on the definition set by Vandermerwe and Rada (1988). Although this definition is widely accepted by the scientific community, it has been written a long time ago. As new elements such as technology play a growing role, the definition might have to be adapted.

10.2 What to explore next

Throughout the case studies and to a lesser extent in the literature, the impact of technology on servitization is expected to grow. As technology will start to play a central role in the bundles offered by the companies, many different new business models will rise. The role of technology, according to me, has not yet received all the attention it deserves. As It will become a dominant part in bundles and combination of product and services, attention will undoubtedly rise.

Some further research could also be done on the relationship between the different models within a company. The challenges and the reasons to keep old models deserves more research. Related questions such as: Is there a limit of servitization upon which companies are not willing to further develop bundles? What is required to reach a fully servitized offering? could be further explored.

Bibliography

- Baines, T. and Lightfoot, H. (2014). *Servitization the industry*, chapter 3. Springer.
- Baines, T. S., Lightfoot, H. W., Benedettini, O., and Kay, J. M. (2009). The servitization of manufacturing. *Journal of Manufacturing Technology Management*, 20(5):547–567.
- Berry, Leonard, L., and Maricle, E. (1973). Consumption without ownership: what it means for business. *MSU Business topics*, 21(2):44–46.
- Bowman, C. and Ambrosini, V. (2000). Value creation versus value capture: towards a coherent definition of value in strategy. *British journal of Management*, 11(1):1–15.
- Brax, S. (2005). A manufacturer becoming service provider: challenges and paradox. *Managing service quality: An international journal*, 15(2):142–155.
- Brax, S. and Jonsson, K. (2009). Developing integrated solution offerings for remote diagnostics: A comparative case study of two manufacturers. *International journal of operations and production management*, 29(5):539–560.
- Chandler, J. D. and Lusch, R. (2015). Service systems: A broadened framework and research agenda on value propositions, engagement, and service experience. *Journal of service research*, 18(1):6–22.
- Davies, A., Brady, T., and Hobday, M. (2006). Charting a path toward integrated solutions. *MIT Sloan Management Review*, 47(3).
- Davies, A., Brady, T., and Hobday, M. (2007). Organizing for solutions: Systems seller vs systems integrator. *Industrial Marketing Management*, 36(2):183–193.
- Dubruc, N., Peillon, S., and Farah, A. (2014). The impact of servitization on corporate culture. *Procedia CIRP*, 16:289–294.

- Ehret, M. and Wirtz, J. (2010). Division of labor between firms: Business services, non-ownership-value and the rise of the service economy. *Service Science*, 2(3):136–145.
- Finne, M., Brax, S., and Holmström, J. (2012). Reversed servitization paths: a case analysis of two manufacturers. *Service business*, 7:513–537.
- Foot, N. W., Galbraith, J., Hope, Q., and Miller, D. (2001). Making solutions the answer. *McKinsey Quarterly*, (3):84–93.
- Frei, F. X. (2008). Four things a service business must get right. *Harvard Business Review*, 86(4):70–80.
- Furrer, O. (1997). Le rôle stratégique des services autour des produits. *Revue Française de Gestion*, (mars-avril-mai):98–180.
- Gaiardelli, P., Martinez, V., and Cavalieri, S. (2015). The strategic transition to services: a dominant logic perspective and its implications for operations. *Production planning and control*, 26(14-15):1165–1170.
- Gebauer, H., Fisher, T., and Fleisch, E. (2010). Exploring the interrelationship among patterns of service strategy changes and organizational design elements. *Journal of service management*, 21(1):103–129.
- Gebauer, H., Fleisch, E., and Friedli, T. (2005). Overcoming the service paradox in manufacturing companies. *European journal of management*, 23(1):14–26.
- Gebauer, H., Friedli, T., and Fleisch, E. (2006). Success factors for achieving high revenues in manufacturing companies. *Benchmarking: An international journal*, 13(3):374–386.
- Gronroos, C. (2000). *Service management and marketing: a customer relationship approach*. Chichester, UK: Wiley, 2nd edition.
- Grubic, T. (2014). Servitization and remote monitoring technology. *Journal of manufacturing technology management*, 25(1):100–124.
- Harrap’s and Chambers (2003). *Chambers English Dictionary*.
- Herterich, M. M., Uebernickel, F., and Brenner, W. (2015). The impact of cyber-physical systems on industrial services in manufacturing. *Procedia CIRP*, 30:323–328.

