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A Business Model for a New Type of Maintenance Agreement for a Heavy Machinery Manufacturer

Metropolia University of Applied Sciences

Master of Engineering

Industrial Management

Master's Thesis

February 12 2024

Preface

After graduating a long time ago for the first time as a Bachelor of Engineering studying full-time, further studies were not in my plans. However, at some point my career needed a change of direction and I decided to study what was the most interesting field for me, Industrial Management. Another bachelor's degree, this time working full-time was a great experience. It was quite clear that a master's degree would be my goal at some point.

Then a few years of life happened. The decision to start the Master of Engineering studies was a rather easy one at that point – work and family was in a good balance so why not stir it up a bit? Now that I look back at the decision to start the studies, I am happy I took on the adventure. Exceeding the normal input every week was a stretch but a satisfying one. Even more important, challenging myself and getting new perspectives on professional life was a wonderful experience.

Thesis work was a tough but rewarding exercise, just how it should be. The sense of achievement is great after some challenges on the way. I am very grateful for my thesis instructor Dr. James Collins, who supported me greatly during the process. For the whole Industrial Management study program and fellow students, thank you for the intriguing journey. My employer and colleagues who enabled the studies – thank you for the flexibility, but also the wealth of topics for the thesis and courses during the studies.

Most of all, thank you to my wife and daughter for the endless support and bearing with me during the prolonged studies. Now daddy is free for all the fun!

Juha Pulkkinen
Vantaa,
12th of February 2024

Abstract

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Title:	A Business Model for a New Type of Maintenance Agreement for a Heavy Machinery Manufacturer
Number of Pages:	77 pages + 1 appendix
Date:	12 February 2024
Degree:	Master of Engineering
Degree Programme:	Industrial Management
Professional Major:	Service Management
Supervisors:	Dr. James Collins, Senior Lecturer Dr. Sami Sainio, Head of IM Master's Program

The case company has slowly evolved from an equipment manufacturer to a strong service provider along with the equipment business. During the past years growth of service business has been remarkable and currently standardizing the offering is given more attention. The company has a history of significant field service involvement. However, despite a good level of customer service and field service presence, there is a recognized need for improved ease of doing business. The company aims to enhance proactive service sales, particularly with an extensive selection of service agreements. The objective of the thesis is to develop a new business model focused on structured and profitable sales of maintenance services for new equipment to complement the company's service offerings.

The study adopts a design research approach and encompasses four stages. Firstly, a literature review is conducted to assimilate existing knowledge and best practices, enabling a comprehensive understanding of servitization process and business models used in service business. The subsequent stage involves a current state analysis, where the strengths and weaknesses of the case organization and its operations regarding the new maintenance agreement are evaluated. The weaknesses found are elaborated and prioritized on the third stage. The stage includes the creation of an initial business model, utilizing a conceptual framework to address identified weaknesses. The final stage comprises a validation round of the initial business model, resulting in an improved solution. Additionally, recommendations for the next steps are provided.

The outcome of this study is a business model to support developing the new type of service agreement. Weaknesses on the business model were found and suggestions on how to improve the issues before launching the product are given. The recommended next steps are valuable insights for the case company on the path to a more standardized service product offering.

Keywords: Business model, Service business model, Servitization, Service agreement, Maintenance agreement

Contents

List of Abbreviations

BMC:	Business Model Canvas
SLBMC:	Service Logic Business Model Canvas
STOF:	Service, Technology, Organization and Finance model
SBMC:	Service Business Model Canvas
BM:	Breakdown Maintenance
FBM:	Failure-Based Maintenance
PM:	Preventive Maintenance
CBM:	Condition-Based Maintenance
TBM:	Time-Based Maintenance
OEM:	Original Equipment Manufacturer
DSDM:	Dynamic Software Development Method

1 Introduction

In a quest for new business opportunities and bigger margins, manufacturing companies have turned their attention on selling services along with their product offering. Traditional product-centred philosophy where a company designs and manufactures evermore better products, sells them and starts over is making way to a more holistic concept of fulfilling customer needs. New and creative services are developed to contemplate the products sold. Transformation from products to services is called servitization and few companies dare to evade that progress.

Reaching bigger share of customers' wallet is an obvious reason to servitize the offering. Manufacturers of equipment are facing growing challenges in expanding their installed base (Reinartz & Ulaga, 2008). In many traditional industries the market is saturated and new customers are hard to find. Customer intimacy is another driver. "The more we enter into a customer's business, the more the customer forgets how things are done", as one manager at Air Liquide put it (Reinartz & Ulaga, 2008). With service operations it is easier to reach a deeper customer relationship.

Industrial companies have developed their service offering in many ways. The progress started decades ago from aftermarket actions such as supplying spare parts to the sold product, and today the service offering can be very creative. Most of the manufacturing companies offer at least basic maintenance services on-demand basis to their sold products – more developed offering can be anything from all-inclusive maintenance and fleet monitoring to outcome-based services.

This study focuses on the case company's servitization progress so far and possibilities to improve their service offering. Maintenance agreement for a new equipment is one of the first steps to improve the offering.

1.1 Business Context

The case company was founded in 1962 as a small workshop for farming equipment. During the 60 years of operation the company has experienced many phases and different owners. Mining industry became the company's main customer segment decades ago. Under the current ownership the company has been operating in the same business segments, but the company has been growing and improving to be one of the industry leaders. Today the case company design, manufacture and deliver underground vehicles to customers in mining and tunnelling businesses globally.

Traditionally equipment development and sales have been in the focus but during the past years, service business has taken development leaps and is growing fast. Service business line was started in 2007 and until 2009 service sales happened globally through different local resellers. In 2009 first own sales offices were founded and acquired in few sales areas. Currently the company operates in 30 countries with sales offices and service operations in all strategic locations.

There still exists the old principle of serving the customer individually – whatever it takes – but that is slowly making way to a global and growing company that requires scalability of operations and new innovations on product offering. Mentality is changing from customizing all products and giving unquestioned service on each case to more standardized production and new business models.

Service business is in the core of company strategy and strong growth is expected to continue. Of aftermarket business, spare parts still generate by far the biggest revenue. However bigger growth and steadier income is expected from other service products so new approach on service sales in the form of new business models is an interesting development to explore.

Mining is the biggest customer segment for the case company. Traditions are long and ways of working well-established. New ideas and operating models are not often seriously considered nor pushed to the customers.

1.2 Business Challenge, Objective and Outcome

Spare part sales of the case company are still mainly transactional business where customer is proactive. Parts are requested by customers and are ordered mainly line by line. Productization of spare parts has improved – spare part kits and recommendations for new machines are already available.

Field service has played a big part in company's history. Now a global company with offices and repair shops around the world, service technicians visit customer sites for different types of service work. Sales areas have different kind of customer base and ways of working. Customer service and field service presence has been on a good level but ease of doing business needs improvement. Along with improvements on sales tools, also new service business models would help to get proactive service sales to the next level.

Service organization has worked together with Equipment organization to build a business model where customers are charged by usage of equipment instead of selling services and spare parts. That is a complicated business model and not expected to be used in the near future widely with many customers. Therefore, it would be important that the company find ways to sell more services and especially with more steady business models.

To complement service offering of the case company **the objective of this Thesis** is to create a new business model for more constructed and profitable sales of maintenance services for new equipment.

The outcome of the Thesis is a new business model to sell maintenance agreements globally in a more uniform way and a more productized offering of service products to accelerate service sales.

1.3 Scope And Outline of the Thesis Report

The Thesis focuses on building a business model for maintenance agreement for new equipment and does not include steps to take the model into action. Detailed agreement, service levels, marketing material and sales strategy will not be part of the Thesis.

The thesis is divided into seven sections. In Section 1, the study is introduced, and the business challenge, objective, and outcome are defined. Moving on to section 2, it outlines the research approach, research design, and introduces the data plan. Section 3 explores the literature on servitization and business models and establishes the conceptual framework for the study.

Section 4 explores the current state of the case company’s operations, presenting findings as well as strengths and weaknesses of the organization regarding service sales. Section 5 introduces the development process and the initial business model for service agreements. Section 6 is dedicated to validation of the business model. The seventh and final section provides overall conclusions, featuring an executive summary and suggestions for future steps, along with the author's self-evaluation and concluding remarks.

2 Project Plan

The first section of the Thesis described the business context and shortly explained business challenge and objective of the Thesis. Also scope and outline of the study was defined. In this section research approach, research design and data collection methods are introduced.

2.1 Research Approach

Research approach defines how the study is conducted. By defining the correct research approach the researcher will have the correct tools to carry out a credible study.

This project was started to find a solution for a practical business problem. The researcher was tightly involved in all phases of the project from defining the problem to building a solution and verifying it. Solving the business problem required hands-on approach and discussions with stakeholders. Qualitative methods such as interviews and workshops were used as the main sources of data.

Saunders et al. (2019) compares basic research and applied research. One of the major differences is the purpose of the research: basic research studies a process or phenomena and results in rather universal principles whereas applied research is conducted to find a solution for a certain business problem. Hence the findings of these studies can be used either for society in general (basic research) or for the organization and managers involved in the research (applied research).

Action research is used to solve organizational issues. It is conducted together with people who are directly involved with the issue on hand (Kananen, 2013). These characteristics also describe this project plan well. However, action research requires several iterations and therefore is a continuous process by its nature rather than one-time project (Kananen, 2013). This project followed the

principles of applied research but was complemented with elements of action research. The research approach that was used can be described as applied action research.

2.2 Research Design

This study consists of four stages. First is literature review of the existing knowledge on the topics of the study. After learning about the different aspects of business models in service business, the second stage is current state analysis. State of service business of the case company is explored to gain an understanding what needs to be done to create a successful business model for a new product concept.

On the third stage proposal for new business model is built. After carefully preparing the proposal, it is validated on stage four. Proposal is tested and feedback is gathered.

Data 1 is formed for current state analysis. It consists of interviews of internal stakeholders such as technical specialists, product management directors and commercial team members. Data 2 is needed to build the solution. Workshop with stakeholders along with interviews are an important part of this data. Data 3 is gathered by interviewing field service and product management directors after the initial proposal is introduced to internal stakeholders.

The outcome of the literature review is conceptual framework. The current state analysis is summarized as strengths and weaknesses of the case organization. The outcome of the third stage is a proposal for a business model to support the service agreement to reach a focal role in case company’s service strategy. An improved business model is the outcome of the fourth stage.

Figure 1 below illustrates the four stages, outcomes of each stage and the data points.

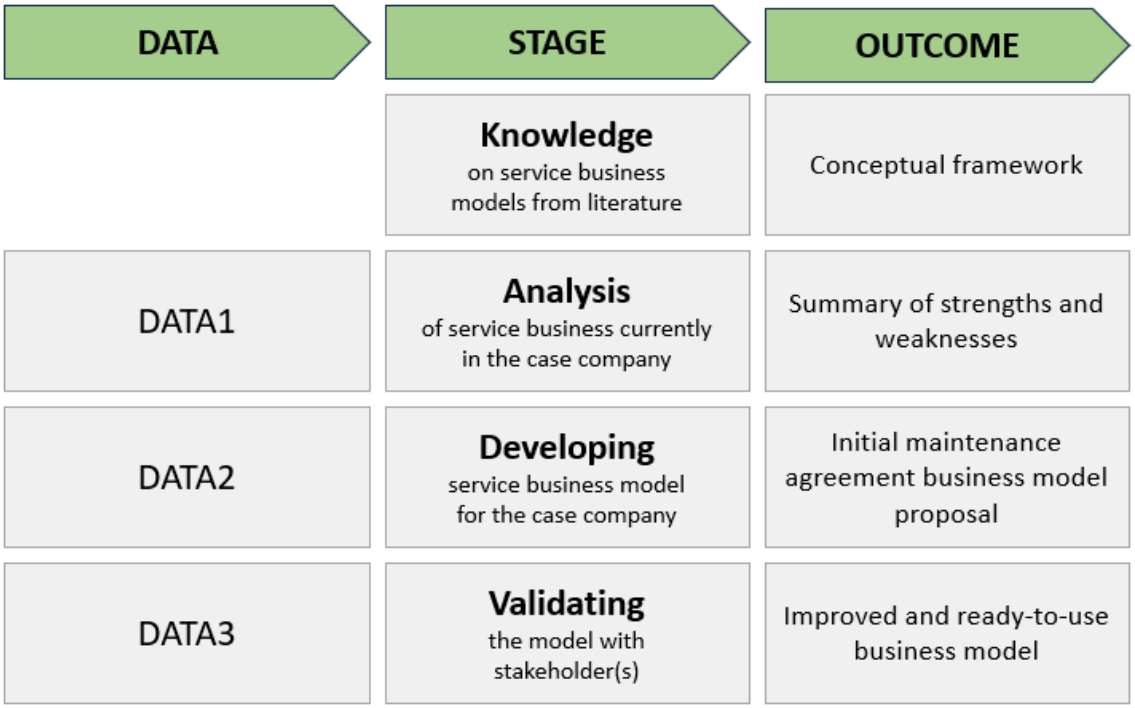

Figure 1. The Research Design of the study

The objective of the study is to build a business model to sell service agreement for all new equipment. Because the study creates a completely new business model for the case company it is important to review literature on the topic first before going to analysis of the case company's current state.

The analysis can be conducted based on the outcome of the first stage, conceptual framework. After current state analysis is done, strengths and weaknesses are known and there is needed information to move on to developing the solution.

The outcome of the development phase is initial proposal, which is only a first draft of the final version. Validating the proposal is done by gathering feedback from stakeholders before the final and improved business model can be introduced.

2.3 Data Collection

The study gathered data through relevant stakeholder interviews, encompassing three rounds of data collection. The comprehensive overview of the gathered data is illustrated in Table 1. The data collection process involved interviews conducted in three distinct stages, as elaborated in this section.

Table 1. Data collection of the study

	Content	Informant	Schedule	Outcome
DATA 1 Current State Analysis	Customer #1 interview	Supervisor Maintenance	Q1 - 2022	Customer opinion of case company's services
	Customer #2 interview	Head of procurement and contract management	Q1 - 2022	Customer opinion of case company's services
	Internal sales processes and services operations	Senior Manager in Service Sales Excellence	Oct 2023	CSA of Services organization's processes and operations
	Service product offering and agreements	Director, Product Portfolio team	Oct 2023	CSA of service product offering and agreements
DATA 2 Creating Business Model	Regional sales and service capabilities	Senior Manager in Service Sales Excellence	Nov 2023	Ideas on improving sales area capabilities
	Service product possibilities	Director, Product Portfolio team	Nov 2023	Possibilities and limitations of service products
	Pricing models	Services Pricing Manager	Dec 2023	Possibilities and limitations of pricing models
DATA 3 Validation of the Business Model	Evaluation of the initial proposal	Director, Field Services Operations	Dec 2023	Improvements on initial proposal
	Cooperation between teams	Portfolio and Commercial teams' workshop	Dec 2023	Insights on Service agreement offering
	Evaluation of the initial proposal	Director, Product Portfolio team	Dec 2023	Additions and improvements on initial proposal

The research involved three rounds of data collection. Table 1 illustrates the initial round, referred to as Data 1, conducted in stage 2 of the study. The objective was to generate a comprehensive overview of the case company's servitization status and factors associated with the new business model. This was achieved by gathering insights from open-ended interviews and extracting relevant information from previous customer interviews. The result was an analysis of strengths and weaknesses that was to be elaborated in the next stage.

