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The Challenges of Implementing Performance-Based Business Models

A Study of Capital Intensive Manufacturing Companies

Master's Thesis in the Master's Programme Management and Economics of Innovation
Master's Thesis in the Master's Programme Quality and Operations Management

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Abstract

The traditional transaction-based business model has recently been challenged with concepts such as servitization and circular economy. From these concepts, the performance-based business model has been developed, which is the main focus of this study. In the performance-based business model, the performance derived from the products is now sold, instead of the physical product, in order to capture more value and increase profit. This thesis aims to identify how to conduct the transformation of the business model to become performance-based. With previous work on performance economy as a foundation, the questions asked are: What are the challenges of changing the business model from a transactional to a performance-based? Moreover, how can these challenges, if possible, be managed? Furthermore, the scope is narrowed to capital intensive manufacturing companies and performance is defined as selling price-per- hour, price-per-unit, or any similar metric. From the interviews conducted with the participating companies, the main challenges were identified as the increase of assets in the balance sheet, the shift in cash-flow, and the organizational structure. The findings indicate that large manufacturing companies with substantial financial capacity, and high-quality products with long product life, are candidates for the business model transformation. These companies should also have the goal of becoming a service provider rather than a manufacturer.

Keywords: Performance-based contracts, Business model transformation, Shift in cash-flow, Special purpose entity, Capital intensive manufacturer, Digital technologies.

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Ludvig Pauli and Oscar Thorén, Gothenburg, May 2020

Contents

Glossary

IAS 17	The former accounting standard of leasing solutions for OECD member countries.
IFRS 16	New accounting standard of leasing solutions for OECD member countries with aim to increase transparency.
Just-in-Time	Methodology to reduce time and response in the production between supplier to customer.
Lean	Purpose of eliminating elements not contributing to increased value in the production.
OECD	The Organisation for Economic Co-operation and Development.
PBBM	The business model that the manufacturer will have to implement to be able to provide performance-based contracts.
PBC	The agreement between manufacturer and customer of the content in the contract, e.g. level of uptime.

Acronyms

CAPEX	Capital Expenditure
CC	Cloud Computing
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
IaaS	Infrastructure as a Service
IoT	Internet of Things
KPI	Key Performance Indicator
OPEX	Operational Expenditure
PA	Predictive Analysis
PaaS	Platform as a Service
PBBM	Performance-Based Business Model
PBC	Performance-Based Contracting
ROCE	Return on Capital Employed
ROE	Return on Equity
SaaS	Software as a Service
SPE	Special Purpose Entity
TBM	Transactional Business Model
VCE	Volvo Constructions Equipment

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1
Introduction

1.1 Background

The movement of servitization has increased in relevance since it was first described by Vandermerwe and Rada (1988), and the subject has become increasingly popular in the attempt to gain a competitive advantage (Fang et al., 2009). The origin of servitization is the aim of encapsulating more value for the customer by selling not only products, but products and services combined (Baines et al., 2009). By offering the customer additional services to the products the value proposition becomes more complex to replicate, which is beneficial when the industry competition increases. This is especially true for mature (Fang et al., 2009), and globalized markets (Kastalli et al., 2013). When studying the concept of servitization, organizational change theories and change management are relevant focus areas during the transition or transformation. This becomes increasingly important when the implemented services are of more advanced character, compared to what is known as basic services (Baines et al., 2020).

The servitization concept has been paving the way for the business model of interest in this study, which is the Performance-Based Business Model (PBBM). The traditional business model, or more commonly known as transactional, is characterized by the transfer in ownership of a sold product from the manufacturer to the customer. However, in PBBM, the product is never sold, and the value transfer is not connected to the product, but rather what the product can perform. Regarding the financial aspect, the traditional model has pushed the manufacturers to produce as close to the requested demand as possible in order to keep the balance sheet light and free from unsold assets. The PBBM forces assets into the balance sheet, which is unfavorable and has, in some cases, made this business model impossible to implement. Creative solutions to this problem have been developed in order to manage these challenges. One of the upsides of this business model is believed to be higher margins, if done correctly, which then results in higher profits (Fang et al., 2009).

When manufacturers transform from the transactional way of doing business, they will face a drastic increase in assets since the ownership of the products never transfer. Opportunity of economic upside opens up for the customer where they can receive better credit rating with lower debt rates when they no longer need to own the assets themselves. Investments in their area of business can then be prioritized

to create a competitive advantage or develop their core business. However, which consequences this financial burden will imply for the manufacturer is not yet fully understood. It is certain that it will have an effect on some of the financial ratios, which for public companies can affect the stock price. The interesting point of research will be if the companies are able to operate with both the financial and managerial implications that follow from the PBBM, such as the shift in cash-flow, increase in assets, and cultural resistance.

1.2 Purpose & Research Questions

The purpose of this thesis is to investigate what challenges manufacturing companies will face when a transition to a PBBM is made from the traditional Transactional Business Model (TBM). A transformation of a company's business model affect the entire organization, which is vital to be aware of before pursuing the change. The economic effects will be of great importance to consider since the transition implies an increasing amount of assets that no longer will shift ownership. In order to avoid substantial investments in business ventures that might turn out not to be feasible, potential financial issues have to be explored and evaluated beforehand. The managerial effects need to be explored as well since resistance in a company could slow down or prevent a transformation of this magnitude to succeed. PBBM is part of the concept of servitization, and since this is a global trend, it is inevitable to avoid for companies that want to stay competitive. Hence, the importance of identifying potential challenges and requirements to successfully implement the new type of business model.

Therefore the following research questions have been the outset of the thesis:

- What are the challenges of changing the business model from transactional to performance-based?
- How are these challenges, if possible, managed?

1.3 Delimitations

The companies of interest for this thesis are of manufacturing and large-cap character with business in capital intensive markets. The reason behind this is that these products are likely to have a significant impact on the balance sheet if they would change the business model. Non capital intensive products will have less effect and is therefore not considered an issue. Therefore, the chosen manufacturing companies are all from Sweden but act globally, which gives rise to a potentially global generalization. Furthermore, to have companies from the same country makes the accounting more comparable and the same rules apply for all. Even though IFRS 16, which will be of great value in easing the comparability for OECD countries, the accounting between these countries still varies, which complicates the comparability. Because the report will focus on a few companies, this will influence the information and data received.

Some parts have actively been delimited from the thesis connected to the legal aspects of these contracts. These challenges are related to the ownership of manufacturing equipment, especially in facilities. When a machine is mounted in a factory, it belongs to the factory according to Swedish law. However, these technicalities outside the power of the manufacturing companies, will hopefully come to a solution when the time is right.

1.4 Limitations

The first limitation to consider is the choice of research method. Since the thesis is based on case studies, it is not suitable to generalize to all types of manufacturing companies. It might even be the case that it is not suitable for all capital intensive manufacturing companies, but through the research, the studied companies showed similar broad structures, therefore some generalization is assumed to be reasonable. Furthermore, studies such as this are hard to imitate since it is based on interviews, which can not be exactly replicated.

The answers we sought from the manufacturing companies could be considered corporate secrets, hence the interviewees might have been reluctant to share all their knowledge. If not reluctant, the interviewees could even have been bound by non-disclosure agreements from their employer. Furthermore, in one of the interviews, information was shared with us that we were unable to use in the report due to this matter.

Furthermore, during the spring of 2020, the Covid-19 virus had its outbreak, which affected the possibilities to conduct all the interviews planned. The virus caused some manufacturing companies in the region to periodically lay off its staff, which caused the top management and corporate leaders to focus solely on their role in the company. It also changed the nature of a majority of our conducted interviews to be via digital channels. The digital channels are good, but there was a distinct difference to the few physical interviews conducted, where it became possible to get a better mutual understanding than through a screen or phone.

1.5 Report Disposition

The structure of the thesis will be as follows. First, the relevant theory will be presented to build the foundation necessary to analyze the industry findings and then followed by the methodology, our findings, a discussion to finally end with a conclusion.

2
Literature

The literature regarding PBBM is rather unexplored. Hence, the literature for this thesis covers the concepts which constitute the foundation for PBBM.

2.1 Servitization

Since Vandermerwe and Rada (1988) first mentioned the word servitization, the number of articles published has increased every year (Baines et al., 2009). Vandermerwe and Rada (1988) explain the concept of servitization as a movement that drives companies towards services in order to become more competitive. Furthermore, the distinction between a service company and a manufacturer is becoming less evident as manufacturers are approaching the customers more holistically. Baines et al. (2009) explain that these new service offerings create value for the customer and make it more difficult for low-cost competitors to compete due to the additional knowledge.