- Hou, J. and Neely, A. (2013). Barriers of servitization: Results of a systematic literature review. In *Spring Servitization conference*. Cambridge Service Alliance.
- James, P. and Hopkinson, P. (2002). Service innovation for sustainability. a new option for uk environmental policy? *Bradford University*.
- Kindström, D., Kowalkowski, C., and Alajandro, T. B. (2015). Adding services to product-based portfolios: An exploration of the implications for the sales function. *Journal of service management*, 26(3):372–393.
- Knopf, J. W. (2006). Doing a literature review. Naval Postgraduate School, pages 127-132.
- Lee, J., an Kao, H., and Yang, S. (2014). Service innovation and smart analytics for industry 4,0 and big data environment. *Procedia CIRP*, pages 3–8.
- Lepak, D. P., Smith, K. G., and Taylor, M. S. (2007). Value creation and value capture: a multilevel perspective. *Academy of management review*, 32(1):180–194.
- Levitt, T. (1981). Marketing intangible products and product intangibles. *Harvard Business Review*, 59(3):94–102.
- Lovelock, C. and Gummesson, E. (2004). Whither services marketing? *Journal of Service research*, 7(1):20–41.
- Lovelock, C. H. (1983). classifying services to gain strategic marketing insights. *Journal of marketing*, 47:9–20.
- Malleret, V. (2006). Value creation through service offers. *European Management Journal*, 24(1):106–116.
- Martinez, V., Bastl, M., Kingston, J., and Evans, S. (2010). Challenges in transforming manufacturing organisations into product-service providers. *Journal of Manufacturing Technology management*, 21(4):449–469.
- Mathieu, V. (2001a). Product services: From a service supporting the product to a service supporting the client. *The journal of business and industrial marketing*, 16(1):39–58.
- Mathieu, V. (2001b). Service strategies within the manufacturing sector: benefits, costs, and partnership. *Journal of service industry management*, 12(5):451–475.

- McMenamin, I. (2006). Process and text: Teaching students to review the literature. Dublin City University.
- Moeller, S. (2010). Characteristics of services - a new approach uncovers their value. *Journal of services marketing*, 24(5):359–368.
- Mont, O. (2002). Clarifying the concept of product-service system. *Journal of cleaner production*, 10:237–245.
- Mont, O. (2004). Drivers and barriers for shifting more service-oriented businesses: Analysis of the pss field and contributions from sweden. *The journal of sustainable product design*, 2:89–103.
- Neely, A. (2006). The servitization of manufacturing: an analysis of global trends. Technical report, Cranfield School of management.
- Neely, A., McFalane, D., and Visnjic, I. (2011). Complex service systems - identifying drivers, characteristics and success factors. In Alliance, C. S., editor, *European Operations Management Association conference*, volume 18th. University of Cambridge.
- Nowak, J. (2014). Company report. Technical report, Hilti Corporation.
- Oliva, R. and Kallenberg, R. (2003). Managing the transition from products to services. *International journal of service industry management*, 14(2):160–172.
- Porter, M. E. and Heppelmann, J. E. (2014). How smart, connected products are transforming competition. *Harvard Business Review*, 92(11):65–88.
- Rushkoff, D. (2005). Commodified vs. commoditized. <http://www.rushkoff.com/blog/2005/9/4/commodified-vs-commoditized.html>. Accessed 29th September 2015.
- Sawhney, M. (2006). Going beyond the product: defining, designing and delivering customer solutions. In Lush, R.F. and Vargo, S.L. *The service dominant logic of marketing: dialogue, debate and directions*, pages 365–380.
- Sawhney, M., Balasubramanian, S., and Krishnan, V. V. (2004). Creating growth with services. *MIT Sloan management review*, 41(Winter):34–43.