Data 2 was gathered through internal interviews with Services business line global team members. The aim was to understand what actions or improvements could help to successfully launch the new business model. The weaknesses found on starting analysis were categorized under themes. Based on the interviews the themes were validated and prioritized from the most urgent to a theme that could wait for future improvements.

The last stage includes Data 3 which was gathered after the initial proposal. Data 3 consists of interviews with Services business line global team members and a workshop between Commercial and Portfolio teams. The interviews were aimed on professionals with understanding of actual field service operations and the interviews concentrated on viability of the business model in practice.

This completes chapter 2, the Project Plan. The next section explores the findings from literature review and builds up the fundamental framework that will be the base of the business model that will be created.

3 Existing knowledge on Services and Business Models

On this section prior knowledge is searched for relevant topics such as business models, service business models, servitization and other aspects that might be helpful to understand the possibilities of new service business models.

3.1 From Products to Services – Servitization Strategy

Manufacturing companies have traditionally concentrated on producing products for the customers. Companies have searched for alternative ways to grow business and today services are a remarkable part of many manufacturing companies – Crozet and Milet (2015) explain that some manufacturers now sell more services than goods. Most of the companies are in some phase of transitioning from supplying products to offering services along with the product. This change started decades ago, and the extent of that change has grown to this day.

This change into a more service-oriented business is widely called servitization. The concept was first introduced by Vandermerve and Rada (1988) when they described it as “market packages or bundles of customer focused combination of goods, services, support, self-service and knowledge” Annarelli et al. (2019) calls the journey as servitization and the organizational aspect as product service system. Bryson et al. (2020) call services that are essentially linked to the company’s product as “product-related services” whereas more advanced “product-service systems” are products that are delivered to the customer with integrated services on it. Each company on their servitization journey goes through several stages regarding maturity of the product-service portfolio.

Oliva and Kallenberg (2003) specifies three main reasons why integrating services into industrial companies’ offering is beneficial and almost inevitable. Firstly the economic arguments are clear: margins for service products are generally higher (according to The Economist (2013) service business margins of elevator companies Kone and Otis are in the region of 25-35% while new

equipment margins were approximately 10% during the same time period), the revenues are more stable as the economic downturns often hinder investments, and instead of offering long-lifecycle capital equipment the company can use existing fleet of equipment to target service sales. Another point is that customers demand more services. Third, competitive advantage can be obtained by creating solid service offering: services are generally more labour-dependent than products and are therefore more difficult to copy by competitors.

After 2003 when Oliva and Kallenberg made their remarks possibly the biggest trend involving companies in all industries is environmental-friendliness and sustainability. Annarelli et al. (2019) underlines the importance of offering services instead of products from global sustainability point of view. This has been questioned by Doni et al. (2019): *"servitization leads to improved energy consumption and therefore enhances environmental performance. However, servitization had no effect on corporate sustainability disclosure and other environmental policies such as environmental assurance, emissions reduction policies, and environmental supply chain management."*

Ojasalo (2007) reminds that transforming from an industrial company to a service provider is not an easy process. Customers want to see clear added value compared to the current cooperation so co-creating the new services with the customer is usually the smartest starting point. When involving customers in the developing process of new services they will be more engaged with the industrial service provider. The service-dominant business logic also means that the service provider should constantly look for new possibilities to support customer's value creation. Thus, to handle both the service aspect and the product, the industrial service providers need a wide set of competencies to successfully carry out the transformation.

3.1.1 Servitization Process

The servitization process has been represented in literature in many ways. A very visual way is different graphs or pictures describing a company's service strategy or level of readiness to offer wide scope of service products. The illustrations are of different form, content and size, but similar to all of them is the idea to present different levels of service offering or readiness to offer services.

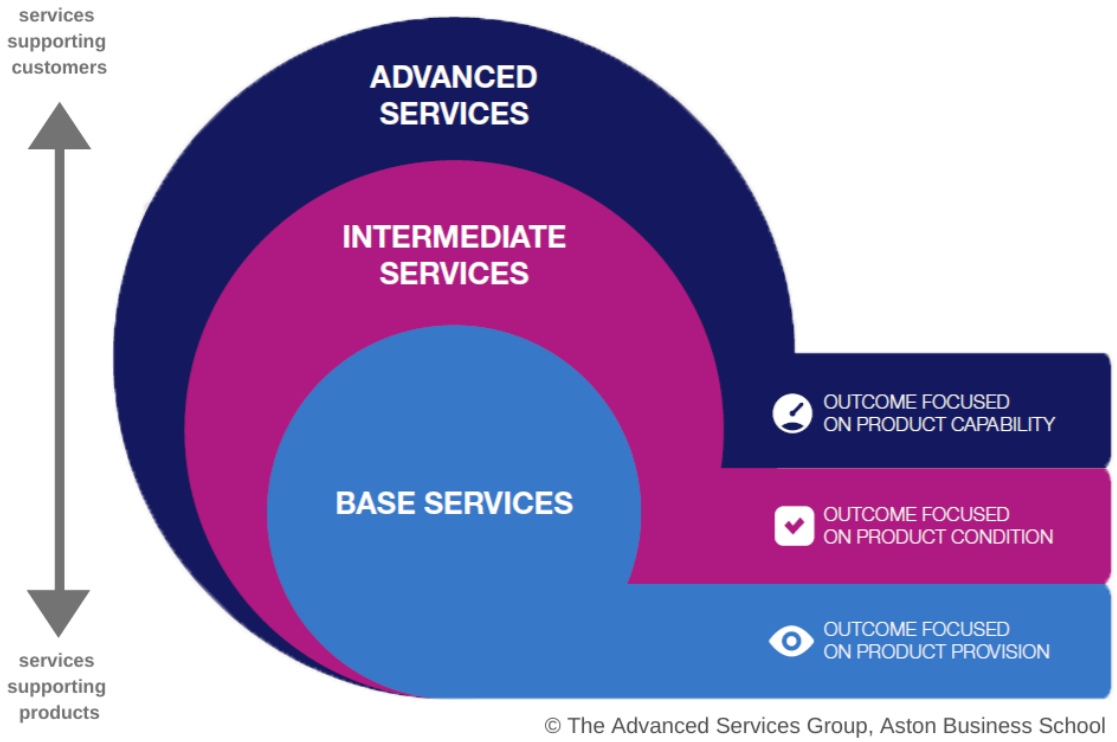

Figure 2. Service Categories (The Advanced Services Group)

The Advanced Services Group, Aston Business School divide services into three categories: base services, intermediate services and advanced services. Outcome of these three categories services is product provision, product condition and product capability respectively. This model discusses only service provider's focus, what they want to offer to the customers.

In a more detailed model they have drawn eight steps from simple product supplying to guaranteeing the outcomes of a certain business platform.

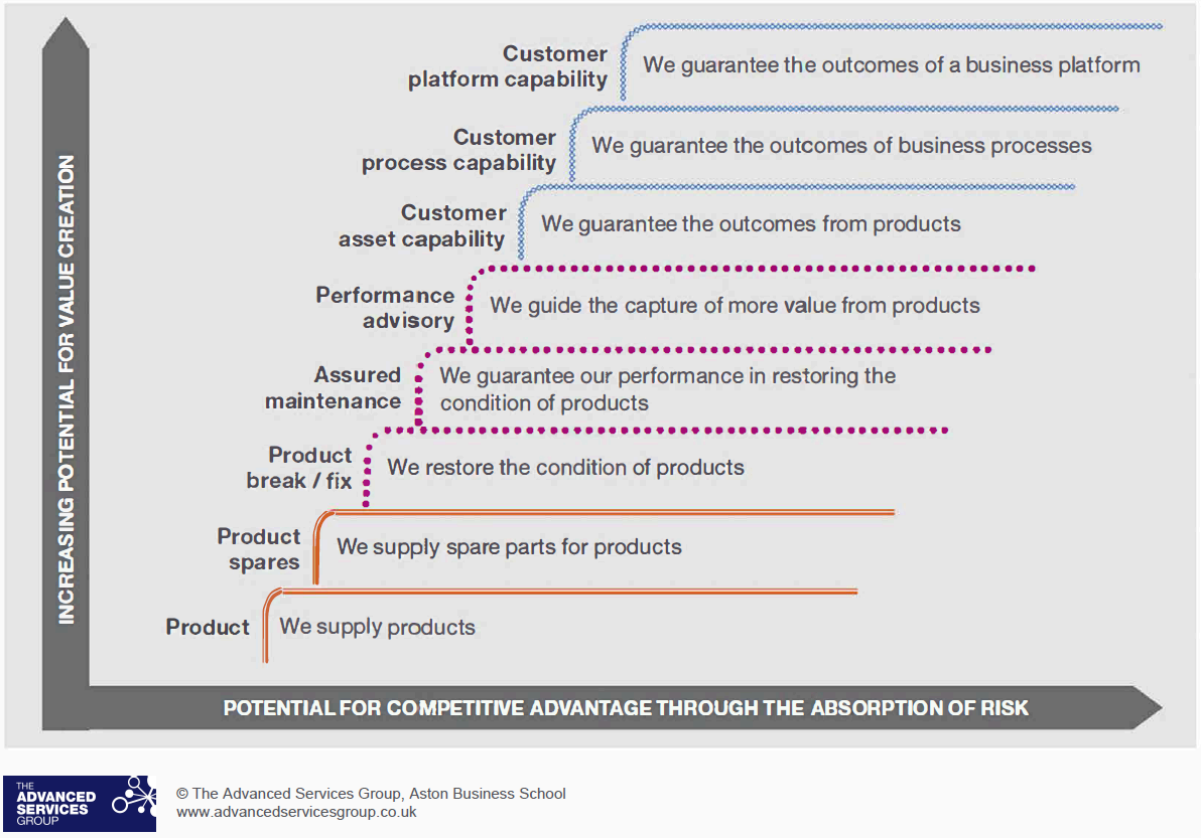

Figure 3. Eight steps of servitization (The Advanced Services Group)

The first two steps can be seen as base services: We supply products and spare parts for products. As intermediate services there are three steps: We restore the condition of products, we guarantee our performance in restoring the condition of products and we guide the capture of more value from products. Finally, there are three last steps that can be classified as advanced services: We guarantee the outcomes from products, outcomes of business processes and outcome of a business platform.

These two models from The Advanced Services Group describe the same evolution of service offering from the simplest of product to the most advanced service solutions. The latter goes a few steps further to form a comprehensive customer-supplier relationship.

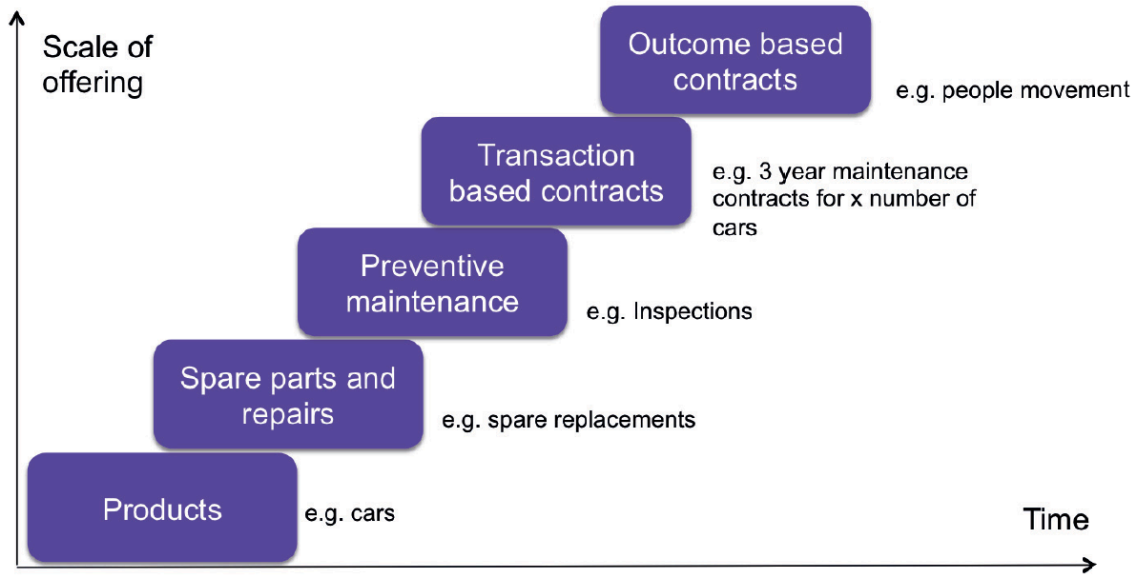

Figure 4. Development of service offerings in manufacturing firms (Turunen 2013)

Turunen (2013) draws slightly different picture of the same subject. The approach is more concrete naming five logical steps on industrial company's daily used professional language: products, spare parts and repairs, preventive maintenance, transaction-based contracts and outcome-based contracts. These steps cover well the concrete products to services scale of an industrial company.

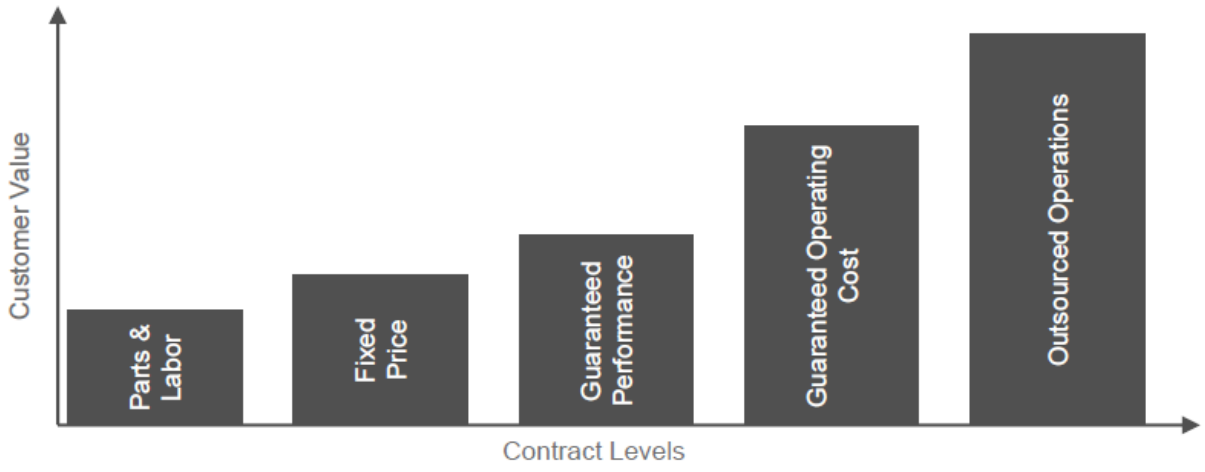

Figure 5. Contract Levels of a Manufacturing Company (Internal consultant 2021)

An internal consultant offers a simple view of different contract levels for manufacturing industry on figure 5. Customer value grows when moving from basic agreement of supplying parts and labour to fixed price contracts, guaranteed performance agreements and on to guaranteed operating cost. Finally outsourced operations represent the highest customer value and the most sophisticated contract level.