Servitization is also called open service innovation, and is a solution for expansion, which gives a competitive advantage and increases growth (Chesbrough, 2011). The increasing focus on customers is seen as a way of innovating the business model (Kastalli et al., 2013), and this innovation is important since service businesses also get outdated and needs to deliver new concepts just like manufacturers (Chesbrough, 2011).

Companies have many incentives to drive their business towards increased service offers, such as the strategic benefit of having loyal customers (Kastalli et al., 2013). By having services to the products, the business focus more on the customer which are strengthening the relationship between the two parts (Bowen et al., 1989). One of the most classic servitization cases is Rolls-Royce, "Power-by-the-Hour", where Rolls-Royce is taking care of maintenance and other service activities that traditionally would have been the customer's responsibility to perform (Spring & Araujo, 2009). This enabled Rolls-Royce to take total control over the engines and guarantee flight hours (Baines et al., 2009).

2.2 Circular Economy

During the last decade, the term circular economy has been increasingly covered in the world of academia (Geissdoerfer et al., 2017). In line with this, managers and shareholders of companies have started to realize the potential value that could be captured for their stakeholders and especially for themselves (Foundation, n.d.). The concept of circularity brings us back to the early days of humankind with the objective of maintaining value regardless of the resource. What distinguishes the circular business model from the TBM, is the optimization of resources rather than the production process (Stahel, 2019). It becomes a transition from "doing the right things" to "doing things right" (Stahel, 2010).The concept was first introduced as a tool to increase resource efficiency, prevent waste, and dematerialization (Stahel & Reday-Mulvey, 1976). Furthermore, Stahel has elaborated upon changing business model, were utilisation is in focus instead of selling goods, in order to be sustainable. The importance of quality, and what type of goods are sold becomes a central point, which Stahel (2010) describes from the two parameters quality and product life, which is illustrated in 2.1.

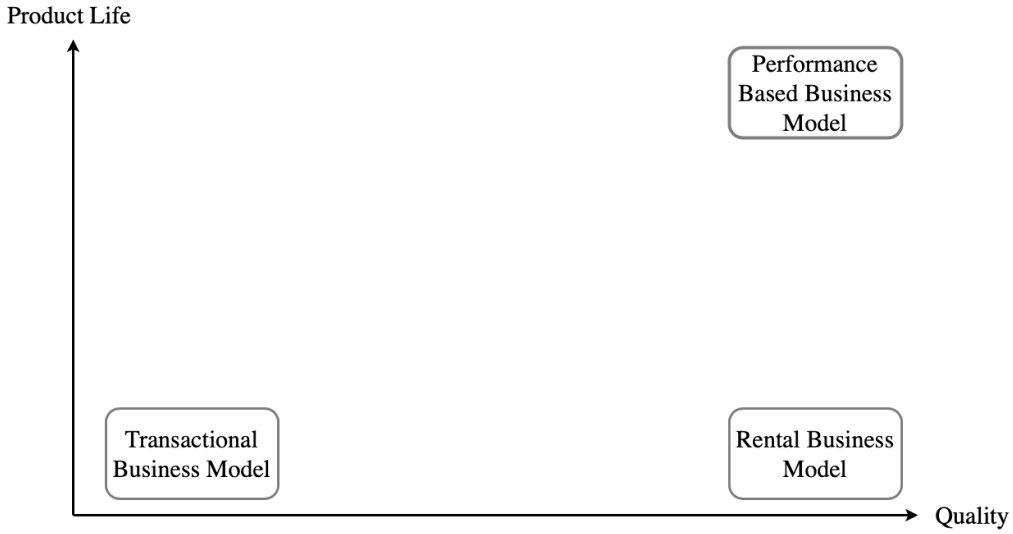

Figure 2.1: Characteristics of manufacturing companies, derived and adapted from Stahel (2010).

The business landscape today is characterized by the importance of being sustainable and the advantages and challenges that follow. Therefore, businesses have started to explore ways of catching up with this trend and become more efficient. Companies seek new ways of how products can be re-used and how to re-store materials, labor inputs, and energy consumption (Foundation, n.d.).

Environmental issues such as global warming and pollution together constitute what can be argued to be one of the most significant challenges of our time. Hence, the idea of a circular economy is to utilize the resources available to decrease the environmental impact efficiently. This concerns companies since they contribute to the

environmental challenges and together with pressure from the society, sustainability have become a priority (Frishammar & Parida, 2019). There are few restraints of what can be considered a circular business model, which makes it more preferable to see as guidelines in order to achieve increased sustainability (Frishammar & Parida, 2019).

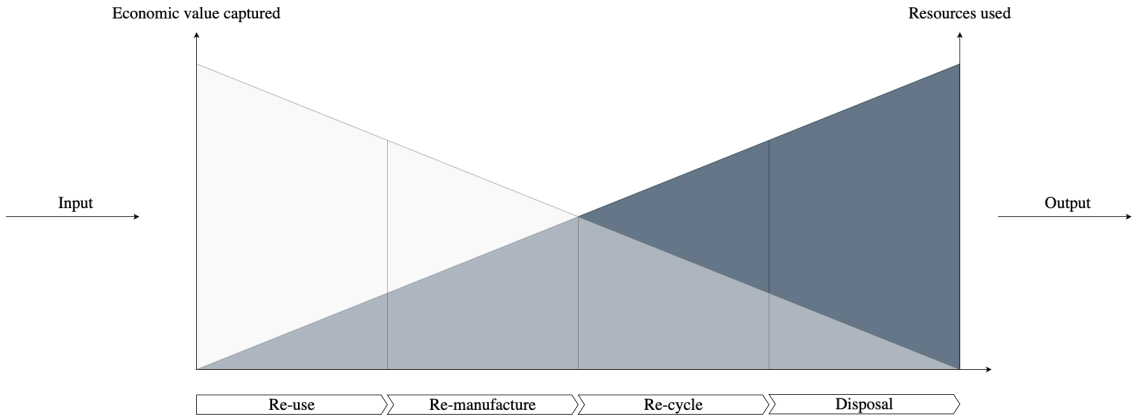

Figure 2.2: The stages of a products life-cycle, the economic value and resources used. The figure is derived from the work of Korhonen et al. (2018)

Figure 2.2 visualizes the concept of circularity. From re-using products, the economic value is higher, and the demanded resources to achieve this are low. The further towards disposal in figure 2.2, the lower the economic value becomes, and the more resources are needed to achieve this. Furthermore, Korhonen et al. (2018) conclude that the circular economy concept contributes to all the pillars of sustainable development, social, environmental, and economical.

2.2.1 Social Effects

New ways of extracting the actual value that is embedded in the resources will give rise to the opportunities for new employment (Korhonen et al., 2018). Also, the ecosystem that arises from circular and or sharing economy will strengthen the sense of participation, cooperation, and community. The focus of the society will shift from consumption towards sharing the functions of physical products, which will decrease the demand for producing new products.

2.2.2 Environmental Effects

The environmental effects have an impact both on the input and the output, hence two perspectives are necessary to take into account (Korhonen et al., 2018). For the input perspective, the significant role of importance becomes the reduction of virgin materials used in production, and the degree of recycled material will increase. For the output perspective, the most obvious one is reduced emissions and waste. Furthermore, resources used in production will be cared for to a broader extent in

order to be able to reuse several times.

2.2.3 Economical Effects

Similar to the environmental effects, the economical can be derived from both the input and the output (Korhonen et al., 2018). The input provides benefits such as, e.g. reduced raw materials, energy consumption, and cost of scarce resources. Furthermore, the cost related to environmental legislation and taxes is reduced. The brand is also likely to increase its goodwill since the image of the company becomes more sustainability orientated. From the output the gains can be, reduced pollution control-costs, value leaks and losses, and waste management costs. Simultaneously, with the sustainable image of the company, the attraction from external investors can increase.

2.3 Performance-Based Contracting

Performance-Based Contracting (PBC) has gained recent interest among both practitioners and scholars and is adding another perspective in the product-service relationship (Kindström & Kowalkowski, 2009). PBC is similar to servitization in the sense that the goods are not sold, but the performance of them is (Markeset & Kumar, 2005). It can be described as taking servitization one step further where the manufacturer retains the ownership of the products and thereby needs to finance this in non-traditional ways (Hypko et al., 2010a). Furthermore, Hypko et al. (2010a) distinguish two different types of PBC where the manufacturer takes over the entire operation or only the maintenance, either way, it includes providing the machinery.