- Schein, E. (2010). *Organizational culture and leadership*. Jossey-Bass, 4 edition.
- Sempels, C. (2014). Qu'est-ce que l'économie de la fonctionnalité? Institut Européen de l'Economie de la Fonctionnalité et de la Coopération.
- Shankar, V., Berry, L. L., and Dotzel, T. (2009). A practical guide to combining products and services. *Harvard Business Review*, 87(10):95–99.
- Sidoli, Y. (2013). Sustainable development: can functional economy fit square pegs in round holes? *ParisTech Review*.
- Spohrer, J. C., Kwan, S. K., and Demirkan, H. (2012). *New business models and value creation: a service science perspective*, chapter 1, pages 7–24. Springer.
- Steinberger, J. K., Niel, J. V., and Bourg, D. (2009). Profiting from negawatts: Reducing absolute consumption and emissions through a performance-based energy economy. *Energy Policy*, 37:361–370.
- Sultan, N. (2014). Servitization of the it industry: The cloud phenomenon. *Strategic change*, 23:375–388.
- Sytch, M. (2015). Organizational leadership: Breaking silos. <https://michiganross.umich.edu/execed/organizational-leadership-breaking-silos-hong-kong?event=710>. Accessed on 29th September 2015.
- TheEconomist (2009a). Idea: planned obsolescence. Mar 23rd on <http://www.economist.com/node/13354332>. Accessed on 15 October 2015.
- TheEconomist (2009b). Rolls-royce, britain's lonely high-flier. *The Economist*, Jan 8th. From the print edition.
- Tukker, A. (2004). Eight types of product service system: eight ways to sustainability? experiences from suspronet. *Business strategy and the environment*, 13:246–260.
- Tuli, K. R., Kohli, A. K., and Bharadwaj, S. G. (2007). Rethinking customer solutions: From product bundles to relational processes. *Journal of Marketing*, 71(3):1–17.
- Turunen, T. (2013). *Organizing Service operations in manufacturing*. PhD thesis, Aalto University.

- Turunen, T. T. and Toivonen, M. (2011). Organizing customer-oriented service business in manufacturing. *Operations Management Research*, 4:74–84.
- Vandermerwe, S. and Rada, J. (1988). Servitization of business: Adding value by adding services. *European Management Journal*, 6(4):314–324.
- Vargo, S. L. and Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of marketing*, 68:1–17.
- Velamuri, V. K. (2013). *Hybrid value creation*. PhD thesis, HHL Leipzig graduate School of management.
- Visintin, F. (2012). Providing integrated solutions in the professional printing industry: The case of océ. *Computers in industry*, 63(4):379–388.
- Visintin, F. (2014). *Servitization in the industry*, chapter 2, pages 23–45. Springer.
- White, A., Stoughton, M., and Feng, L. (May 1999). Servicizing: the quiet transition to extended product responsibility. Technical report, Tellus Institute.
- Wirtz, J. and Ehret, M. (2013). *Servicing customers: global services marketing perspectives*, chapter 2, pages 28–46. Tilde University Press.
- Wise, R. and Baumgartner, P. (1999). Go downstream: The new profit imperative in manufacturing. *Harvard Business Review*, September:133–141.
- Wittkowski, K., Moeller, S., and Wirtz, J. (2013). Firms’ intention to use nonownership services. *Journal of service research*, 16(2):171–185.
- Wolak, R., Kalafatis, S., and Harris, P. (1998). An investigation into four characteristics of services. *Journal of empirical generalisations in marketing science*, 3:22–43.
- Zaring, O., editor (2001). *Creating Eco-efficient producer services*. Gothenburg Research institute. Research report.