3.1.2 Servitization and applications

Servitization today in industrial companies is mostly some way of the last steps of servitization process. There are some examples of large manufacturing companies that have successfully developed solutions that are clearly outcome-based contracts or outcome is focused on capability. Bryson et al. (2020) explains what happened with Rolls-Royce engine offering and Flowserve industrial pumps.

Rolls-Royce

In 1987 engine manufacturer Rolls-Royce supported customers with engine repair and overhaul arrangements “which often failed to align interests with those of customers” (Rolls-Royce 2007). Services were considered at that point as something to support their equipment sales rather than a strategic element of their offering. Since then, the company has transformed from engine manufacturer to power provider.

Transformation was possible because they had a huge existing fleet of engines, and the customers were happy to try the new business model. The new type of agreements based on engine usage hours gave the customers a new kind of visibility and stability to their expenses. With the new business model and service offering Rolls-Royce managed to turn their manufacturing business into

a mostly service-based offering. Bryson et al. (2020) pictures Rolls-Royce's transformation on table 2.

Table 2.Transformation of Rolls-Royce (Bryson et al. 2020)

Good →				Service
Delivery of engine				Delivery of power
Traditional support	*Enhanced support*	*Advanced support*	*Total support*	*Extended support*
Spare parts Repair and overhaul	Data and forecasting services Technical and logistics support Customer training	Comprehensive package integrating elements of basic and enhanced support Spares, including repair and overall contracts	Complete, availability-based services. Can cover all aircraft or some aircraft activities Configuration management and reliability enhancements covered	Partnered capability Turnkey service Non-propulsion-related support solutions
Customer responsibility →				*Service provider responsibility*

Flowserve

Flowserve's core business had been for decades designing and manufacturing flow-handling equipment such as pumps and valves, and also servicing the equipment was offered to the customers. According to Bryson et al. (2020), they realized that economic cycles greatly affected the sales of their products, but service sales continued roughly the same no matter if it was good or bad times economically. In 1997 the company decided to establish a new division to concentrate on selling service solutions to their installed base of equipment. Quick response centers started to provide 24/7 customer support and not long after also IoT-based monitoring systems kept eye on the equipment before anything needed servicing. The company wants to be seen as a "cradle-to-grave" company that serves the customers throughout the whole lifecycle of their products.

3.2 Business Models

The most important aspect from the case company's point of view is how they will benefit financially, where do they get money from? A well-considered business model enables successful launch of a new product. Osterwalder et al. (2010) define business model: "A business model describes the rationale of how an organization creates, delivers, and captures value".

Several different approaches on business models are published in literature. Common to all of them is the aim to pay attention to all the aspects of the business model and draw a picture of it rather than only describing it by writing. The most cited business model by Osterwalder et al. (2010) sets the standard for other models.

3.2.1 Business Model Canvas

Osterwalder et al. (2010) created a Business Model Canvas (BMC) to help planning a new business or a new concept – like in this case the initial maintenance agreement. The idea of the canvas is to cover the most important aspects of a successful concept by drawing a table of the key elements and analyze the new concept/business on it.

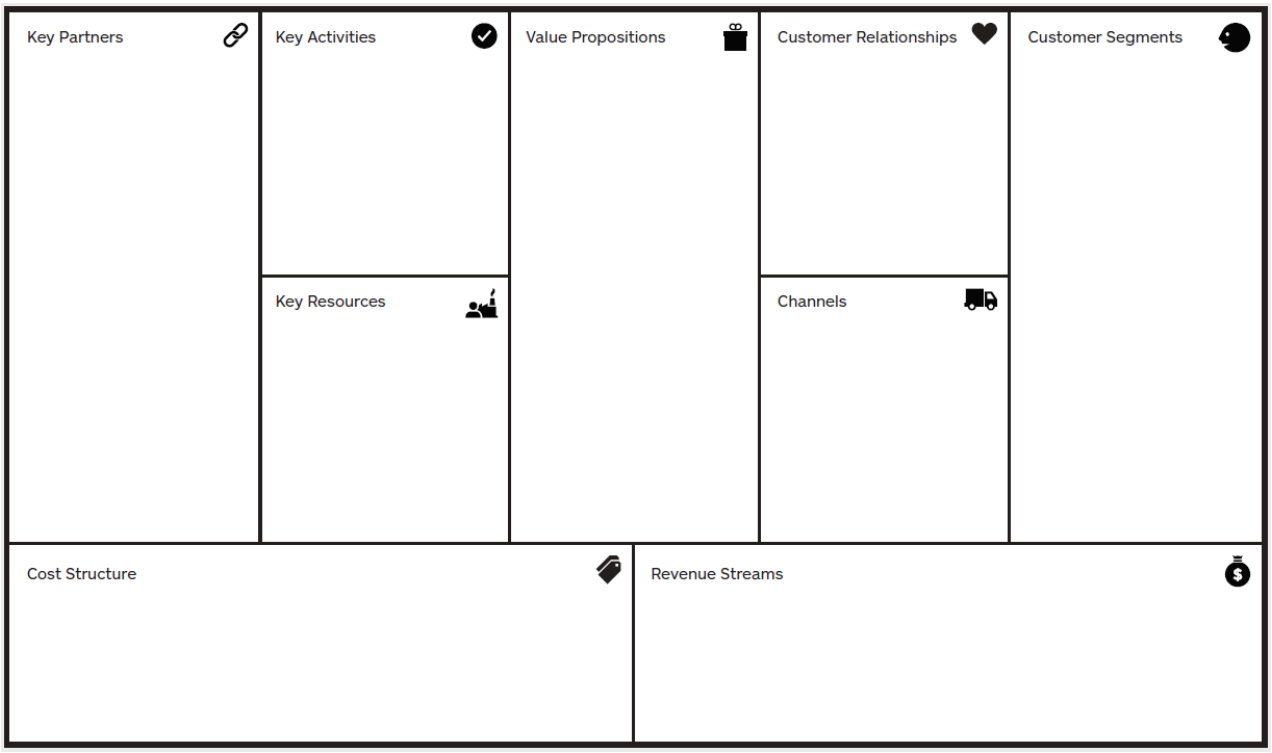

Figure 6. The Business Model Canvas (Osterwalder et al. 2010)

The Business Model Canvas (BMC) is based on nine building blocks.

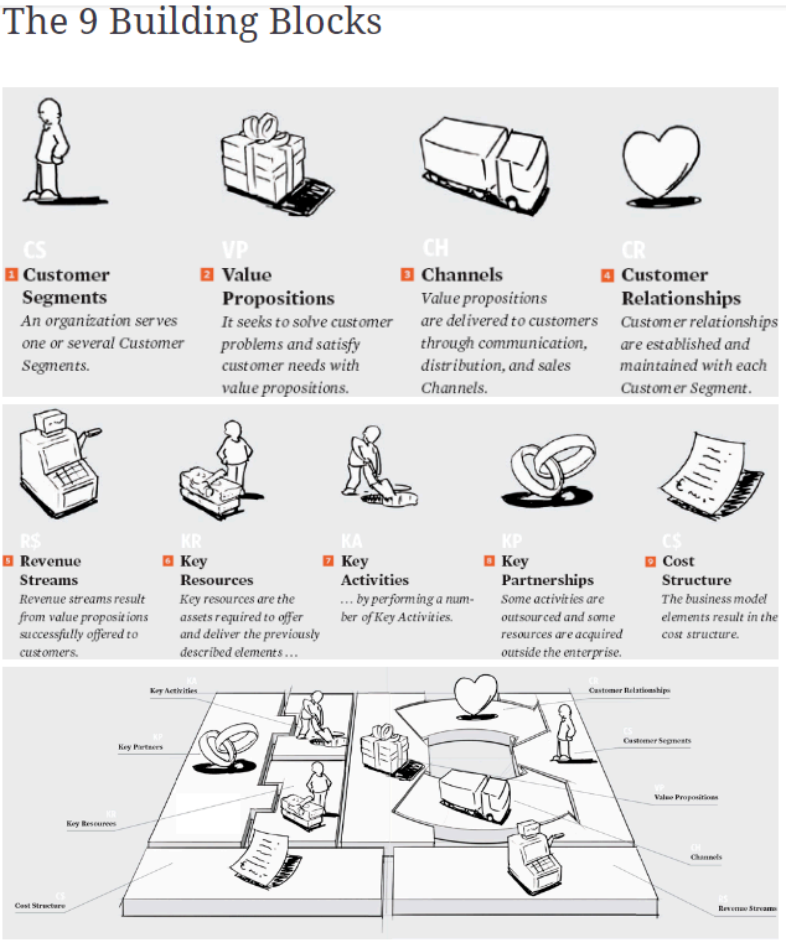

Figure 7. The 9 Building Blocks of The Business Model Canvas (Osterwalder at al 2010)

1. Customer Segments: “The Customer Segments Building Block defines the different groups of people or organizations an enterprise aims to reach and serve”

2. Value Propositions: “The Value Propositions Building Block describes the bundle of products and services that create value for a specific Customer Segment”

3. Channels: “The Channels Building Block describes how a company communicates with and reaches its Customer Segments to deliver a Value Proposition”

4. Customer Relationships: “The Customer Relationships Building Block describes the types of relationships a company establishes with specific Customer Segments”

5. Revenue Streams: “The Revenue Streams Building Block represents the cash a company generates from each Customer Segment (costs must be subtracted from revenues to create earnings)”

6. Key Resources: “The Key Resources Building Block describes the most important assets required to make a business model work”

7. Key Activities: “The Key Activities Building Block describes the most important things a company must do to make its business model work”

8. Key Partnerships: “The Key Partnerships Building Block describes the network of suppliers and partners that make the business model work”

9. Cost Structure: “The Cost Structure describes all costs incurred to operate a business model”

3.2.2 Service Logic Business Model Canvas

Another adaptation of business model canvas created especially for service logic within manufacturing industry is Service Logic Business Model Canvas (SLBMC) (Ojasalo and Ojasalo 2015). The tool is designed for industrial companies to develop business models with a deep understanding of customer contexts.

It is built from nine building blocks in a similar manner to the original canvas. With a fast look the blocks are mostly the same as on the original canvas. The content puts more emphasis on the cooperation of the industrial company and its customer. While the original BMC targets the right customer segments and considers customer relationships and channels, SLBMC assumes there is a

strong customer relationship already in place. More attention is given to consideration of cooperation and co-creation of new service products.

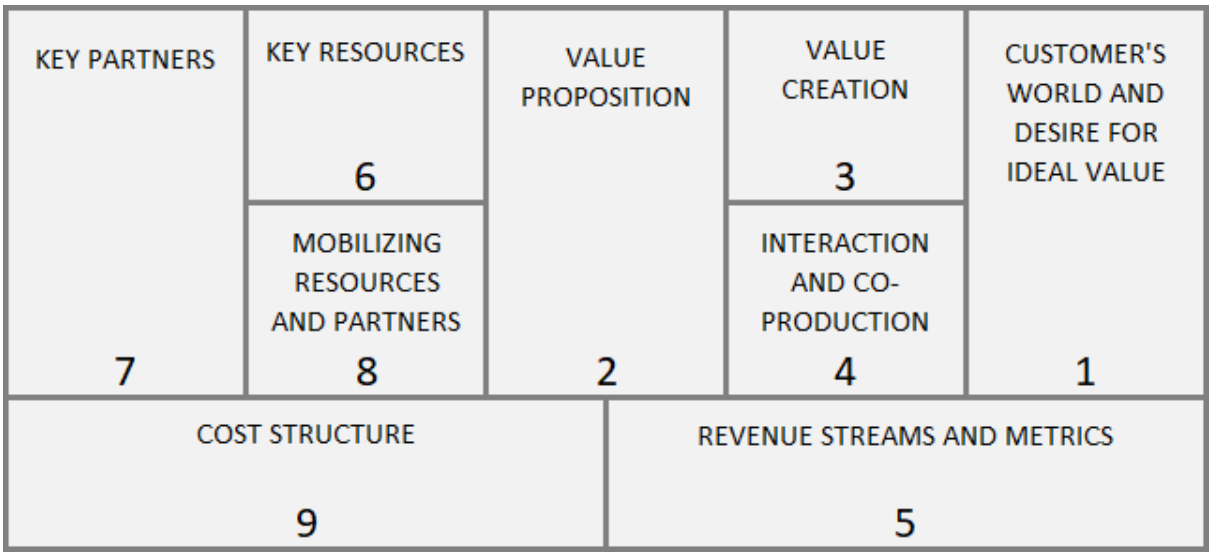

Figure 8. Service Logic Business Model Canvas (Ojasalo and Ojasalo 2015)

Service Logic Business Model Canvas consists of nine blocks, each addressing a specific aspect of the business model. Ojasalo and Ojasalo (2015) describe the blocks:

1. Customer's world and desire for ideal value

The first block is about understanding the 'customer's world and desire for ideal value.' Before discussing the value proposition and other business model elements, it is important to thoroughly explore the customer's business to grasp their context, activities, practices, and experiences. This block includes analyzing explicit and hidden customer problems, motivations, goals, and desired benefits. Customers may prioritize not only functional and economic aspects but also emotional, social, ethical, environmental, and symbolic factors.

2. Value proposition

The second block describes what customers can expect from the industrial company's product or service. It is important for this description to match the customer insights from the 'customer's world' block. This emphasizes the need to understand what customers really get when they buy the company's solution.

The company's offering should match what customers have in mind, aligning with their goals and expectations.

3. Value Creation

The third block 'value creation' explores how the industrial company and the customer are connected. How the company's products fit into the customer's daily activities and experiences? The analysis aims to understand how the company can help customers create value and achieve their goals, as outlined in the first block ('customer's world'). The focus is on figuring out how value is made in the customer's everyday operations and how the industrial company can assist and improve its customer's value creation.