How these contracts are constructed vary from contract to contract, but common types are pay-per-hour, pay-per-use, and pay-on-availability (Hypko et al., 2010a). According to Baines et al. (2009), these types of contracts are relevant for manufacturing companies during the servitization journey, since it shed light on performance criteria, monitoring performance, and thereby the possibility of improvements. Probably the most central part of contracts of this character is the transfer of risk from the customer to the manufacturer. This is from the customer's perspective favorable since, as stated by Hypko et al. (2010b), they thereby can avoid substantial investments related to the operation. At the same time, this becomes the source of business opportunity for the manufacturers, which also increases the dependency, hence long term relationships are most likely to develop (Hypko et al., 2010a). Therefore, by co-creating value, as Vargo and Lusch (2008) describe, the value chain can be optimized to create additional value to the end-customer, and a win-win situation is likely to occur, which there are cases that support (Markeset & Kumar, 2005).

Baines et al. (2009) describe three main reasons why companies pursue strategic decisions towards becoming more of a service provider, and it comes down to marketing, strategic, and financial. The economical effects that follow from PBC are lower but more continuous income streams with higher profit margin (Wise & Baumgartner, 1999). For some of the industries, Wise and Baumgartner (1999) assume the outcome to be two or even three times as profitable as TBM. According to Hypko et al. (2010a) this sounds good in theory, but there are no certainties that it corresponds with reality. With PBC, the uncertainty for performance arises since the manufacturer, and now performance provider lacks a particular influence and is, to some extent, limited to the customer's decisions.

There are both benefits and uncertainties connected to the PBC concept according to Hypko et al. (2010a). Furthermore, Selviaridis and Wynstra (2015) describe the PBC model with three main dimensions illustrated in figure 2.3:

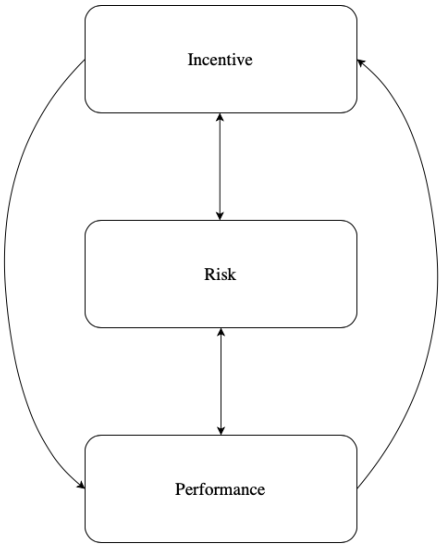

Figure 2.3: Visualization of the dimensions of Performance-Based Contracting described by Selviaridis and Wynstra (2015)

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2.4 Culture of Change

In the fast-moving business environment that exists today, companies have to monitor customer preferences continually, and be ready to change both how they are doing business and in what direction they are moving in (Baines & Bigdeli, 2017). However, since the culture within the service industry is different from the traditional manufacturing industry, the transformation is challenging and demands a shift in the corporate mindset (Baines et al., 2009). The organizational environment for products integrated with software, needs to be far more cross-functional compared to traditional manufacturing (Porter & Heppelman, 2015). Also, the speed of which projects are conducted varies, and therefore, the organizational structure has to be thought through in relation to norms and policies before pursuing. Baines et al.

(2009) further explain that a change from the traditional product-centric structure to a customer-centric structure is essential in order to succeed but will probably result in resistance within the company due to insufficient knowledge about the service industry.

Innovation within an organization is, according to Howell and Higgins (1990), the process of initiating, adopting, and implementing new concepts. The PBBM, will in this case, compose an innovation. However, for an innovation to happen, the organizational inertia has to be overcome. Champions are a role common to be part of overcoming resistance, by having great perseverance and continuously promoting innovation until it is implemented. The capital intensive manufacturers are generally considered to be rigid, and the role of champions is only needed in organizations with resistance (Bertels et al., 2020). They are considered to play an even more important role during the early stages of new projects. One of the drawbacks with champions as advocates, is if they do not support the innovation. If the innovation is not in line with the current strategy, the champion might feel it jeopardizes its credibility, and future career opportunities. The innovations can thereby be ignored or even discouraged by them. As an organization, it becomes crucial to be able to provide a setting for these potential champions to be exactly what they were meant to be, champions. Howell and Higgins (1990) mention critical factors for this setting to occur. First, top-management must mediate that the company support taking risks, and that failing is not fatal. Providing the support necessary, could be in the form of sponsorship or similar in order to protect champions, and provide guidance from internal organizational occurrences that might oppose a threat towards the innovation. In the case of PBBM, the top management might be the champions or even the CEO himself. However, the CEO could then use this to foster new champions to enroll innovation throughout the organization.

Typical reasons for top management and shareholders for avoiding investments in innovations is that they focus on short-term stock performance and thereby neglects the long-term outlook of the company (Christensen et al., 2009). Senior executives in almost every publicly listed company focus myopically, for a number of reasons, on earnings-per-share and the growth of this. Due to the increased importance of earnings-per-share, many have neglected other metrics such as competitiveness, market share, and brands, to mention a few. Christensen et al. (2009) also highlight that investments that will affect long-term performance is ignored. This has not merely to do with money, the reputation of executives and CEO constitutes a significant driver as well. Metrics asses their individual performance, hence they want to keep them as good as possible for their tenure. The culture in organizations is intangible and an element of struggle (Kindström & Kowalkowski, 2014). To successfully conduct a large-scale cultural change, fit for services, it requires a long-term outlook, which makes a poor fit for the financial targets brought up by Christensen et al. (2009). Furthermore, Kindström and Kowalkowski (2014) mention the potential value that champions can bring, and that good leadership is vital to attract and keep critical individuals for service offerings. Conducting a strategy towards service innovation requires changes in the business model. The organization might perhaps

set up a new entity or unit to manage this new business model. Furthermore, in addition to this, the structure of sales, development, purchasing, and especially a greater understanding of the customer need, is of high importance. Therefore, initially the organization needs to realize the current situation and thereafter, set out the target of what to become. This can provide a holistic view of what, how, and when things need to be done for managers.

2.5 The Enabler Digital Technologies

Digital technologies have, in recent years, made a considerable impact on the economy as well as society, and an essential driver for that has been the price decline in small computers and processors (A. Goel, 2008). Also, the change in technology can enable or even force a business model change for manufacturers in order to capture more value (Björkdahl & Holmén, 2018). Digital technologies need to be in place in order to make it possible to monitor and collect necessary data from e.g. sensors, and from this new product-service offerings can be derived (Ardolinoa et al., 2018). Therefore, wireless communications are essential to make this exchange of information between drivers, vehicles, and stations flow. This type of remote monitoring technology is what has made service integrated solutions possible by manufacturers (Grubic & Jennions, 2018). Oliva and Kallenberg (2003) argue that this only constitutes an enabler, in order to provide services, but without any further value. Furthermore, the digital technologies does not automatically generate profitable growth but constitute the foundation of digital transformation (Björkdahl, 2020). The earliest example of this is the well known Rolls-Royce concept "power-by-the-hour" where live data is collected during the flight, which have made it possible to change the offering from products to services or performance (Grubic & Jennions, 2018). Furthermore, Ulaga and Reinartz (2011) have identified the potential in customer usage data, and concluded it to be a strategic resource. Hence, Porter and Heppelman (2015) concludes that digital technologies are reshaping the industry competition and the nature of the manufacturer.

Strategic resources can help create competitive advantages, and are therefore, a good foundation for value propositions. Grubic and Jennions (2018) identified the nature of the product as one of the most important factors to what extent digital technologies can be used, which of course, impacts the value proposition. They conclude that in mechanical-electric product systems, digital technologies are used to identify if something does not work as supposed to, and gives the operators notifications before the product stops working to minimize downtime. Nevertheless, as mentioned previously by Oliva and Kallenberg (2003), the technology will not provide any further value itself and therefore has to be implemented in a broader setting (Grubic & Jennions, 2018).

2.5.1 Internet of Things

Internet of Things (IoT), is core to offerings such as pay-per-use, which is of performance character (Ardolinoa et al., 2018). The definition used for IoT is presented by Ardolinoa et al. (2018) to constitute the foundation of monitoring and gathering of data to develop new offerings. The primary functions of IoT, sensing, and connecting, will extend the product autonomously without human interaction (Björkdahl, 2020). Monitoring will provide, in this case, the manufacturer with loads of data, and as Oliva and Kallenberg (2003) state, provide no additional value. Similar conclusions are presented by Ardolinoa et al. (2018), that data has no intrinsic value. On the contrary, Porter and Heppelman (2015) states that data has intrinsic value and further has an exponential increase in value when it is integrated with other types of data.