4. Interaction and Co-production

Block 4, 'interaction and co-production,' focuses on how customers engage in the company's activities and use its resources. Key questions include how to improve interaction between the company and customers, understanding customers' mental models in this interaction, and analyzing customer activities in different usage situations.

5. Revenue Streams and Metrics

The fifth block shifts focus to identifying the company's earnings logic, financial feedback and customer benefits. It links price to customer value and outlines key performance indicators for measuring business success.

6. Key Resources

This block focuses on the dynamic and sometimes intangible resources related to the specific value proposition being discussed. Key resources, particularly core competencies, are emphasized. In a service-dominant business, recognizing the customer as a vital resource is crucial, leading to the analysis of the customer's knowledge and skills.

7. Key Partners

The seventh block focuses on identifying and analyzing 'key partners' essential for value creation. How can we identify key partners and their roles in value creation? It goes beyond the typical industrial company-customer relationship by examining the roles, resources, and benefits associated with these partners.

8. Mobilizing Resources and Partners

Block eight, focuses on using and developing resources and partners, showing how knowledge and skills are created together by everyone involved. Stressing the importance of combining resources, this block underlines that coordinating resources is a key activity for all parties in business relationships.

9. Cost Structure

The ninth block discusses the business model's cost structure, covering both company costs and sacrifices, including those imposed on the customer. It explores the impact of potential cost-cutting on customer value and experience.

3.2.3 Business Model Ontology

The most common business model illustration in literature is BMC on 3.2.1. Osterwalder’s earlier version of the subject was named Business Model Ontology.

Table 3. Business Model Ontology (Osterwalder 2004)

Pillar	*Building Block of Business Model*	*Description*
Product	Value Proposition	A Value Proposition is an overall view of a company's bundle of products and services that are of value to the customer.
Customer Interface	Target Customer	The Target Customer is a segment of customers a company wants to offer value to.
	Distribution Channel	Distribution Channel is a means of getting in touch with the customer.
	Relationship	The Relationship describes the kind of link a company establishes between itself and the customer.
Infrastructure Management	Value Configuration	The Value Configuration describes the arrangement of activities and resources that are necessary to create value for the customer.
	Capability	A capability is the ability to execute a repeatable pattern of actions that is necessary in order to create value for the customer.
	Partnership	A Partnership is a voluntarily initiated cooperative agreement between two or more companies in order to create value for the customer.
Financial Aspects	Cost Structure	The Cost Structure is the representation in money of all the means employed in the business model.
	Revenue Model	The Revenue Model describes the way a company makes money through a variety of revenue flows.

Business Model Ontology is built with the same Building Blocks as BMC. The former deals with the same aspects as the latter model. BMC can be described as more developed because of the clear visualization.

3.2.4 STOF Model

Bouwman et al. (2008) created another way to describe business models. STOF model consists of Service, Technology, Organization and Finance domain.

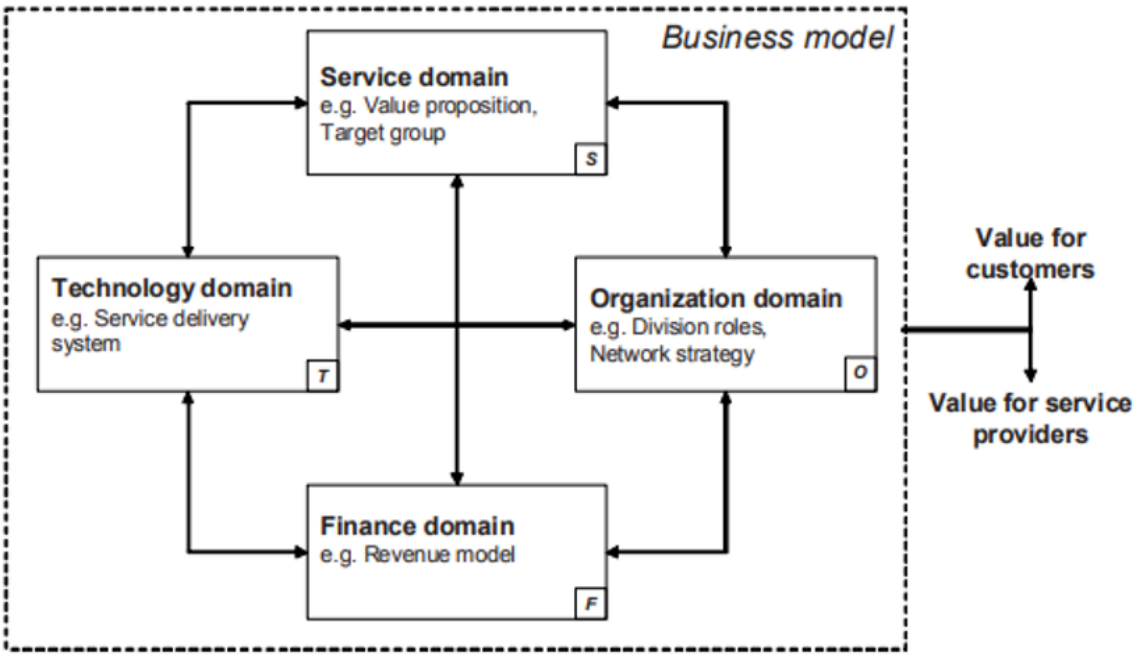

Figure 9. STOF business model domains (Bouwman et al. 2008)

Service domain includes Value Proposition and Target group, similar to building blocks 1 and 2 on the BMC – Customer segments and Customer Value Proposition.

Technology domain's purpose is to evaluate the delivery system of the service/concept on hand. This is similar to building blocks 3 and 4 – Channels and Customer Relationships.

Internal and external partner's roles and capabilities such as division roles and network strategy are considered on Organization domain. On BMC these are covered on building blocks 6 and 8 – Key Resources and Key Partnerships.

Finance domain covers the concept's Revenue Streams and Cost Structure – building blocks 5 and 9.

Only Building Block 7. Key Activities cannot be clearly placed under one STOF domain but can be considered as part of either Technology or Organization domain.

When comparing Business Model Canvas and STOF model it is obvious that The Building Blocks of BMC and domains of STOF model cover all the same aspects of building a business model.

3.2.5 Service Business Model Canvas

A business model design by Zolnowski et al (2014) is targeted for Service industries. Service Business Model Canvas (SBMC) is a variation of Osterwalder's Canvas or the original Ontology. Each Building Block is divided into Customer, Company and Partner perspectives to give more emphasis to seamless co-operation between these stakeholders.

Customer perspective	***Customer*** (Customers in the business model)						
	(Costs borne by customers)	*(Resources provided by customers)*	*(Activities carried out by customers)*	*(Value proposition for customers)*	*(Contribution of customers to maintain the relationship)*	*(Channels provided by customers)*	*(Revenues captured by customers)*
Company perspective	**Cost Structure** *(Costs borne by the focal company)*	**Key Resources** *(Resources provided by the focal company)*	**Key Activities** *(Activities carried out by the focal company)*	**Value Proposition** *(Value propositions of the focal company)*	**Relationship** *(Contribution of the focal company to maintain the relationship)*	**Channels** *(Channels provided by the focal company)*	**Revenue Streams** *(Revenues captured by the focal company)*
Partner perspective	*(Costs borne by partners)*	*(Resources provided by partners)*	*(Activities carried out by partners)*	*(Value propositions for partners)*	*(Contribution of partners to maintain the relationship)*	*(Channels provided by partners)*	*(Revenues captured by partners)*
	Key Partner (Partners in the business model)						

Figure 10. Service Business Model Canvas (Zolnowski et al. 2014)

The visualization is different than rigid but visual BMC layout. On SBMC the different perspectives are precisely defined on the canvas and because of that any point of view is difficult to miss.

3.3 Service Agreements

Service Agreements are used to define what kind of services are included in the relationship between service provider and customer. According to Benyon et al (2006) a Service Agreement is a legally binding contract outlining the mutual

expectations and responsibilities in a business relationship between a service provider and a customer.

3.3.1 Content of Service Agreements

Service agreement defines also the metrics used for that certain service, the acceptable and unacceptable service levels and the liabilities and obligations for both parties. Benyon et al (2006) lists the most important items that service agreement covers:

- The services to be provided
- The metrics associated with these services
- The acceptable and unacceptable service levels
- The liabilities and obligations on the part of the service provider and customer
- The actions to be taken in specific circumstances.

3.3.2 Equipment Maintenance Agreements

Hami et al (2020) explain that over time, the significance of the maintenance function has significantly broadened, evolving into a central function within companies and a vital aspect across diverse industries. Maintenance plays a pivotal role in averting equipment failures, prolonging the lifespan of assets, mitigating workplace injuries, minimizing equipment downtime, improving equipment efficiency and productivity, ensuring the ongoing functionality of system assets, boosting equipment availability, and generating value for both internal and external stakeholders.

3.3.3 Types of Maintenance

Kobbacy and Murthy (2008) describe the key objective of maintenance as "total asset life cycle optimization," meaning maximizing the availability and reliability of assets and equipment to produce the desired quantity of products with the

required quality specifications, in a timely and cost-effective manner, and in accordance with environmental and safety regulations.

The Swedish standard SS-EN13306 (2001) illustrates a categorization of maintenance types and their interconnections, as depicted in Figure 11. Maintenance is segmented into two primary activities: corrective and preventive.

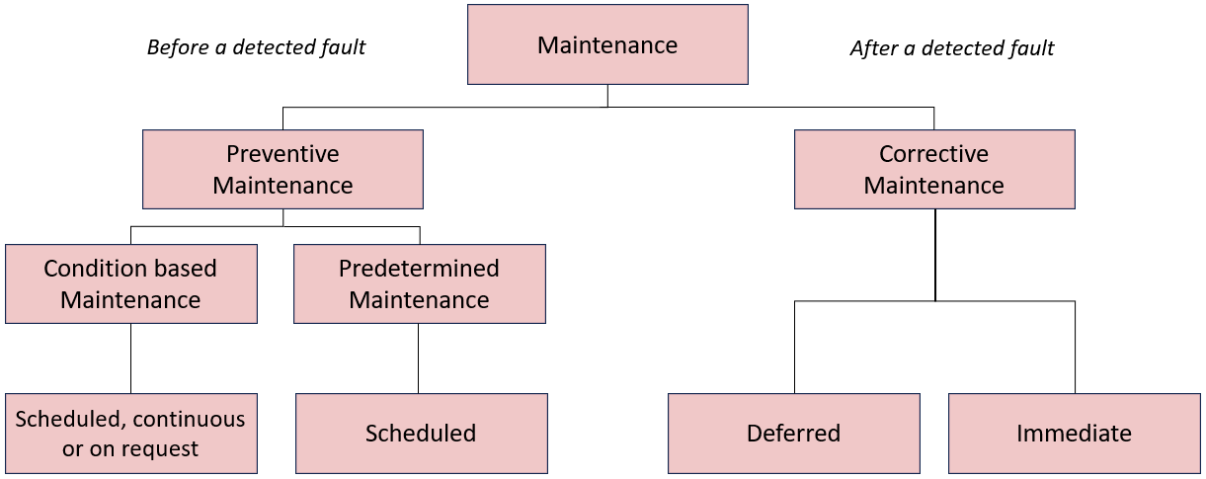

Figure 11. Overview of different maintenance types (SS-EN 13306, 2001)

Corrective Maintenance / Breakdown Maintenance (BM):

Corrective maintenance refers to maintenance conducted after fault recognition with the aim of restoring an item to a functional state. It is often interchangeably used with terms such as breakdown maintenance (BM) or failure-based maintenance (FBM). Also recognized as run-to-failure or reactive maintenance, corrective maintenance involves repairing or replacing equipment after a failure occurs.

Preventive Maintenance (PM):

Preventive maintenance is maintenance performed at predetermined intervals or according to specified criteria to reduce the likelihood of failure or functional deterioration of an item. The concept of preventive maintenance means conducting maintenance activities before equipment failure. It can take the form

of predetermined (periodic) maintenance or condition-based maintenance (CBM).

Predetermined Maintenance / Time-Based Maintenance (TBM):
Predetermined maintenance is preventive maintenance conducted at established intervals of time or usage, resembling scheduled maintenance but without prior investigation of the item's condition. It is sometimes synonymous with Time-Based Maintenance. The application of TBM in industry is typically guided by experience or original equipment manufacturer (OEM) recommendations and follows a scientific approach. Experience-based TBM is a traditional preventive maintenance practice carried out at regular time intervals.

Predictive Maintenance / Condition-Based Maintenance (CBM):
Predictive maintenance is defined as "condition-based maintenance carried out following a forecast derived from the analysis and evaluation of significant parameters of the condition of the item". It is sometimes used interchangeably with Condition-Based Maintenance. CBM can be defined as "preventive maintenance based on performance and/or parameter monitoring and subsequent actions". Performance and parameter monitoring may be scheduled, on-request, or continuous.

3.4 Conceptual Framework

The concepts taken from the literature review, which include definitions and important business models, are combined to create the conceptual framework for this thesis. Shown in Figure 12, this framework is built on key elements found in the literature as explained in the previous sections.

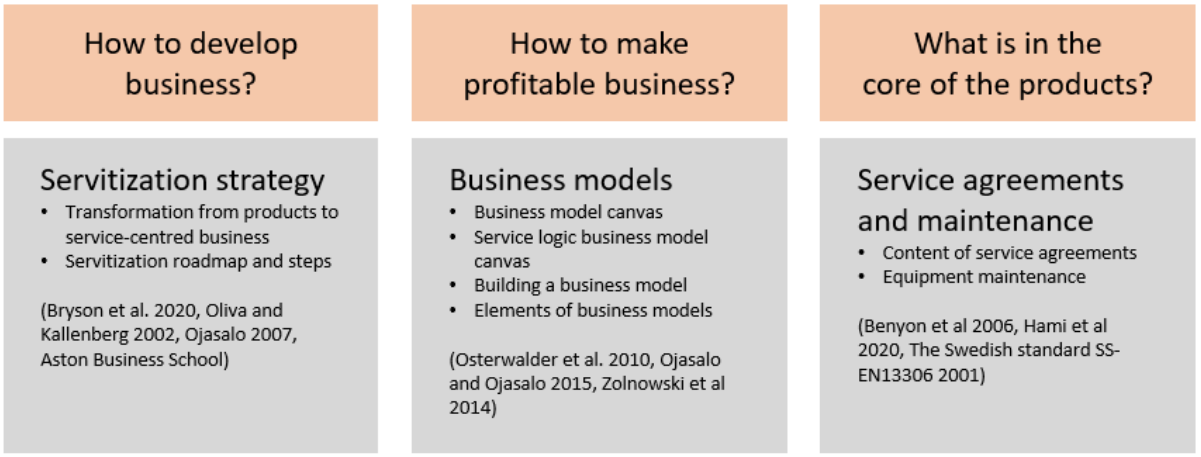

Figure 12. Conceptual Framework of the Study

Building a business model for a new service product needs a thorough analysis of the current state of the case company before the actual business model can be developed. The most important aspects in the process are diverse but can be summarized in three questions as seen on Conceptual Framework on figure 12.

The first question considers the development of the whole service business or the case company's Services business line. In the core of service development is the servitization of organization, products and processes. Understanding the status will help deciding how to proceed.

Probably the most important aspect when developing service business and products is the question how to make money out of the business? The business model answers to that question and the different models available in literature create a platform to learn where the case company is at the moment; what issues there are to improve.

The last question helps to understand what are the actual products that are developed. It gives a deeper understanding of the elements that must be considered when creating a new product and what has to be known when developing the business model.

This concludes the conceptual framework stage of this study. In the next chapter the current state of the case company's organization and operations is explored. The starting analysis tries to find answers to the questions presented in the conceptual framework.

4 Starting Analysis

The previous section gathered existing knowledge on servitization, business models and service agreements. In this section the current state of the case company's organization regarding those aspects is analyzed.

Service business has been in a focal role in the case company for the past few years. Growth has been rapid and steady. Market outlook has been favourable, and the Service business line staff have stretched to reach the ever-growing targets set by the management. Processes, products and tools may have not been developed as much when the focus has been on fulfilling the orders and customer needs.

4.1 Servitization Status and Service agreements

To develop service product offering further the case company re-organized some of the Services business line functions. Global Service Product Portfolio team was established with the focus on creating new service products and productizing existing product offering. That means that the company wanted to monetize on opportunities on growing service demand and find new ways to offer existing products.

Although the case company has long traditions of servicing the customers, easiness of doing business has not been of the highest standard. Productizing the offering would help to sell clearer service products but also get better margins on the products. Portfolio Team Leader emphasizes the importance of clear roles on productizing the Service offering:

> It is essential to have clear roles on product management. Before it was a bit hazy who was responsible of what – now because the portfolio team includes all the product management, we always know who owns the product and who is responsible for developing the product. We will progress more efficiently with our service product offering. (Director, Case Company's Services Product Portfolio team)

Service Portfolio team consists of Spare Parts, Training Solutions, Electrification and Digital Solutions, Upgrades and Repairs, Remanufacturing, and Service Agreements functions. Each function is managed by a Product Manager who reports to the Portfolio Team Leader.

One important function of the Portfolio team is Service Agreements. The ambition of this function is to combine all the Service offering and offer those through Service Agreements. Portfolio team leader described the objective of Service Agreements function as follows:

> We aim to increase the revenue in Services organization and one important element is service agreements. We need a product offering that is easy to sell and hopefully easy to buy as well. A roadmap for service agreement development is drawn and now product management takes responsibility for receiving feedback but also developing the products based on it. The company appreciates the profitability of service business and more of it is wanted. Service agreements is a great way of getting steady income for available service products. (Director, Case Company's Services Product Portfolio team)

The case company's customer base is mainly mining companies and tunnelling operators globally. There are companies of different sizes and strategies, therefore a diverse offering is needed to serve all the customers. The company operates in different parts of the world through Sales offices. Each Sales office have been working in their own way for years or even decades. Some of them have followed global guidelines where the guidelines exist but some have preferred to build their business on more independent and local way. This leads to many kinds of Service Agreements globally.

The first task of the Service Agreement function was to create a holistic view of the agreement offering. The earlier mentioned functions cover most or all the needs. Each function develops their own products but how are they offered to customers depend on the Service Agreement offering. There are several views how to describe the agreements that already exist throughout the case company's sales offices. To summarize that offering and decide what kind of agreements the company wants to offer, a simplified view was created.

The holistic view is needed to cover all the Service offering but also to unify the wording and principles that are used when dealing with agreements. In a fast-growing global company, a framework of offering is essential – sales offices will get structure to their work to offer customers a wider selection of service products than just arranging them what is requested.

Of the Service Agreements concepts most of them have been in use to some extent. Existing service contract might resemble Full-Service agreement or some other of the offering – the starting point for negotiations might have been some kind of idea of servicing their machine. Contracts have been customized for each customer, from local starting point.

1.1 Maintenance Agreement Business Model

A servitization study was conducted in 2021 in the case company's Services business line. One of the most feasible development projects on the servitization study was to re-design traditional services. That opportunity consists of several products that could be developed. At this point the case company decided to progress with the maintenance agreement for new equipment.

The new maintenance agreement is planned to be designed for individual new equipment – whenever equipment is sold, the new maintenance agreement is offered to the customer to help them concentrate on their core business instead of machine maintenance. It will be designed for a single equipment unlike most of the other concepts under Services agreement offering which are targeted primarily for fleet of equipment.

The most important aspect of the maintenance agreement is the easiness of operating the equipment during the first year of operation. The case company would take care of all the periodical maintenance: scheduling and conducting the maintenance, arranging necessary spare parts, and auditing the machine

each time when maintaining the machine. All other repairs and maintenance requests would be handled on-demand basis.

Potential customers usually operate on a site where there are several OEMs (Original Equipment Manufacturer) involved. Maintenance of the entire fleet can be arranged by the company itself, a maintenance company or by OEMs' maintenance personnel. This agreement concept would help the customer in a way that they would not have to train any subcontractors or their own technicians for maintaining that new machine.

The idea of offering carefree first year for the customer when they buy a new machine is solid. It will lift a lot of pressure from operating the machine. However, a business model for the agreement has not been considered. According to Ojasalo and Ojasalo (2015) readiness of a concept can be tested with the Service Logic Business Model Canvas. That model relies in close cooperation with a customer and therefore is difficult to use directly to a customer base of several companies. The original Business Model Canvas (Osterwalder et al. 2010) on the other hand is developed for a wider perspective, even for Business-to-Customer industries. It would probably be smart to use BMC when developing a business model for a new consumer product.

To understand the starting point of developing a business model for maintenance agreement for a carefree first year, an adaptation of both business model canvases is used.

1. Customer Segments and Customer's desire for ideal value

Customers of the case company operate underground in mining and tunnelling sites in different kinds of locations and environments. Ideal values vary between segments, but two elements are commonly important: firstly, easiness of operating and maintaining the equipment, and secondly cost of the services provided. While the cost of maintenance could be lower with maintenance

agreements, selling the idea of relatively high monthly fee against invoicing transactional ordering could be challenging.

The customers buy from the case company either an equipment, or an equipment with some selection of services. Services can be extended commissioning, extended warranty or any such service product. The concept of carefree first year maintenance is based on making the customer's life as easy as possible.

Customers' operations are underground in challenging conditions which makes the equipment wear out fast. Digging tunnels by blasting and handling rock is also expensive and dangerous. All of this means that the equipment must be in top condition. Operations often run around the clock, which makes the servicing of equipment an extremely demanding and scheduled action. The case company's Senior Manager in Service Sales Excellence highlights the company's position embedded in customers' operations:

> Our customers work mostly in similar manner: long days underground with no room for mistakes. They work in dangerous surroundings. They must be sure their operators know what they are doing and take care of safety precautions. In this kind of environment it is vital that their equipment work as they are supposed to. Our offering of equipment are industry leaders and very safe. The conditions underground are rough: it can be very humid, dark and noisy for the people working there but moist and toxic for the equipment. Both the staff and equipment wear out. Our offering of services hit that spot very well: we take care of the equipment professionally and make sure their environment to operate is as good as possible regarding the equipment. (Senior Manager in Service Sales Excellence, Case Company's global commercial team)

+ A thorough understanding of customers' operations and offering to contemplate it

- Cost-sensitive customers might not be interested as the pricing of the agreement would preferably not be transparent

2. Value proposition

The value proposition of the concept is to offer peace of mind, carefree operating with the new equipment, maintenance of highest quality and letting them concentrate in their core business. Without the agreement customer must use resources on equipment maintenance training, scheduling maintenance, conducting periodical maintenance and spare part supply. The case company can help the customer with everything mentioned above – saving in planning and resources is of high interest to all the customers.

Customers are having problems finding a skilled workforce for maintaining their machines. Whenever they purchase a new machine, it would be an interesting option if the machine manufacturer offered maintenance service for the equipment. Maintenance supervisor of a customer described the situation as follows:

> We do require outsourced maintenance at times and with the market now struggled to provide support when required, because they're stretched with the capabilities… To be realistic, the market is stretched for personnel and people, therefore outsourcing makes sense. (Customer #1, Supervisor Maintenance)

> We have two normal technicians; we normally can supply our site full time support with them. For the last around five months, we have been down to one normal technician because there is no supply for more skilled labour to maintain the machines. We do normally have one person so there is one on a break and one at work. But at the moment, we have been there with only one. (Customer #1, Supervisor Maintenance)

+ Value proposition includes exciting elements for all customers

+ The customers' life can be made easier with the maintenance agreement and let them focus on their core business

- Customers who maintain their whole fleet by themself

3. Value Creation and how to deliver it

Delivering the value proposition is based on existing business relationship. Before a maintenance agreement can be negotiated the customer must have bought an equipment from the case company. The service business is based on a good relationship between the companies – aftermarket sales cannot happen if the equipment sales process does not work well.

There must be room for negotiation on the maintenance agreement. Customers are different and their operating environment can vary a lot from each other. Because of that their requirements for service are often very different and agreements should be negotiable. This is the starting point for building a mutually beneficial solution which has a great chance of growing into a long-lasting arrangement between the companies.

One challenge in selling the maintenance agreement globally in all locations is that there are no sales office and technicians in every corner of the world. The company can sell equipment wherever there is a mine, but service cannot reach all the places frequently.

> We have an extensive fleet of equipment around the world which enable us to sell services. What we do not have is maintenance personnel in each of these areas – our possibilities are limited and viability of service visits is not good (Senior Manager in Service Sales Excellence, Case Company's global commercial team)

One aspect of the easy experience is the location of the spare parts that are needed to conduct the maintenance work, as explained by Head of procurement and contract management of one customer:

> the OEM provides the list of critical parts and consumables to the subcontractor, but these do not follow the recommendation 100% to reduce the maintenance cost in the contract. You cannot do anything against, only if we put some pressure on the subcontractors. Today you keep the parts in their facility and then there is a Purchase order (PO) and all the logistics required. The competitors do use a VMI system for a better service experience and rapid deployment of parts in the field. The containers are in our

> facilities (Mining site) and the subcontractors manage the inventory. You have the inventory 2 hrs by plane from our location. (Customer #2, Head of procurement and contract management)

A solution for this must be considered.

+ Starting point already there after equipment sale – the offering of equipment and services are embedded in customers' core operations

- Reach of service capability does not cover all areas of the world

- Rapid deployment of parts in the field

4. Interaction and Co-production

Co-operation with the customer does not stop when the maintenance agreement is signed. A good aspect of the agreement model is that a service technician will visit the customer periodically. Ideally that person should be the same person each time for a long period of time – it would help to create trust between the companies. An account manager would be the responsible person interacting with the customer but in the end the technician is the one who understands the customer's process in a more detailed manner.

Case company's portfolio team leader is responsible for service product offering. He sees the co-operation with customer as an important way of getting constructive feedback and ideas for product development:

> The whole idea of service product development is based on customer needs. We have many long and mutually beneficial customer relationships. We have a history of improving our performance based on their feedback and we have been also able to help them with their operations. Our key account managers must discuss with customer counterparts about our services – both the quality of our services and the product offering. We are able to react to their feedback by improving what we do. (Director, Case Company's Services Product Portfolio team)

+ Interaction and co-production happen naturally when service technician visits the customer site regularly

- Human Resources management would have to be taken seriously – a different person every time visiting would not create trust

5. Revenue Streams and Metrics

Invoicing the services can happen in two ways: transactional invoicing or by a flat monthly/yearly fee. Traditionally customers have paid for maintenance services for example by hours plus travelling and other additional cost and spare parts needed for the maintenance work. The new maintenance agreement concept relies on more sophisticated value-based pricing. That value for the customer is not evaluated yet. Director of the Portfolio team stresses how the business model would bring predictability regardless the invoicing model:

> The business model is simple in this sense - we charge a fee for the service and we deliver it. It is not crucial if we charge per day or month or year. What is important is that we create stronger customer intimacy and a continuous income. By creating an extensive service agreement offering we can allocate the income to the right functions. (Director, Case Company's Services Product Portfolio team)

Naturally the case company would like to price the service so that the margin would be higher than traditional transaction-based pricing. One other benefit is customer purchasing behavior: the case company would supply all the needed spare parts instead of customer buying parts from several sources. Another benefit in the long term is the possibility to sell more comprehensive service agreements to the customer.

The customer would benefit financially and in efficiency from the agreement: machine would be maintained in OEM standards which is normally much higher than customer's own maintenance program, and that would result in better uptime of the equipment.

+ Better margin for the case company products, bigger share of wallet, and better uptime for the customer

+ Future business potential in more service agreements

- Beneficial pricing for both parties

6. Key Resources

The ones who would make the concept work are the skilled service technicians trained by the case company that visit the customer sites to do the maintenance. The case company has trained technicians on maintaining different machine types and applications. The technicians are based around the world, and they work in their designated region.

Currently the technicians work mostly on-call basis but the way of executing the service is similar to the new concept: a technician travels to a customer site and conducts the service. The only difference from their point of view would be predictability because they would have more scheduled visits arranged well in advance.

Customers' or subcontractors' own technicians would still be responsible for the daily maintenance of their equipment. They would give valuable insights to the case company's technicians on the equipment performance and possible repair needs. Head of procurement and contract management of one customer stressed the importance of skilled technicians of the case company:

> All daily maintenance will be conducted by the subcontractor, but all preventive and predictive maintenance MUST be done by you. We see a huge gap between all competencies needed to conduct an in deep maintenance program (Customer #2, Head of procurement and contract management)

+ Skilled technicians already in place in each region

-

7. Key Partners

Human resource functions in the sales areas are responsible for making sure there is an adequate number of skilled technicians. In practice this usually ends up to local Service Manager to arrange as well as moving the technicians to customer sites. Following the service tasks and having enough technicians in each area is essential for successful maintenance operations – if agreements are sold, updating the list of skilled personnel is a must. Senior Manager of the case company describes the roles:

> In theory the local HR function is responsible for making sure there is enough skilled labour but in practice the need is often so urgent that the local Service Manager must react by finding more technicians fast to fulfil customer needs. They are well aware of the situation and are aligned with company's objectives. (Senior Manager in Service Sales Excellence, Case Company's global commercial team)

The service organizations in sales areas have grown steadily together with the company's growth. Currently the workforce is good in numbers and skills.