2.5.2 Cloud Computing

Cloud Computing (CC) can imply several kinds of services such as Infrastructure as a Service (IaaS), Software as a Service (SaaS) or Platform as a Service (PaaS) (Ardolinoa et al., 2018). Further, it allows for open access to a pool of data and operating systems to be able to conduct on-demand computing. These parts are described by Porter and Heppelman (2015) as one of the three components in smart connected products. With the use of algorithms, the collected data can with CC become information (Ardolinoa et al., 2018), and unlock its full value (Porter & Heppelman, 2015). By, collecting and analyzing data the control over the products will increase which leads to cost savings and reduced uncertainty (Björkdahl & Holmén, 2018). Furthermore, CC is a vital part of the creation of pools of data that will pose as the foundation for Predictive Analysis (PA).

2.5.3 Predictive Analysis

Predictive Analysis is defined as machine learning, cognitive computing, data mining, or any other tool that can be applied in order to calculate the likelihood of an event occurring in the future (Ardolinoa et al., 2018). By leveraging tools like these, it seeks relationships and patterns to identify useful and valuable information. In order for PA to work, the amount of data in the pools have to be substantial. By collecting data, e.g. vibrations and heat, the point in time of bearing failure can be calculated days or weeks in advance (Porter & Heppelman, 2015). Which leads to less stops, inspections and preventative maintenance that translates to savings in both resources and time (Björkdahl, 2020). Moreover, Ardolinoa et al. (2018) conclude that PA becomes especially important if a manufacturer will transform towards becoming a performance provider. Correct data from the installed base will be essential to develop advanced services of value.

3
Methodology

The methodology chapter will focus on how this study was conducted in terms of research methods, strategy, and design. The procedures for both the collection of the data and the analysis will be further explained.

3.1 Research Design

In order to answer the research question, the study has been conducted under a qualitative research strategy with a case study design and an abductive approach.

Easterby-Smith et al. (2015) state that a research design is a guide for the research activity as well as the collection of data that most likely achieve the aim. A qualitative research design is chosen for this study since it is flexible and includes a range of different methods and structures (Astalin, 2013), and focus on obtaining a more-in-depth focus on a specific phenomenon (Kahn, 2013). These methods combined, make up a comprehensive tool kit of great value for the researcher. When the research is concerned with gaining new insights and knowledge, rather than confirming existing knowledge and theories, Kuada (2012) states that a qualitative research method is recommended. The nature of qualitative studies tends to lean towards being more exploratory, which is suitable due to the lack of literature on the particular area (Walle, 2014).

A case study investigates a number of organizations over time Easterby-Smith et al. (2015) and provides several different options of qualitative methods to choose from (Astalin, 2013). The selected cases were thought to represent companies from different areas of the industry, and as, Stake (1995) states, by the probability to learn from them. With a case study, multiple perspectives can be documented, and the relationship between them can be examined (Simons, 2009).

During the study, an abductive approach has been exercised, which is a combination of a deductive and an inductive approach. (Bryman & Bell, 2007) explains that a deductive approach has its starting point in an hypothesis, which is then, with available theory and data, either rejected or confirmed. In contrast, inductive research produces theory and knowledge instead of examining what is already known (Waller et al., 2016).

Non-probability sampling was used since the interviewees were chosen due to their

potential value to the study (Pruzan, 2016). The contacted people had positions relevant for the topic, best knowledge and was interested in providing their insights. With this sample strategy, the probability of a participant of the sample can not be stated (Easterby-Smith et al., 2015). Convenience sampling was also utilized since some people were easier to get in touch with (Easterby-Smith et al., 2015). Since contact was being made with people that did not have the right knowledge, these people redirected the interview to someone more sufficient, which was accepted every time it occurred.

3.2 Research Method

A research method is defined by Bryman and Bell (2007) as a way of collecting data, and by Waller et al. (2016) as approaches to find things out. For this study, semi-structured interviews have been the chosen method due to the exploratory nature of it. Semi-structure interviews build on a series of questions where the interviewer has the possibility to vary the sequence of them (Bryman & Bell, 2007). Since the subject was rather unexplored, these type of general questions were able to guide the conversations with the possibility for the interviewer to continuing on interesting tracks that seemed relevant. This interview structure also suits well when it is essential to develop a picture of the respondent's perception (Easterby-Smith et al., 2015).

3.2.1 Literature Review

A literature review was conducted, and where the starting point for this research in order to develop an understanding of the subject. A literature review is essential since it provides an understanding of previous research and findings within the field (Kuada, 2012). It also provides the researcher with information about underdeveloped areas within the field. However, since the research regarding PBC is minimal, the litterateur review aimed to seek knowledge about concepts and models that were important in order to understand PBC.

3.2.2 Participants

The participating companies are all companies from the industry that today produces capital intensive products. They are all on the list of the largest manufactures in Sweden and have a turn over of more than 85 billion SEK each. Together with these manufacturing companies, an investment bank has contributed with their input in the subject. The interviewed people are all at the top of their organizations, such as CFOs or someone close to that role. Later in the report, the full list of interviews will be presented in more detail. In table 3.1 the interviewed companies are listed and to what degree they are involved or not with PBC.

Company	Performance Involvement
Volvo Constructions Equipment	Has active contracts but are still in the learning phase. They believe that PBC will be crucial to offer in the future and have most experience about it among the interviewed companies.
SKF	Is testing PBC with a couple of customers e.g. BillerudKorsnäs. They believe that the industry will move towards these contracts in the following 10-15 years.
Scania Group	Was early in trying to implement pay-per-mile but failed due to limited financial capacity. Has investigated this further in a lean start-up.
ABB	Has a similar concept called full-service-agreement, which is not entirely performance-based according to themselves. Further development has not occurred.
Sandvik	Do not offer PBC or anything similar. They sell all their products the traditional transactional way.
Volvo Group	Is looking into business models such as performance-based or similar. Since VCE is part of Volvo Group it can be argued they have some involvement in PBC. Furthermore, digitalization and data has caught their interest.
Volvo Cars Group	Is not currently offering PBC. Has the business entity mobility, which is more focused on availability than performance.

Table 3.1: Participating Companies

3.2.3 Interviews

At the beginning of the study, face-to-face interviews were conducted since they were thought to give a better connection with the interviewee (Bryman & Bell, 2007). The companies located close to Gothenburg was initially supposed to be visited physically to conduct the interview on sight. However, the majority of the interviews were conducted through phone since the respondents were widely dispersed, but also due to the Covid-19 virus. Many companies were not allowed to welcome visitors to their offices, which made it impossible to conduct those interviews face-to-face. A handful of the companies were also forced to lay off people or make them work from home, which made it even more challenging to meet. However, the phone interviews saved much travel time, which also made them cost-effective (Easterby-Smith et al., 2015).

The interviews were conducted in the preferred language of the interviewee, which in most cases were in Swedish. The participating companies did not want us to record the interviews due to the nature of the subject's close connection to future corporate strategy. Hence, in order to make the phone interviews easier, and to collect as much information as possible, one of the interviewers was in charge of asking the questions while the other took notes. These notes was directly summarized after the interview, and conclusions were drawn to capture as many details as possible. A translation from Swedish to English was also done, which can cause problems if the translator's knowledge is inadequate (Bryman & Bell, 2007). Bryman and Bell (2007) also argue that the information can change since some words can not be translated without changing the meaning. However, since both authors are fluent in both Swedish and English, this risk was kept to a minimum.

Title	**Company**	**Date**
Chief Digital Officer	Scania Group	2020-02-27
Global Director	Volvo Constructions Equipment	2020-03-02
Vice President Business Control	Volvo Constructions Equipment	2020-03-02
Global Director	Volvo Constructions Equipment	2020-03-09
Vice President Business Control	Volvo Constructions Equipment	2020-03-09
Senior Advisor	Scania Group	2020-03-10
Chief Financial Officer	SKF	2020-03-11
Senior Advisor	Scania Group	2020-03-12
Equity & Research Analyst	Pareto Securities	2020-03-26
Executive Vice President & Chief Financial Officer	Sandvik	2020-03-30
Domestic Sales & Strategic Account Manager	ABB	2020-03-30
Senior Vice President & Commercial Strategy	Volvo Cars Group	2020-03-30
Vice President Digital Transformation	Volvo Group	2020-04-30

Table 3.2: Conducted Interviews

3.3 Data Analysis

Since the interviews was semi-structured, the interviewee could cover relating topics several times with additional information being added along the way. Therefore, the data received was first structured in order to collect the relating information, which then made it easier to analyse. In order to find common themes between the interviews the data was analyzed in a thematic way, which Waller et al. (2016) states mainly focus on relationships, commonalities and differences across the data sets. These aspects was compiled to easily compare the data and draw conclusions from it. Furthermore, topics that was covered in several interviews was prioritised and analysed in depth to extract as much as possible.

4
Findings

The findings presented will cover topics that constitute important areas regarding the challenges of PBBM. First, there will be a section about the business model to depict the significant differences between the traditional and the performance-based. Thereafter, the forces that are driving the change will be covered from the industry perspective in the catalysts chapter. After presenting these, the following sections will cover implications and challenges to bear in mind for the companies pursuing the transformation from the TBM to PBBM

4.1 Business Model

Being able to explain the differences between a PBBM and the traditional TBM is essential both for internal acceptability, and external understanding from the customer (VCE, Personal Communication, March 9, 2020). Therefore, the concept is presented with knowledge and real examples from industry. This is particularly important since manufacturers have had issues communicating what the benefits of the business model are to their customers (VCE, Personal Communication, March 9, 2020).

A change towards a PBBM impacts the company in different ways depending on the nature of it, internal and external structure, as well as its products (VCE, Personal Communication, March 9, 2020). Approaches similar to the PBBM have been tested in the past in different industries with varying results. Microsoft conducted a similar transformation when they developed *Microsoft 365*, which is a subscription-based version of *Microsoft Office*. Instead of buying new versions of the program, the latest version is always installed for a fixed monthly fee. Even though Microsoft does not share the same nature as the manufacturing companies examined in the study, it is a successful example of that a change from the TBM is possible to conduct.

Many of the companies in the manufacturing industry have then realized that a more open approach towards new concepts is critical to not become obsolete. Therefore, keeping up with new concepts such as Lean, Agile, Scrum, and now PBC has almost become a trend (Scania Group, Personal Communication, March 10, 2020). Furthermore, inspiration is also taken from the business to consumer setting, where a rapid decrease in private ownership is observed (Pareto, Personal Communication, March 26, 2020; Scania Group, Personal Communication, March 10, 2020).

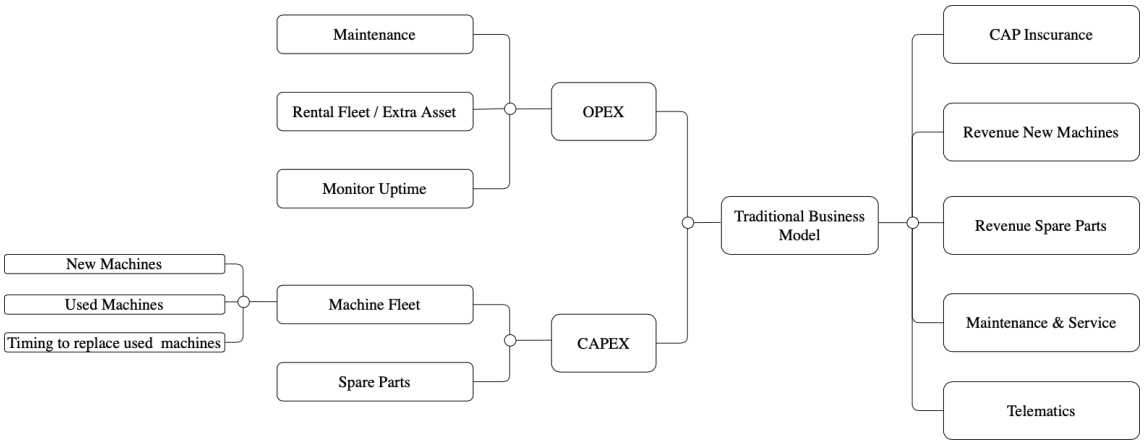

Figure 4.1: Traditional Business Model of VCE

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Figure 4.1 visualizes the structure of a typical traditional TBM. The left-hand side represents the customer who has to manage things such as maintenance, monitoring, and machine fleet, among others by themselves. On the right-hand side, the manufacturer's different business areas are presented.

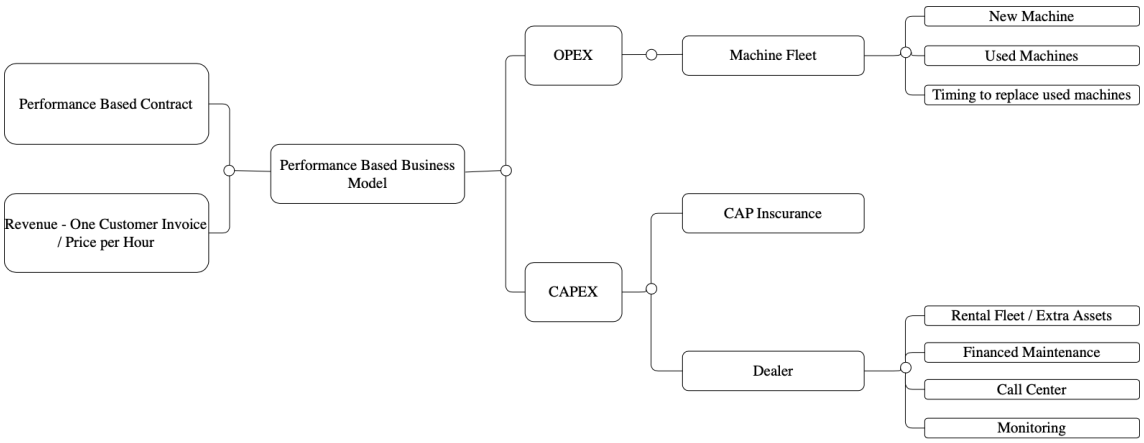

Figure 4.2: Performance-Based Business Model of VCE

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In figure 4.2, a PBBM is visualized, where the manufacturer both have ownership of the product as well as taking care of service and maintenance. In contrast to TBM, the manufacturer changes activity from "pay me when it is broken" to "pay me when it works" (VCE, Personal Communication, March 9, 2020). Traditionally, service contracts and repairs are important sources of income for the manufacturer, which instead is seen as costs in a PBBM. This results in less maintenance work for the customer who only needs to negotiate a performance-based contract that fulfills their needs. The customer side is still on the left, and the manufacturer is on the right. Furthermore, some initial standards that characterize the PBBM are (VCE, Personal Communication, March 9, 2020):

- The customer commits to a specific **capacity consumption**.
- The manufacturer commits to specific **capacity availability**.
- The customer continues to operate the assets.
- Finally, by delivering availability and capacity, the manufacturer takes on all the **risk**.

Under the PBBM, the distribution of responsibilities is changing drastically between the manufacturer and customer, as illustrated in figures 4.1 and 4.2 (VCE, Personal Communication, March 9, 2020). The most obvious difference from the traditional business model is the change in ownership of Capital Expenditure (CAPEX) and Operational Expenditure (OPEX), which previously were in the customer's possession. Suddenly, the manufacturer has new incentives to increase the reliability and efficiency of the products, since this will directly impact the profit (Scania, Personal Communication, March 11, 2020; VCE, Personal Communication, March 9, 2020; ABB, Personal Communication, March 30,2020). Although the case companies products are of high-quality standard, the previous incentives to further improve the quality has been absent, since this was a waste of resources and loss of potential aftermarket income. This is also elaborated up on by Björkdahl and Holmén (2018) where the manufacturing companies of their study could not benefit from the added customer value with their current business model. Therefore, the business opportunity that arises can be concluded to the following points:

- A closer and longer customer relationship are likely to occur since the contracts often span over long time periods.
- The manufacturer attains a better position to manage and operate the performance of their assets, which can increase gross profit margin.
- Reliability improvement, and the ability to cut costs, give direct results on the bottom line.
- Third-party service providers will no longer be a threat because the manufacturer receives a 100% aftermarket penetration

The aftermarket will no longer bring direct revenues as before, but by locking in 100% of the customers into the performance-based contracts, that money will be captured.

4.2 Catalyst of Performance-Based Contracts

During the interviews, key drivers have been identified as the catalysts of implementing performance-based contracts as an alternative to TBM. These are also in line with what Stahel (2010) presents as the drivers of a business model transformation towards performance-based:

- Competitiveness in the market.

- Performance-based contracts are sustainable.
- The demand for buying performance is growing.
- Legal Frameworks, e.g. IFRS 16.
- Digital Technologies

According to Volvo Constructions Equipment (VCE), their initial driving force towards PBC has its origins in the release of the accounting standard IFRS 16. The standard affects how their customer's leasing contracts are treated in the financial report (VCE, Personal Communication, March 2, 2020). A leasing contract in IFRS 16 is defined as the right to exercise an asset under a specific time period which Tănase et al. (2018) further confirms. All leasing contracts were previously treated as a cost in the cash-flow statement but are after IFRS 16, also classified as an asset in the customer's balance sheet (Pareto Securities, Personal Communication, March 26, 2020; VCE, Personal Communication, March 2, 2020). The standard was first introduced in 2016, which triggered the exploration of the new contracts. However, the standard was not entered into force until January 2020, which has given VCE time to develop the contracts.