The industry is not the simplest regarding defining key partners on the customer side. There are many influential departments or people in most of the customers' organizations which makes defining the key partners complicated. Case company's Senior Manager in Service Sales Excellence explains the challenge:

> We have to find the right persons each time we enter a new site or customer office. Maintenance department is naturally an important function if we try to convince a customer of our service excellence. But then again someone else is in charge of their expenditure. Also, if the maintenance department want to protect their homebase and all the maintenance on site, the Service Manager or Fleet Manager of the site might see the big picture better and decide that they need our services. We must find the key players in every site and every customer. If we do not, we end up convincing the wrong people and get no sales even though the interest is clearly there. (Senior Manager in Service Sales Excellence, Case Company's global commercial team)

In general, the case company sales personnel know the customer organizations relatively well. Because each customer is different, assessing the customer organization must be done every time when trying to increase interest in service agreements.

+ Customer organizations are mostly well known and key personnel possible to find

- Internal key partners' (Area Service Managers) possibilities to make sure there is an adequate number of resources in use

8. Mobilizing Resources and Partners

To keep service technicians' skills up to date, extensive training is needed. In bigger sales areas case company's global technical trainers have also trained personnel to train the local personnel whenever there are new technicians hired. In general, the training has been a focal point in the case company's operations in all sales areas.

Human Resource functions in the sales regions must be kept aware of the maintenance agreement sales cases. Also Service Managers of the sales areas play an important part. If technician personnel are adequate for the new agreements, arranging the movement of the personnel in a smart way is vital for successful service execution. Continuity in this kind of service agreement must be noted – a skilled technician who knows the customer and the equipment in question is needed for the service visit. This is a priority on the global level and sales areas follow the principle well in general.

Sales personnel in each sales area must be notified and trained for the new concept. In fact, the aim of the case company is to offer maintenance agreement for each new equipment that is sold as Portfolio Director points out:

> We need to ensure the growth of Service business, and securing service agreements with key customers is a very important part of the plan. While we try to negotiate comprehensive agreements with

> them, we must take the opportunities for future growth as well – maintenance agreements for as many new machines as possible would guarantee a steady flow of income, but moreover a ground for possible future arrangements which might be much bigger in volume. (Director, Case Company's Services Product Portfolio team)

This means that it should be a priority for service sales personnel to ensure that the customer gets the information and quotation of this new service when they receive their new equipment delivered by Equipment business line.

+ Solid training concept to keep technicians' skills up to date

- Sales personnel awareness and readiness to sell the product

9. Cost Structure

The cost structure of the maintenance agreement is quite simple but the numbers vary in each sales area. Spare parts that are needed to execute the maintenance are standard globally and their pricing is relatively similar everywhere. Variation has to be taken into account, but bigger fluctuation concerns cost of labor and especially traveling costs. On the positive side the cost of labor is known in each area even though it differs greatly between countries. More difficult to forecast are the travel costs which naturally differ from site to site – some locations are reachable only by expensive flights and even local transportation and accommodation might differ greatly depending on country and site location.

Global organization can be utilized in local service operations. That might add a cost element on top of plain cost caused by service agreement as Portfolio team leader states:

> Cost structure for this product is simple: there is the spare parts that are needed for the job, labor hours and travel cost. There is also administrative cost because we have a global organization that can help core team in solving customers' problems: technical support function is important in urgent cases and Equipment organization can help in more fundamental challenges with the

> machines. We even have service centers in many areas to conduct more challenging operations. (Director, Case Company's Services Product Portfolio team)

+ Components of cost structure are well known

- Costs differ greatly depending on country and site location

1.2 Summary of strengths and weaknesses

The Starting analysis considered different aspects of the case company's organization and processes regarding readiness to offer new kind of maintenance agreements to customers. The findings of the starting analysis can be presented as strengths and weaknesses of the business model. On table 4 those are listed in the order of the building blocks in the Service Logic Business Model Canvas.

Table 4. Strengths and Weaknesses

Building Block	Strength	Weakness
Customer's World and Desire for Ideal Value	+ Understanding customers' operations, business and valuation of services through long relationships and trust	- Pricing of the agreement would preferably not be transparent
Value Proposition	+ More carefree operations and focus on core business through fully arranged maintenance	- Customers with fully in-house maintenance
Value Creation and How to Deliver It	+ After successful equipment sale, the customer has obvious need for services as well + Service personnel do visit customer sites already	- Reach of service capability does not cover all areas of the world - Rapid deployment of parts in the field
Interaction And Co-production	+ Interaction and co-production happen naturally when service technician visits the customer site regularly	- Risk of incontinuity of service personnel
Revenue Streams and Metrics	+ Better margin for the case company products + Bigger share of wallet + Better uptime for the customer equipment + Future business potential in more service agreements	- Beneficial pricing for both parties

Key Resources	+ Skilled technicians already in place in each region + Continuous co-operation with customers' technicians	- Availability of adequate number of skilled technicians
Key Partners	+ Customer organizations are mostly well known and key personnel possible to find	
Mobilizing Resources and Partners	+ Solid training concept to keep technicians' skills up to date	- Sales personnel awareness and readiness to sell the product
Cost Structure	+ Components of cost structure are well known	- Costs differ greatly depending on country and site location

According to the Starting analysis the organization is in relatively good state to progress with the maintenance agreement concept. Despite the strengths there are weaknesses that need to be addressed.

4.2 Key Findings to Elaborate

The starting analysis revealed weaknesses in most of the building blocks. The severity of the weaknesses varies. Some of them can be considered points of view that should not be overlooked but do not need to be revised. On the other hand, there are other issues that need attention before the maintenance agreement can be put in a more focal position in service product offering.

The findings from the starting analysis form themes that are repetitive throughout the nine building blocks. All the weaknesses found can be presented under five themes:

- Personnel-related: Technicians and Salespeople
- Pricing and cost
- Rapid deployment of spare parts
- Reach of service capability

- Value proposition for customers with fully in-house maintenance

The presented key findings are presented under above themes and elaborated in section five. This concludes the starting analysis section.

5 Developing the Initial Solution

On the previous chapter the strengths and weaknesses were found and evaluated. To build a business model the weaknesses must be elaborated. A solution for all of them might not be possible to develop, therefore prioritization of the findings would be a beneficial way to start.

This chapter firstly prioritizes the themes that were identified as weaknesses to elaborate in the previous chapter. Building a solution for these themes will follow the prioritization. This chapter will be finished with a summary of solution development.

5.1 Prioritization of the Weaknesses

The MoSCoW technique is recognized as a simple method for prioritizing requirements. Hudaib et al (2018) explains that it is derived from the dynamic software development method (DSDM). Software development expert Dai Clegg created the MoSCoW method in 1994 while working at Oracle. He designed the framework to help his team prioritize tasks during development work on product releases. In accordance with the Moscow mechanism, requirements can be classified into four priority categories.

5.1.1 M – Must have

This category encompasses requirements that are imperative for the final solution. They are non-negotiable, and the project cannot succeed without fulfilling them.

Service Sales and Service Execution Capability

The challenge with personnel is to ensure adequate skills and the number of technicians, and to align the sales force with the target of offering service agreements. Both groups of employees are trained and adequate in numbers

for the current situation. Sales area personnel are managed by the sales areas; thus, the global team cannot directly affect their decisions.

Technicians working for the case company are used to traveling to customer sites, conducting the maintenance and dealing with the customer counterparts. Senior Manager in Sales Excellence describes the need to find answers on the questions regarding personnel:

> Our service staff in the sales areas are professionals and know the products, company and customers well. What we might be lacking is the readiness to conduct this kind of maintenance agreement in all the areas with current setup. There are probably enough skilled technicians in most of the sales areas but in some areas the service work is organized quite badly. We just have to make sure we have the capability to deliver the service in the areas we offer the new product. (Senior Manager in Service Sales Excellence, Case Company's global commercial team)

Key account managers interact with customers regularly and have a good connection with them. About selling the service agreements in general, case company's Service Portfolio team leader explains service sales logic:

> Our sales force is capable of selling the service products. They have a good connection with the customers in general and whenever there is a chance to develop the relationship or sell something more, they can probably do it. This new way to offer maintenance contract for new equipment is a different case: we must sell the contract already when the equipment is sold. It might be possible to do it at a later stage as well but to ensure a successful start to sales we must target the discussions where the customer's need for equipment is explored. (Director, Case Company's Services Product Portfolio team)

The case company would need the buy-in to the maintenance agreement offering especially from the sales personnel. If they do not offer the new agreement to the customers, the agreements will not happen.

The case company must also make sure of the availability of service technicians. In case there is interest in the maintenance agreement and sales personnel can sign a deal with the customer, there must be technicians

available to conduct the agreed service. Because of these reasons these two groups of personnel are needed to be aligned and available for the new maintenance agreement model.

5.1.2 S – Should have

These are high-priority features that, while not critical for the initial launch, hold significant importance and value for users. They hold the second position in the priority list.

Effective Pricing Model

The cost structure of the business model is clear but varies by sales area and customer site. There are different options for pricing models, and it should be decided before launching the product and entering the market. There are risks included in determining the pricing model. A monthly invoiced flat fee for the service would be the clearest and the most advanced but there the risks are also the biggest. Either the case company would not make profit or even lose money, or the customers would be put off by a too high price in their view.

The pricing model should be well considered and compared to different cost structures. However, the maintenance agreement can be sold and delivered also by the way maintenance is invoiced today: agreeing the new service and invoicing based on time and effort. It would not be the ideal solution but an option for a risk-free start to the new business model.

5.1.3 C – Could have

Desirable but non-essential requirements fall under this category. According to the method, these requirements are the first to be removed from the scope if the project's timelines are at risk.

Rapid Deployment of Spare Parts and Reach of Service Capability

While being in a way essentially important themes for successful business model, rapid deployment of spare parts and reach of service capability can be considered on a later phase of development and the service product can be launched without considering them thoroughly.

The existing process of spare part deliveries is working for all customers. Building a better solution would ensure that there would be no shortage of spare parts in unexpected events. The new business model is based on preventive maintenance – the case company knows when to conduct the maintenance and what spare parts are needed each time. Together with the customer this can be arranged by preparing maintenance visits in advance. A better solution would be preferable but it would also involve more forecasting, spare part coordination and probably bigger spare part stocks on customer premises. All of this would mean more resources and expenses.

The case company’s service operations are global and extensive. Some locations are not ready yet for regular maintenance operations. Building a solution for these locations would be a huge effort in terms of time and money because new sales and service organizations would have to be started and infrastructure founded. The new business model can be directed only to customers within service capability reach; therefore it will not be decisive for this project.

5.1.4 W – Won’t have

Requirements in this category will not be incorporated in the current release but might be considered for future stages of development. Typically, these requirements do not have a substantial impact on the project's success.

Value Proposition for Customers with Fully In-house Maintenance

The customers who maintain their fleet of equipment completely independently cannot be offered most of the case company's service offering. The new maintenance agreement is therefore not a viable product for them. For this project it only scopes out some of the customers.

5.2 Solution for Service Sales and Service Execution Capability

The case company is growing strongly, and its organization is still in development phase. Especially potential growth of Services business line is great. Global team organizes most of the development projects, and steers goals and targets of sales area organizations. Global team is led by the Senior Vice President who is located in Espoo, Finland as well as most of the global team. This makes the core of Services business line rather well-organized, whereas the Service teams in sales regions are smaller and therefore might not be capable of following all the changes in local market.

5.2.1 Service Sales Capability

The new maintenance agreement must be made available for sales as easily as possible. The sales personnel in each sales area have great responsibility to offer the agreement to the customers.

Arranging training is a must for sales personnel. Informing via the company intranet or other channel is needed before any sales can happen. That is not enough, though, because the sales personnel must be involved properly from the start. Senior Manager in Service Sales Excellence explains why training is needed:

> You can post the news everywhere but people barely read it, let alone take actions based on it. We need to activate the salespeople and they need to learn. They are competent and interested in new products, but no one wants to start selling something they do not really know. A training about the product and how to sell it would be

> necessary. The product itself is nothing fancy or even new so we do not need a full day course. A digital course that must be passed would be a good option. After passing the exam the salesperson would be okayed to sell the product. But still when there is discussion with customers there should be a service manager involved. We do not want a case where a salesperson has promised things that we cannot actually deliver. (Senior Manager in Service Sales Excellence, Case Company's global commercial team)

A well-organized training would be the key but that alone is not enough. The salespeople are mostly familiar with capital equipment and their features. Training cannot teach all the aspects there is to know about service products and processes, thus a Service Manager should be involved in the sales cases. That way a professional service knowledge can be ensured when offering and negotiating a service agreement.

Another important thing to offer to the sales personnel is marketing materials to support their message to the customers. This should be a reasonably straightforward matter to arrange with the marketing department. The Product Manager of Service Agreements from the Portfolio team would be responsible for cooperating with the marketing department to prepare the marketing materials.

To get the sales force properly inspired by the new product a sales incentive can be considered. Senior Manager in Service Sales Excellence gives an insight on the incentives:

> The salespeople work primarily for Equipment organization and get their pay check from there. Their incentives change throughout the regions but in general they rarely have incentives for selling Service products. (Senior Manager in Service Sales Excellence, Case Company's global commercial team)

The product is sold together with the new equipment, which means it does not require a lot of effort – buying the service agreement for one or two years is a much smaller decision than buying the equipment. Still, a small incentive for

getting the customer to sign a contract would encourage bringing it up in the first place.

Finally, probably the most important step to promote the sales of the new agreement would be integrating it into equipment sales tools. A configurator is used in equipment sales cases where customers can decide which features and additions they want to include in their machine. Ultimately that is the tool where the maintenance agreement for the first year of operation should be included as an option that can be selected for each new equipment sales case. Sales tool development is a time-consuming and expensive effort; therefore it is not included in this project.

5.2.2 Service Execution Capability

Service technicians are located around the world as near to the customers as possible. In those areas local sales offices are responsible for arranging the service visits and technicians to conduct the service.

The Human Resources function in each sales area is responsible for hiring the personnel. Each sales area is responsible for budgeting and their financial result. Service Managers are in a key role in moving the technicians to the customer sites, but in practice much else is on their responsibility as well as case company's Senior Manager in Service Sales Excellence describes:

> The Service Managers can make the new business model work in the sales areas. They can make sure that there is always someone available for the tasks agreed on the contract at required moment of time. They can also look after that there would be the same person going to the same customer to service the same machines he already is familiar with. On top of that the Service Managers should not be responsible for other HR management such as hiring new personnel or technicians' training – however often they are. We should get them onboard with the new business model to ensure we have the skilled technicians in place. (Senior Manager in Service Sales Excellence, Case Company's global commercial team)

An obvious and efficient solution to secure sales area capability would be to contact all Service Managers at the latest when the new service product is ready for launch. Training in which all the aspects of the product are presented as well as needs for the sales area and Service Managers, would be needed.