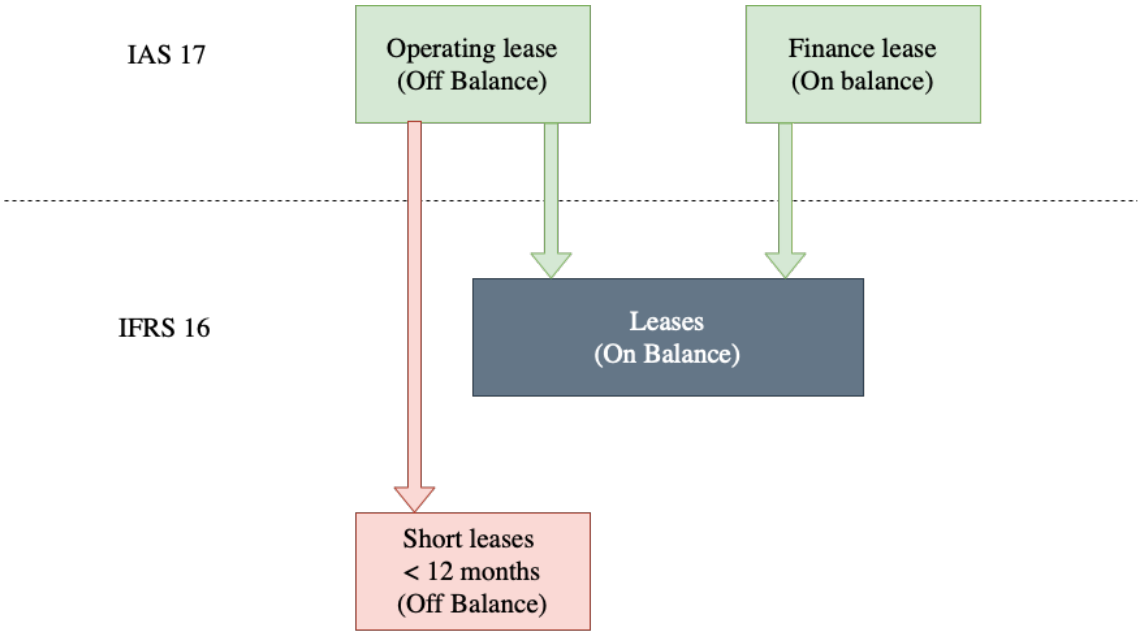

Figure 4.3: The impact of the change from IAS 17 to IFRS 16 for the lessee/customer (VCE, Personal Communication, March 2, 2020).

An operating lease is a leasing contract that is owned by the lessor for the entire period, which is generally treated as a rent (VCE, Personal Communication, March 2, 2020). The payments for the lease are treated as an operating expense, which results in the asset not showing up on the balance sheet. All operating leases were previously off-balance and not visible on the balance sheet at all, but under IFRS 16, it is still possible to have leases off-balance when they are shorter than 12 months. A financial lease is usually treated as a loan and is considered to be owned by the

lessee, which results in the asset showing up on the balance sheet. The financial risk is transferred to the lessee, which is not the case under an operating lease (Pareto Securities, Personal Communication, March 26, 2020). As previously stated, the effect of IFRS 16 is that there is no longer any difference between operating leases and financial leases (VCE, Personal Communication, March 2, 2020; Pareto Securities, Personal Communication, March 26, 2020). When both types of leases now end up in the balance sheet, the transparency increases towards lenders that now have full insight into the financial responsibilities that the lessee carries. This could make it more difficult for the customer to loan money in order to leverage the core business of the company.

Previously, there was no need for VCE to offer solutions that made leasing contracts disappear from the balance sheet since the contracts were treated differently (Pareto Securities, Personal Communication, March 26, 2020). However, when the implementation of IFRS 16 was introduced, VCE saw an opportunity to offer the customers their products without affecting the customers balance sheet. As mentioned before, it is still possible to have leasing contracts off-balance if they are shorter than 12 months. However, after the 12 months have passed it is not possible to sign a new contract to avoid getting the asset in the balance sheet again (VCE, Personal Communication, March 26, 2020).

In order to work around the problem, the lessor in PBC exercises something called practical ability and therefore spare the customers from having the lease in their balance sheet (VCE, Personal Communication, March 9, 2020). The practical ability exists if there is an economic benefit for the lessor to swap the customer's asset with something similar during the contract period. The leased asset would then no longer be an identified asset, which is an asset with a serial number (Tănase et al., 2018), and it would not be possible to put that asset in the balance sheet (VCE, Personal Communication, March 9, 2020). Since VCE has the control of the asset, they have incentives to maintain the condition and sell when they benefit the most. Furthermore, it would not be possible to have several leasing contracts shorter than 12 months on the same or similar products, without the risk of getting trouble with authorities.

VCE emphasizes that the customers increasing balance sheets could be a temporary problem since all companies will have the same prerequisites in the future (VCE, Personal Communication, March 9, 2020). Instead, the main selling point is the "peace of mind" that the PBC gives the customer when no machines need to be owned or serviced by the customer. In the case of a mining company, VCE explains that their core business is to dig and extract valuable materials, and not to conduct maintenance or service of expensive machines. The PBC lets the customer focus on their core business, and the money which does not get locked by investments in machines can instead be invested in new mines in order to scale and increase their competitiveness towards other mining companies.

Business Model	**Transaction**		**Leasing**		**Performance**	
Accounting Standard	IAS 17	IFRS 16	IAS 17	IFRS 16	IAS 17	IFRS 16
Manufacturer	No	No	Yes	Yes	Yes	Yes
Customer	Yes	Yes	No	Yes	-	No

Table 4.1: A summary over for which business model the assets are visible or not in the balance sheet, with the former IAS 17 and the current IFRS 16 accounting standard.

Common for all the manufacturers, is that they realize PBC is profitable under the right circumstances for, both the customer, and manufacturer. Controlling the product vertically enables the manufacturer to service and make repairs at the right moment in order to prolong the lifetime of the product (VCE, Personal Communication, March 9, 2020). With total control of the product, it is possible to refurbish and resell the product at any time before the value has dropped significantly. The PBC will also make the cash-flow stream more evenly distributed instead of receiving substantial sums more irregularly.

The other key driver towards PBC is the increasing performance of digital technology, and the ability to monitor the product remotely. VCE explains that this opens up a whole new business opportunity where the company has the tools to act proactive rather than reactive when it comes to e.g. maintenance. When VCE owns their products, there no longer exists any incentives to serve or repair a vehicle before it is necessary since that is a cost for the company instead of the customer. Sensors installed in the products also enable the manufacturer to monitor the operator and determine if the vehicle or machine is operated in the most favorable manner, and as agreed. This is important since VCE has to calculate the cost for the contract based on the driving conditions at sight and make a forecast of the wear and tear of the vehicle.

Sensors have a similar role in SKF were hundreds of these are positioned throughout the machinery to monitor the bearings, and make sure that they run under optimal conditions (SKF, Personal Communication, March 11, 2020). Their customers have huge machines, such as paper mills, which costs enormous sums to stop if something would break down, hence these stops have to be kept to a minimum. The sensors registers vibrations, temperatures, and other important variables that affect the machine and detect anomalies that can be fixed or repaired before it is too late. SKF explains that in their case, it is the monitoring and collecting of data that leads to PA that constitutes the performance-based contract, and the bearing is still purchased traditionally by the customer. In the case of VCE, the machine is included in the contract price, together with the monitoring service. Furthermore, the price drop in sensors has made it easy to install more of them without becoming unprofitable. This results in more accurate monitoring, which leads to shorter downtime.

4.3 Financial Effects of Performance-Based Business Model

When the decision to transform into a PBBM is going to be made, it is crucial to keep the economic effects in mind. The costs-structure, amount of assets as well as cash-flow differs significantly compared to a TBM. These implications could potentially be to difficult to deal with if the wrong circumstances are present. Figure 4.4 visualizes the value exchange in TBM, where the value follows the transfer of assets.

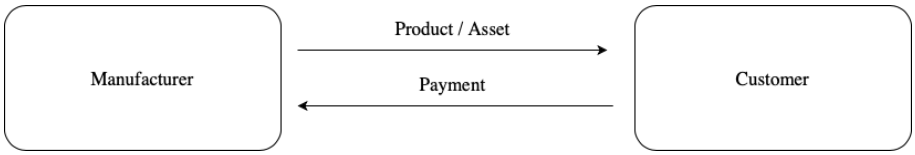

Figure 4.4: Traditional Value Exchange

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Stated by several of the case companies as well as previous literature, manufacturing companies have historically been characterized by the mission of having less assets in stock, but at the same time a buffer. Therefore, concepts such as Just-in-Time and Lean occurred as a way to manage the demand, and to reach those goals (Scania Group, Personal Communication, March 10, 2020, Sandvik, Personal Communication, March 30, 2020; VCE, Personal Communication, March 9, 2020). The relationships with suppliers and customers have therefore been distanced, but later trends have moved towards higher interdependence and long term relationships, which is recognized by all the interviewees.

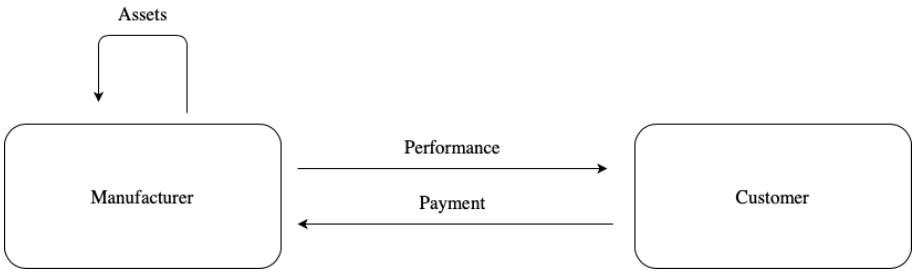

Figure 4.5: Performance Value Exchange

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In the case of a PBC, the ownership of an asset or product does not transfer, and is therefore separated from the value exchange, which is visualized in figure 4.5 (VCE, Personal Communication, March 9, 2020). The focus is no longer put on the hardware itself, but instead on the value that it can produce. The reason for even consider the increase in assets is the higher profit margins as stated by foremost VCE, but also by Hypko et al. (2010a). As an example, VCE implemented a total digital solution for their customer. One of the aims was to utilize 100% of the trucks loading capacity since the utilization level, in general, is around 85% due to previously

logging everything manually with pen and paper (VCE, Personal Communication, March 9, 2020). Another reason for not achieving 100% with manual logging is that the drivers are personally responsible for the fine if there is an overload, hence they load below the limit. The key activities of this PBC were to deliver a monitoring system and an IaaS in order to achieve a 100% utilization level without any overload. To implement this as a customer without PBC would cost too much and require too many resources compared to the manufacturer, in this case VCE, that already have developed the infrastructure for this. The direct costs for the customer with the contract will be higher than their previous leasing cost with the manual logging system per month, but the cost savings for this project ended up three times bigger than what was predicted, and thereby increased the customer's profitability (VCE, Personal Communication, March 9, 2020). However, with this business model, the customer never owns the machinery necessary to conduct their business, VCE does, hence a number of financial implications occurs for the manufacturer that needs to be addressed.

- First, when the ownership of the assets is not transferred, the manufacturer's asset stock will increase, which heavily affects the balance sheet.
- Second, the need for financing is evident since the monthly payments are much lower than the selling price.
- Third, the cash-flow will be spread out over a more extended period of time since the asset is not sold but a tool to bring in the monthly payments from the performance-based contract.

4.3.1 The Increased Assets of Performance-Based Business Model

The amount of assets would increase for the manufacturer with PBBM, which could cause challenges (Volvo Cars Group, Personal Communication, March 30, 2020; Volvo Group, Personal Communication, April 30, 2020). However, having a substantial balance sheet *per se* does not necessarily account for issues. It all depends on what type of business model the manufacturer has (VCE, Personal Communication, March 9, 2020). Many large corporations, such as Scania Group or Volvo Group, have their own financial services departments with the purpose of building balance. The issue with an increased stock of assets arises when the company's business model is constructed for the opposite, keeping the assets to a minimum. With traditional TBM, this issue does not exist since the customer either has purchased the entire product or leased it. The customer has then received the assets in its balance sheet or as a leasing contract, which the financial services have been taking care of previously. The financial services could potentially manage the increase in assets from the PBBM. However, due to organizational resistance, VCE need to manage this by themselves without any financial aid from the financial services (VCE, Personal Communication, March 9, 2020). Many of the customers have previously used the leasing option since they not want to burden their balance sheet either. The reason for this is that the customers of the case companies often grow by scaling their business by, e.g. acquiring another mine as a mining company, and

therefore want to invest their money most strategically. When the balance sheet is full of expensive assets, the company becomes rigid due to the increasing amount of cash that is blocked (Volvo Group, Personal Communication, April 30, 2020).

Furthermore, the fixed costs in these manufacturing companies are very high, which then creates a need for getting the produced goods sold (Volvo Group, Personal Communication, April 30, 2020). From a customer perspective, the liability to have assets makes their company rigid, and the PBC will then create more flexibility, which previously has been the reason for choosing to lease (Volvo Group, Personal Communication, April 30, 2020). However, with the changes mentioned above in accounting standards from IAS 17 to IFRS 16, even the leasing option forces the assets to be visible in the lessee's financial reports. The customer's ability to get new credit or loans will then decrease according to VCE, Scania Group, and Hypko et al. (2010a).

By choosing a PBBM, this issue can be considered dealt with for the customer since they end up with no equipment in their balance sheet, and therefore can expand their core operations. The idea behind this is that the PBC extends over to many years for one machine to last the entire contracting period. According to VCE, the machines typically last 7-8 years, and for Sandvik this is around 18 months, and what occurs then is the need for replacement or complete service (VCE, Personal Communication, March 9, 2020; Sandvik, Personal Communication, March 30, 2020). When the machine needs to be replaced, and the contract period is long, the contract can no longer be assumed to be of leasing character and thereby avoids the IFRS 16 rules. Therefore, the potential to capture more value has occurred for the manufacturers since they can provide an off-balance solution with PBC.

4.3.2 The Financing of Performance-Based Business Model

The PBBM gives rise to issues related to the financing of the assets. Previously, there has been no need for financing since the product was sold or leased (Pareto Securities, Personal Communication, March 26, 2020). Therefore, the assets have not been kept in the manufacturer's balance sheet since they have been taken over by the customer or financial service department. This changes when the assets stay in the manufacturer's ownership since the assets are no longer financed directly by either the customer or the financial services. To simplify this, one can either choose to finance by equity or by credit, which both have their benefits and drawbacks. A company does not want to finance this increase in assets solely with the company's equity since this would affect the ROE (VCE, Personal Communication, March 9, 2020; Pareto Securities, Personal Communication, March 26, 2020). However, when leverage is used to finance the assets, an increase in interest could result in an unsustainable situation if the interest would increase and thereby decrease the profit.

4.3.3 Impact of Shift in Cash-Flow

Regarding the financial implications, the shift in cash-flow is one of the most important to address since this is why a need for financing arises. In figure 4.6, this shift is visualized to illustrate what happens.

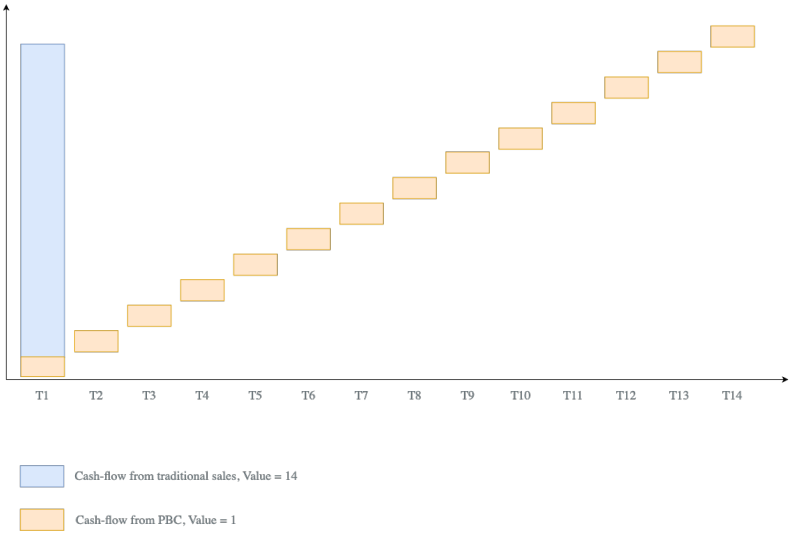

Figure 4.6: Shift in cash-flow.

Figure 4.6 illustrates the difference in cash-flow between a PBBM and the traditional TBM. Since the PBBM is characterized by periodic payments, it will take a longer time to retrieve the same amount of cash-flow as the traditional transactional sales would. It is, therefore, important to address who will be the owner of the product (Pareto Securities, Personal Communication, March 26, 2020).