The level of service team setup varies greatly between regions. Some of them are ready for new ways of working and delivering new service products. This should be considered when the new product is launched – certain areas would be better targets than others. Case company's Senior Manager in Service Sales Excellence understands the differences between regions:

> We must know our capabilities before we try to get more service agreements. The sales areas differ very much regarding capability to deliver services. Australia is a good example of advanced service team – they are very professional and competent, and they are located strategically around the huge country in adequate numbers. We have no problem presenting a new service product to them and we can expect them to deliver the product. I am more worried about other areas, for example Central and Southern Europe is not covered well at all. There is no service technicians and the maintenance there is done by technicians from Finland or the UK. It would not be a good idea to start selling the new product there. (Senior Manager in Service Sales Excellence, Case Company's global commercial team)

For this project it is not possible to develop the service organization in different areas. Go-to-market plan must be very clear about the areas that are targeted first. Even if there is interest in the maintenance agreement in a sales area with no capability to deliver it, the product should not be launched in those areas first.

One concern was the changing technicians conducting the maintenance in customer sites. While ideally the same technician would conduct the maintenance every time for the same equipment, it is not always possible. Certain areas can usually arrange that but as the case company's Senior Manager in Service Excellence explains, for example in Southern Europe it could be every time a technician from different organization:

> The service guy in Italian site could be today from Finland and next month from a Turkish partner. There is no way to ensure there is continuity. The same applies in other areas as well, not all areas and not as bad, but we cannot trust we have the ideal setup on site every time. What matters is a systematic approach and our maintenance platform – all the tweaks and changes must be documented well so that the next technician can continue without problems. (Senior Manager in Service Sales Excellence, Case Company's global commercial team)

This means that the case company should always try to be consistent in service execution but more importantly ensure there is a systematic approach to documentation for every service visit.

5.3 Effective Pricing Model

The pricing model for the aftermarket products is relatively advanced in the case company. Spare parts are priced value-based for each market. Service work is priced per hour according to local standards and price levels. The most advanced pricing model is used on one big customer: Equipment usage is priced per hour including all service work and most of the spare parts.

Different pricing models are not widely used and tested in the case company. Spare part pricing has developed from cost-based to value-based and new services have pushed to explore new pricing models. The case company's Services Pricing Manager explains how the different pricing models can be used:

> Our service products are priced in a rather straightforward way from the customer perspective. Spare parts are value-based but still they cost fixed price per piece for the customer. Labor is priced per hour and even the most complicated pricing with CPH contract is a certain amount of EUR per hour. This new maintenance agreement could be a product we can try something else: there are options from time and effort based invoicing to flat fee per month and everything between. (Services Pricing Manager, Case Company's global commercial team)

The first option of how to price the new maintenance agreement is the way spare parts and service work have been priced until this point. Time and effort based pricing means that transactional invoicing is based on a fixed price list where the customer pays for each part and used hour. For spare parts or service work or combination of the two, a monthly flat fee has not been used in the past. That would be the second potential option for pricing the maintenance agreement.

The third way would be a more dynamic pricing model. All the variables would be entered into a pricing tool which would give a price for either whole service including spare parts, labor and travel costs per month or one/two components mentioned. This option would require software that exists on the market but has not been used before in the case company.

5.3.1 Pricing Based on Time and Effort

The maintenance agreement is a beneficial solution for both the customer and the case company. The customer gets peace of mind because all the maintenance is secured with the agreement. The case company would get steady income and guaranteed full share of the service business for that equipment. Normally customers buy parts and services wherever they please. In that sense the contract is already mutually beneficial, and the customer would buy agreed parts and services for a normal price.

The case company might want to add a monthly fee for the service. That does not change the concept: a fee would merely be compensation for administrative tasks. An interesting justification for a bigger monthly fee would be an availability promise: Uptime of the machine would be measured as a KPI. This model would add substantial risk of losing money.

+ A pricing model based on time and effort is familiar to all parties, it is transparent and does not need a new process or tool
- The case company would miss potential higher margin of the service

5.3.2 A Flat Fee Per Month

A convenient way to offer the new maintenance agreement would be to guarantee the periodical maintenance tasks and parts included for a flat fee for the first year of operation of the new equipment. This would be interesting for the customers because they would know exactly the cost of maintenance of the equipment. For the case company it would be similarly beneficial because it would guarantee a steady monthly income.

The biggest concern regarding this model is the risk that the case company would have to carry. Another challenge is that each sales area would have to be priced separately. Labor costs vary greatly and that affects the total price of the service. An option would be to price only needed spare parts for a monthly flat fee and charge maintenance work and traveling separately. This way the pricing model would be clearer to the case company and possibly to the customer as well: Required spare parts and their price are known but travel costs could change and sometimes be unpredictable.

One clear advantage for the case company to use this pricing model is to make the price untransparent and higher than the sum of its parts. Service products are in general sold for a better margin than capital products and this service product is not different. A clear and flat fee will probably interest many customers, but all might not be convinced.

+ Higher margins for the case company, steady and predictable cost for customer
- Varying cost of labor and especially traveling, untransparent pricing for customer

5.3.3 A Pricing Tool

The most advanced and maybe an ideal solution for pricing would be a pricing tool dedicated to pricing services. That would solve all the issues with other

pricing models. The variables in the maintenance agreement are well-known: Spare parts for the maintenance jobs, labor to conduct them and traveling costs of the service technician.

This option would help the processes of the case company if a clear flat fee for the service is wanted. It is especially interesting to Services Pricing Manager:

> A flat fee would be a more advanced solution than a traditional time and effort based invoicing and therefore a suitable model for a more sophisticated product. Process-wise the tool is a problem-solver: we would not need to be worried about sales personnel's misunderstandings of pricing principles or mistakes and it would save a lot of time also. Salespeople would not have to calculate manually, and sales management could trust the figures that are quoted to the customers. (Services Pricing Manager, Case Company's global commercial team)

Spare parts used during the first year of operation of a new machine are mainly filters and some other parts defined as "periodical maintenance" parts. Their change intervals are defined in the maintenance program, therefore there should not be any surprises. The parts are priced separately for each region and sometimes per customer. The needed part id-codes are known, their quantity and local pricing as well.

Cost of labor is standard per region as well. Hours spent on the tasks may vary but generally periodical maintenance jobs take a maximum of one day. Typically a technician spends one day on a customer site and the customer would be charged for 8 hours. More challenging to estimate is the travel costs because each site is different: the case company's office might be located next to one site, but another site would have to be reached by plane and taxi.

Additionally to the price of spare parts, labor and travel cost, a safety factor would have to be used. It would be added to the total monthly price. It would cover possible additional costs such as ineligible parts, unexpected travel costs, even inflation and would ultimately be the case company's margin for the service product. Service Pricing Manager sees the necessity of a safety factor:

> Naturally we have to get money out of the product so a margin must be calculated somehow. There are always unexpected costs. The margin must be considered carefully, and we might even want to tweak the pricing to a slightly more value-based approach. In any case a safety factor including/plus margin plays an important role in the calculation. After thorough consideration on paper, it can be easily added on the pricing tool logic. (Services Pricing Manager, Case Company's global commercial team)

Because of geographically changing costs, the dynamic pricing tool would be the best solution for the pricing of the maintenance agreement. The costs for each case would be entered into the tool and a flat monthly fee would be given. For great success there is also a great price: The tool is not used in the case company, thus it would have to be purchased.

+ A superb solution to dynamically price changing costs for each customer case
- A relatively expensive tool would have to be purchased

5.4 Rapid Deployment of Spare Parts and Reach of Service Capability

There is a massive gap between the case company's different sales areas' service capabilities. Outcome-based contract where customer pays for machine usage per hour is in use on one big customer site. There it is agreed on the contract that there is always required number of skilled technicians available. In case there is temporary shortage of personnel, the maintenance tasks can be handled for a short period of time by the available workforce. To sum it up, that customer site is ready and capable of serving the customer fleet of equipment every hour of the year.

One of the worst regions regarding reach of service capability is central and southern Europe. There is no local service organization or sales office, and all the operations are carried through by personnel from other areas. The case company's Senior Manager in Service Sales Excellence describes the situation:

> In certain areas we are very capable of offering the customers an extensive scale of services and execute them. In India with Cost Per Hour contract we are always on site and could probably serve

> also other customers well. In the worst areas I cannot see a flawless service operation where we would be contractually binded to go to few sites in certain moments of time. We have to be very careful where we offer this kind of service product. (Senior Manager in Service Sales Excellence, Case Company's global commercial team)

Most of the sales areas are somewhere between the two examples in terms of service capability. It would be wise to scope well the area where the new maintenance agreement would be offered. Especially the first cases would show how it works in practice and what is needed from the local team, thus a strong local service organization is needed for the first opportunities of the new product.

Discussions within Global Services team has brought up the best potential areas where this kind of new business model would probably work best. The areas where offering the new product first would be the smartest choice are Finland and Australia because service presence is very strong in both areas and competence of the technicians is of very high standard.

The same issues prevail regarding rapid deployment of spare parts. The Global Distribution Center in the Netherlands can deliver parts to all parts of the world in generally acceptable timeframe. For urgent cases there are local warehouses in the sales areas. Delivery times from those facilities naturally vary based on location. The areas where service capability is high there is usually fast spare part deliveries as well.

For the most urgent machine down situations the delivery times are not good enough. The maintenance agreement's purpose is not to serve that kind of situation, but it is important to consider that aspect because overall capability to service the customer's fleet of equipment does matter when a service agreement of any kind is agreed. During a contractual service visit, other, often billable extra tasks might occur.

Because there are challenging areas in service capability and spare part availability it is suggested that the new business model would be initially

launched only in regions where the service organization is the strongest. After successful launch and steady operations, it is possible to expand the offering to regions where capabilities are not as strong.

5.5 Summary of Initial Solution

To build an effective business model for the new maintenance agreement, first the weaknesses of the case company's service organization and operations were investigated on starting analysis. On this chapter the solutions for the improvement areas were searched. On table 5 below the weaknesses are complemented with short descriptions of the weaknesses and the best solutions found during the study.

Table 5. Summary of Initial Solution

Weakness	Description	Solution
Service Sales Capability MUST	• A strong buy-in from sales personnel • Sufficient knowledge on service products • Inclusion of service products on equipment sales discussions	❑ Arranging training for sales personnel ❑ Marketing materials ❑ Product launch on limited sales areas ❑ Service Managers to attend sales discussions ❑ Sales incentives for service products ❑ Maintenance Agreement to be included in the Equipment sales configurator
Service Execution Capability MUST	• Availability of technicians in the sales areas • Skill level of the technicians • Proper planning of service visits	❑ Early involvement of the Service Managers ❑ Arranging training for Service Managers ❑ Maintenance records of service visits ❑ Product launch on limited sales areas
Effective Pricing Model SHOULD	A pricing model for the Maintenance Agreement • Profitable for the case company • Attractive for customers • Clear and easy to facilitate	a) Invoicing based on time and effort b) A flat fee per month c) Pricing case by case with pricing tool
Reach of Service Capability And Spare Parts COULD	• Service capability reach does not cover all the potential customers • Spare part deliveries to some areas difficult	❑ Product launch on limited sales areas ❑ Suggestions for first launch in Finland and Australia

The weaknesses are listed in the order that was set up in the beginning of this chapter according to MoSCoW method. Based on the starting analysis, Service sales and service execution capability were the most important weaknesses (Must) that have to be improved before the new product can be launched. Also, an effective pricing model was considered to be an issue that should be developed for a successful business model.

The case company is not very strong covering service operations and spare part availability in all their sales areas. That weakness does not stop the new business model from succeeding – however consideration regarding the areas in which to sell the new product must be taken.

The initial solution for the new business model was built in chapter 5. In the next chapter that solution is validated with the stakeholders and feedback is collected before the final proposal is presented.

6 Validation of the Solution

In the previous section the initial solution for the new business model was built by developing solutions on the weaknesses found on starting analysis. In this section the initial solution is validated by collecting feedback from the stakeholders and adjusting the initial solution. Based on that the final proposal is presented and summarized.

6.1 Overview of the Validation Stage

The validation stage was conducted by interviewing the most relevant stakeholders involved with the service agreements. The case company's Director of the Portfolio team is responsible for the service products in general whereas the Director of Field Services Operations has the best view on the actual field service work conducted in the customer sites and sales areas in general. Both Directors were interviewed on several occasions.

A workshop between Portfolio and Commercial teams was arranged for better co-operation. Service agreement issues were part of the discussions and some views from that event were used in the validation stage.

6.2 Adjustments to the Initial Proposal

During the conversations with Directors of case company's Portfolio team and Field Service Operations it became clear that the issues pointed out in the previous section very much exist. Co-operation between different teams and organizations was underlined to make the new business model successful. Many of the weaknesses were tied to different teams operating together for better performance.

The weaknesses found on the starting analysis were validated during the interviews on validation phase. Service Sales Capability, Service Execution Capability and Effective Pricing Model were the issues that all stakeholders

agreed to process. Reach of Service Capability and Spare Parts was prioritized as “could have” on solution building phase and it was decided to leave it out of the final proposal.

6.2.1 Service Sales Capability

The interviews and workshop revealed a concern regarding Sales area personnel’s capability to effectively sell service agreements. While some of the areas are highly skilled and motivated to sell capital equipment, there might be challenges in Service sales. Director, Case Company’s Services Product Portfolio team stressed the easiness of selling the service products:

> We must create a compelling story behind the new product such as service agreement and tell it in a way that everyone can understand it. The worst situation is where the salesperson does not really know what the product essentially is. We must be very clear on the customer value proposition and draw that narrative in a simple manner. The marketing material must reflect what the product is, but it must also be so simple and clear that the customer understands it, but first and foremost the salesperson understands it perfectly. If we can create a solid customer value proposition and present it clearly, the product would be easy to sell for every salesperson in the sales areas. (Director, Case Company’s Services Product Portfolio team)

This point of view is an important adjustment to the initial solution. Successful selling of the initial maintenance agreement requires the product to be attractive and understandable. Additionally, the need for capital equipment sales tool development to include the new service product was recognized at a workshop between Portfolio and Commercial teams. Another service product was added to the sales tool and the sales of that product soared. A well explained and marketed product together with a sales enabling tool would be a big step towards the ease of selling the new product.

Having the right people in sales teams is essential when considering sales capability. Suitable skillset and experience may be hard to find but choosing people for the right roles can build a great team. Case company’s Director of

Field Services Operations highlights the importance the challenge of finding suitable people:

> Our bottleneck in sales cases is currently a skilled salesforce. We have to find enough employees with the right background and competence. Good salespeople alone do not help – our service managers should bring to table the experience of underground operations preferably from both customer side and service provider. Sales personnel and service managers should work together on sales cases for optimal results. Also service technicians can help to build a great team because their knowledge of customer's operations is valuable. (Director, Case Company's Field Services Operations)

On the other hand, the products should be so simple that they explain themselves. The sales personnel should be able to sell the products even with slight experience of underground operations. Limiting product launch to certain sales areas was not considered an issue regarding service sales capability:

> If we are able to tell a credible story behind the new product, we should not be worried about the sales personnels' skill level. The product is not very sophisticated technically, so we just have to be clear about the product's advantages and convince them to sell. (Director, Case Company's Services Product Portfolio team)

One challenge that was presented is management of the sales and operational teams in sales areas. All roles play an important part in the team and help to reach the goals. On the customer side there are several entities that are needed to be influenced, as the Case company's Director of Field Services Operations reminds:

> Strong leadership helps to create a wider approach to customers. We should not have gaps between different layers of customer organization: We need to be in contact with the technical people, financial decision makers as well as the ones who can influence all stakeholders. That way we will get a strong hold of customer decision making. For this we need different roles and competent staff in our team to do their part. (Director, Case Company's Field Services Operations)

For successful business model two important additions were recognized. The right people and competence are needed as well as effective management between roles. To secure sales capability even with insufficient human resources a compelling story behind a new product is needed – and this story must be told well with marketing materials.

6.2.2 Service Execution Capability

The challenge of having available technicians in the sales areas was noted also in the validation phase. The difficulty of the issue was realized but also the importance of properly dealing with it was highlighted by the Case company's Director of Field Services Operations:

> We are losing leads for service agreements because we do not have enough service personnel. The only way is to be prepared: planning is the key. Our technicians must be trained regularly for more versatile competence, but we must also hire technicians when we have a contract lead with a probability of over 80%. We cannot afford to lose those contracts. (Director, Case Company's Field Services Operations)

Competence of the service personnel is the key for successful maintenance services. However, the whole team involved needs to be aligned with each other to facilitate the operations. Director of Case Company's Services Product Portfolio team does not believe the skill level of the technicians can solve the problems, but it is the competence of the service team:

> The skill level of the technicians is important, but the big picture is much more. The whole team that is involved must be up to their tasks. There is order planning of the maintenance tasks, spare part orders, service managers who facilitate the maintenance jobs. The whole team makes a difference. (Director, Case Company's Services Product Portfolio team)

For successful service operations the local team in the sales area needs support from the global team. The case company operates in different sales regions, but the main functions are centralized mainly in Finland. This makes the service operations sometimes challenging: Global guidelines help

standardizing operations and support functions help in technical issues, but the help is not within the local core team and often in foreign language. Case company's Director of Field Services Operations thinks the operations will fail without seamless co-operation between the organizations:

> If we want to succeed locally in different regions there must be good connection to the global team. Technical Support is obviously a function that can help the sales areas with customer cases in technical challenges, but also global production and R&D organizations can give valuable insights on the equipment under service. It is all connected, the local team and different global functions. (Director, Case Company's Field Services Operations)

During the validation phase it was made clear that advanced resource planning and development would help building an adaptive service team. Also, competence of the whole local service team must be high to carry out the service operations effectively. In the end the local team would have to work closely with the global team around the customer cases.

6.2.3 Effective Pricing Model

Pricing of the new maintenance agreement can be a complicated issue. The conversations during the validation phase revealed that each of the presented approaches has its pluses and minuses but different views on pricing model does not prevent the new product from launch and sales.

Developing an outcome-based flat monthly fee would require a lot of research and prior knowledge on cost structure of the maintenance work. According to Director of Case Company's Services Product Portfolio team traditional invoicing based on time and effort would be the easiest and effective solution to start with:

> The more sophisticated pricing model we use, the more risk we carry. We have developed successful value-based and even outcome-based pricing models, but we had challenges when building them. For this case we should create an advanced outcome-based pricing model, but I think we are not there yet – the

> best way to start would be a more traditional way where we invoice the customer by labor hours, travel cost and spare parts: time and effort based pricing model. When we get more experience with the new service product we can develop the pricing model to a more value-based approach. Then we must be aware of all the costs that affect the product and make a proper risk assessment before doing the actual pricing of the product. (Director, Case Company's Services Product Portfolio team)

When moving to develop a more advanced pricing model the current market price level must be understood. Selling labour and parts is very straightforward compared to value-based pricing. Case company's Director of Field Services Operations underlines the importance of market understanding:

> Some of our competitors are already providing similar services according to value-based contracts. To be able to offer this kind of contract we have some way to go. Knowledge of competitor pricing is essential if we want to be competitive and profitable. Regions are different so we must get a good view of each region we are targeting with value-based pricing. There could be remarkable differences even between different customers – research on each key account must be done. Before we are confident with our information, we should offer the agreements based on time and effort. (Director, Case Company's Field Services Operations)

The path to value-based and outcome-based pricing requires more information but also trust between customer and service provider. Trust must be gained before untransparent pricing models can be discussed as Case company's Director of Field Services Operations sees it:

> We have certain customers who we have been working with for several years. The co-operation has grown, and we have our operations aligned with theirs. These customers are a good starting point where we could offer more advanced pricing models for the maintenance agreement. Other customers need more evaluation. Worldwide references or good marketing material does not convince them, we should be a well-known and trusted service provider in the region and preferably with that certain customer. Starting with spare part sales and continuing to maintenance advisory and finally full-service contracts is the right way to approach each region. (Director, Case Company's Field Services Operations)

After discussions with the stakeholders, it became clear that more advanced pricing models require a lot of research, information and trust. The long-term target should be in value-based pricing, resulting on a flat fee including all the labour, travel and spare parts that are needed to conduct the service for the new maintenance agreement. Before the case company is ready for that, a more traditional way of pricing the product should be used: invoicing based on time and effort – all the components that are included in the service are invoiced separately.

6.3 Final Proposal

The initial proposal remained mostly the same after validation phase. A few points were added and some of the points were stressed more or rephrased in the validation phase. Below table 6 presents the final proposal.

Table 6. Final Proposal

Weakness	Description	Solution
Service Sales Capability MUST	• A strong buy-in from sales personnel • Sufficient knowledge on service products • Roles and skills of sales personnel • Inclusion of service products on equipment sales discussions	❑ Arranging training for sales personnel ❑ Strong customer value proposition narrated in marketing materials ❑ Service Managers to attend sales discussions ❑ Sales incentives for service products ❑ Maintenance Agreement to be included in the Equipment sales configurator
Service Execution Capability MUST	• Availability of technicians in the sales areas • Competence of the service team • Proper planning of service visits	❑ Advanced focus on resource planning ❑ Early involvement of the Service Managers ❑ Arranging training for Service Managers ❑ Cooperation between local and global teams ❑ Maintenance records of service visits ❑ Product launch on limited sales areas
Effective Pricing Model SHOULD	A pricing model for the Maintenance Agreement • Profitable for the case company • Attractive for customers • Clear and easy to facilitate	❑ Invoicing based on time and effort ❑ Long-term: Value-based flat fee per month

All the needed actions to build an effective business model before launching the new service product are rather clear. To strengthen Service Sales Capability there are several steps: Easiness to sell means efforts on customer value proposition and marketing, training for sales personnel, organizational co-operation and sales tool development.

Service Execution Capability might be better than sales capability, but for instance competence and resource planning need strong focus from the sales areas. Co-operation between local service teams and global functions would ensure better capability conducting service operations.

Plans for Effective Pricing Model are clear: the case company should start with clear and simple model based on time and effort. Growing knowledge on the cost structure will help to evaluate the risks included in the new service product, and trust between customers and case company will facilitate a deeper cooperation. These steps will happen slowly but will be massive steps forward heading to a value-based pricing model.

7 Conclusions

This final section of the study summarizes and concludes key findings and results presented throughout the text. It consists of an executive summary, recommendations for the next steps, a self-evaluation and reflection and finally the closing words.

1.3 Executive Summary

The case company is in a growth stage and especially service business has been growing strongly. Product offering has developed from delivering spare parts to a wider selection of services such as equipment maintenance, service agreements, training and modernization products.

Productization of the services has been some way behind the growth of the company. Developing scalable products that could be easily offered through the customer base is the next big step for the Services business line to widen the service offering. Service product Portfolio team was created, and all the responsible Product Managers currently work in that team.

Service agreements is one service product group that is expected to gain importance during the coming years. In the past many kinds of service contracts have been agreed with the customers. However there has been no uniform way to offer agreements and in each case, sales areas have created their own format of service agreement. Now the case company wants to put focus on productization and scalability of service agreements.

The object of the Thesis was to create a business model for initial maintenance agreements for a new equipment. The outcome of the study is a business model that allows to move onto the next steps of productizing the new maintenance agreement.

The study adopts a design research approach relying on qualitative data collection methods. It comprises four stages: a literature review in the first stage to get understanding of the existing knowledge on the topics of the study – resulting in a conceptual framework; a current state analysis in the second stage aligning strengths and weaknesses with the conceptual framework; a third stage involving the creation of an initial business model proposal for the case company to address weaknesses and emphasize strengths; and a fourth and final stage validating the initial model through feedback from the stakeholders.

The literature review explores the current state of knowledge regarding services, servitization and business models. The chapter concludes with a Conceptual Framework, offering a comprehensive overview and synthesis of the discussed topics.

Based on the conceptual framework, the starting analysis was conducted. The current state was analyzed by studying the processes and organization and interviewing relevant stakeholders. An overview of the state of the case company's readiness on servitization path was formed. It was presented in a systematic way using tools presented in conceptual framework. The analysis showed the strengths and weaknesses of the organization regarding the new business model.

The initial proposal for the new business model was built on the findings of the starting analysis. The possible weaknesses were categorized under themes and importance of each theme was analyzed. The most important themes and issues were explored thoroughly. The starting analysis identified service sales and service execution capability as the foremost weaknesses that must be addressed before the launch of the new product. Additionally, the development of an effective pricing model was recognized as a crucial step for a successful business model.

After the initial proposal was built, the solution was tested on validation phase. Relevant stakeholders were interviewed and suggestions for improvements

were gathered. The final proposal includes several adjustments and additions to the initial proposal.

1.4 Practical Next Step Recommendations

The case company is well on its way towards more servitized organization and operations as well as more productized service offering. Regarding the new maintenance agreement, the business model needs certain improvements before it can be successfully launched.

Training for sales personnel needs to be arranged to ensure their readiness and knowledge. A compelling customer value proposition must be articulated in marketing materials, detailing the strengths of the products. Incentives for service products should be implemented to encourage the promotion of comprehensive solutions by the sales team.

The inclusion of maintenance agreements in the Equipment Sales Configurator needs to be executed for a streamlined purchasing process. Advanced resource planning is important to ensure efficient management of inventory and workforce. Training for Service Managers must be arranged to enhance leadership skills. Finally, a strategic product launch in limited sales areas must be executed to gather feedback and make necessary improvements before a broader release.

After a successful launch, early involvement of Service Managers is essential, allowing them to contribute their expertise from the outset and address potential service-related challenges. Service Managers must actively participate in sales discussions, bridging the gap between sales and service to ensure a seamless customer experience. To build a strong solution, effective cooperation between local and global teams becomes paramount to facilitate smooth operations and communication across diverse markets. Additionally, meticulous maintenance records of service visits should be maintained, providing valuable insights into customer interactions, and allowing for proactive service improvements.

1.5 Self-Evaluation of Thesis Project Credibility

The relevance of a study is evaluated by the extent of the study's outcome being relevant to the case company. The objective of the thesis was to create a business model for a new service product. This objective was systematically approached through a well-defined structure during the entire process of execution. The thesis has effectively fulfilled its intended purpose by comprehensively formulating a business model and addressing identified weaknesses in the current organizational and operational setup.

The thesis addresses a specific issue within the case company by employing an applied research method to develop practical solutions. This approach ensures a logical framework and structure, creating viable solutions that can be readily applied to facilitate the launch of the new product. Aityan (2022) explains that for a credible research project, a thesis requires a well-defined business problem, a clear objective, and adherence to appropriate research methods. Collecting data from reliable sources, conducting accurate analysis, and incorporating relevant literature are essential. The conclusions should directly address the business problem, logically derived from data and literature. The research report should present the phases in a structured manner.

The collaborative effort involved individuals with diverse functions and experiences, fostering a comprehensive understanding of the issue and minimizing potential biases during data collection. Discussing improvements with various experts allowed for the generation of more versatile ideas. The approach was used throughout the study and is presented in Section 2. This reflects the adoption of the triangulation method throughout the study, enhancing credibility and internal validity.

Qualitative data, primarily gathered through one-to-one interviews, was emphasized to prevent individual opinions from being overshadowed in large group discussions. Workshop in the right time probably would have been beneficial to define the needs for the new business model. Because of

scheduling challenges, a workshop especially for this project was not arranged. The relevant stakeholders were interviewed separately, and arranging all interviews one by one took more time than a workshop would have done. This was one reason why more professionals in different fields were not interviewed. Also finding time from several busy experts was not possible during the timeframe. More views from more people might have benefited building the business model.

When the new team of product managers was established in the case company, the responsibilities of the author were changed. This happened during the Thesis process and affected on the focus area of the Thesis but also tightened the schedule slightly. New position and tasks gave new insights on the Thesis topics but also took some focus from the Thesis work.

1.6 Closing Words

The manufacturing industry has developed constantly since the industrial revolution. The time span is hundreds of years, hence there has been enough time for several steps for development. The improvements to products, processes and ways of working do not stop today either; new ideas for better business are needed evermore. The case company is well on its way from equipment manufacturer towards a more servitized future, but there are many different paths to explore before services are productized in desired level.

New kinds of service agreements are now in focus for the case company. This thesis gives helpful insights into the subject – it does not solve all the challenges they face but hopefully will be a tiny but an important step for a better service offering.

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Questions for internal interviews

Director, Product Portfolio team

- What is the purpose of the new Portfolio team?
- What is the company's service product strategy?
- How would you describe the importance of developing Service agreement offering?
- What type of pricing/invoicing model would you prefer for the new maintenance agreement?
- What would be the biggest benefits around the new agreement model?
- How can we improve Sales personnel's buy-in for the new product?

Senior Manager in Service Sales Excellence

- What are the biggest challenges in our field service operations?
- What could be improved in Sales area service execution?
- What is the skill level of our service technicians in general?
- How are service sales executed?
- Who are the people responsible for service sales?
- Are there sales personnel dedicated to service sales or incentives for service sales?
- Do we know customers' counterparts for selling services?
- Do the sales personnel get training to sell for example new products?
- What kind of differences there are between Sales areas regarding Sales competence?

Services Pricing Manager

- How are the services priced in the case company?
- What kind of pricing models there are for services?
- Which would be the best pricing model for the new maintenance agreement?

Director, Field Services Operations

- How do the Sales areas arrange their field service operations?
- Is there an adequate number of technicians in sales areas in general?
- Who are our counterparts on customer end for service operations?
- How do the local field service teams align with the company's global requirements?
- Do we have certain customers that we co-operate in an especially good level?