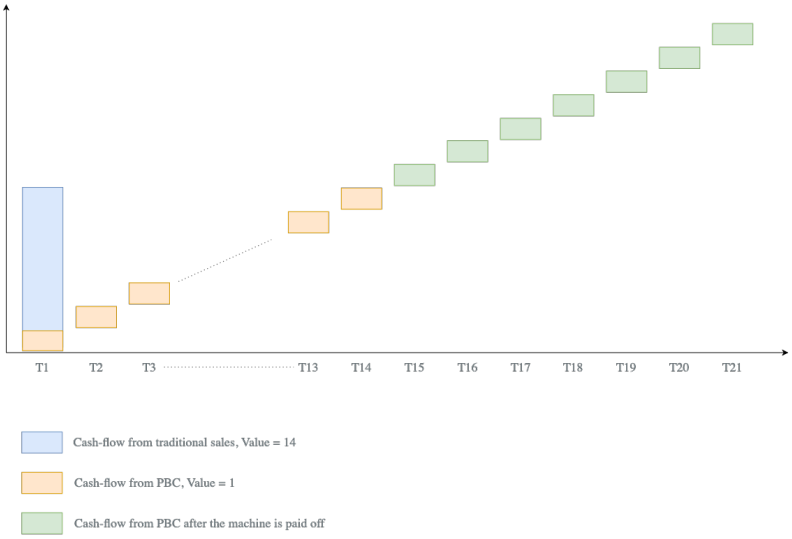

Figure 4.7: Shift in cash-flow over a longer time period were the green boxes represent pure profit since the machine is already paid off.

Furthermore, the upside of this business model is demonstrated in figure 4.7, where the monthly payments are higher than just the price of the machine divided over some time-horizon. The PBC includes insurance and maintenance, which together with lower downtime and proper monitoring, would lead to less repair costs (VCE, Personal Communication, March 9, 2020). When the machine is paid off, the payments afterward will have a higher profit margin. This typically occur after e.g. 7-8 years, on a performance-based contract that spans over 12 years, the manufacturer then replaces the machine at the customer plant. The customer still receive what is agreed upon, and the manufacturer can motivate keeping the price the same as before the machine was swapped. This shift in cash-flow is especially tough during the ramp-up stage, due to the lower level of income, hence there has to be an incremental development at a pace possible to finance (VCE, Personal Communication, March 9, 2020; SKF, Personal Communication, March 11, 2020; Pareto Securities, Personal Communication March 26, 2020). However, in the long run, it will be possible to predict future cash-flow with PBBM better since the contracts span over longer time-periods than with the former TBM, where bigger cash-flow occurred on irregular occasions (Volvo Group, Personal Communication, April 30, 2020).

4.4 Effects on Internal and External Structure

SKF, VCE, Sandvik, ABB, Scania Group, and Volvo Group all mentioned other issues that arise from a transformation to a PBBM. One issue that was pointed out is the structure of their organizations, and that the competence might not exist in-house for this transformation to be possible. Since the PBBM has not been fully implemented in any of the organizations, it is difficult to know how the resistance will look like internally.

The Key Performance Indicators (KPI) that are central in the organization will also change drastically, which the different departments have to find ways of dealing with. An example of this could be spare parts, which becomes a cost that previous was a profitable revenue stream (VCE, Personal Communication, March 9, 2020; SKF, Personal Communication, March 11, 2020). The KPIs were designed for the old business model, which makes it important to adapt them to the new one. Therefore, the employees might be confused regarding how to do business and measure success, which can slow down the implementation of the new business model. To make the employees conduct a change from e.g. profitable service contracts, it is necessary for them to truly understand the concept in order to avoid resistance (SKF, Personal Communication, March 11, 2020).

Furthermore, Volvo Group pointed out that there is a need for better customer knowledge. This new business model requires extensive knowledge about customer behaviour, and their operations, in order to take over the responsibilities. The following structure in figure 4.8 is used today when the business model is transactional (VCE, Personal Communication, March 9, 2020). The network of dealers have a relationship with the end customers, and thereby ensures to maintain the customers by satisfying their needs.

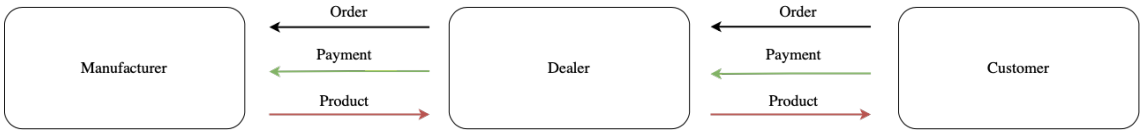

Figure 4.8: Relationship structure with Traditional Business Model

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For the manufacturer, this network of dealers seems to be useless, with the PBBM, since the transactions do not take place (VCE, Personal Communication, March 9, 2020; Scania Group, Personal Communication, February 27, 2020). According to some manufacturers, this structure is not favorable since they have a long relationship with the dealers, and thereby would eliminate their entire business. Instead of cutting out the dealer VCE has proposed that they would benefit from the current structure by maintaining the dealers even though their business model needs to change as well. Since the customers are spread across the world, their network is valuable. Therefore, they will be in charge of the PBC for their market since they have built up relationships with their customers for long periods of time.

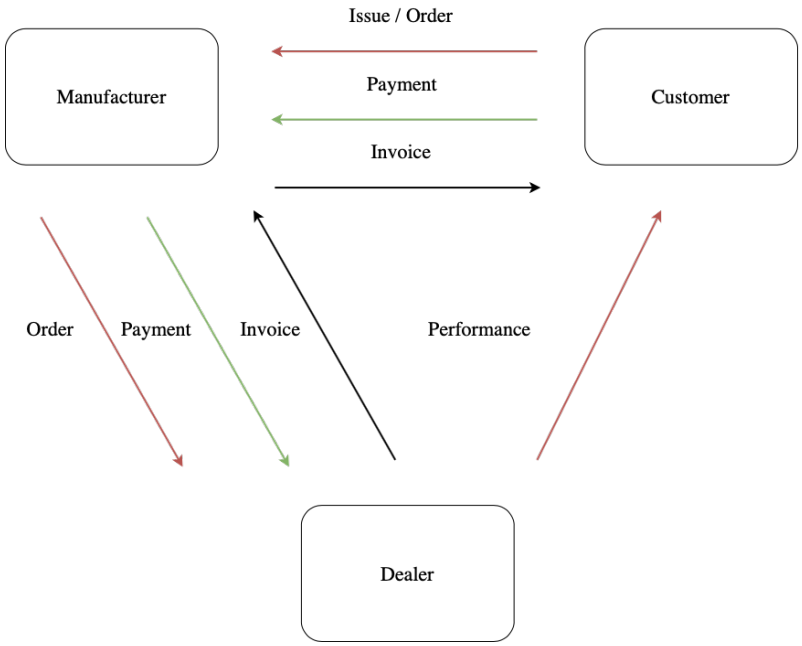

Figure 4.9: Relationship structure with Performance-Based Business Model

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The structure can be described as follows (VCE, Personal Communication, March 9, 2020). If an issue or preventive measure arises under a performance-based contract, this will either come directly from the customers or the monitor systems. The manufacturing company will then forward the order of what needs to be executed in terms of service, and finally, the dealer performs the ordered tasks. Then the manufacturing company will send the monthly invoice to the end customer who pays

for this as agreed, and the dealer will send an invoice to the manufacturing company for executed performance and therefore receive payment from them. According to VCE, a structure like this will optimize the value chain for all parties. The customer will only pay for what is agreed upon in the performance-based contract, and the dealer will earn more since the margin on the service job is higher than selling the actual product. The PBC captures more value down the line since the manufacturer has total control over the customer's service and maintenance. Even though the manufacturer has to share this revenue with the dealers, they now get 100% market penetration on the aftermarket services, which usually only accounts for about 40-50% in the TBM (VCE, Personal Communication, March 9, 2020).

4.5 The Potential of Special Purpose Entity

Manufacturers with capital intensive products quickly run into problems when taking ownership of the customer's assets, which heavily influence the balance sheet (VCE, Personal Communication, March 2, 2020). Hence, traditional company structures are not suitable for PBC, which creates the need for an alternative structure that can absorb the risk. A Special Purpose Entity (SPE) is one way to financially engineer a structure fit for this kind of business model that can handle a growing balance sheet (Scania Group, Personal Communication, February 27, 2020; ABB, Personal Communication, March 30, 2020; Volvo Group, Personal Communication, April 30, 2020). Several of the interviewees brought up this possible solution, but no one had this or similar structure implemented today. The concept can be visualized in figure 4.10, where the SPE is legally separated, and considered an entirely new company.

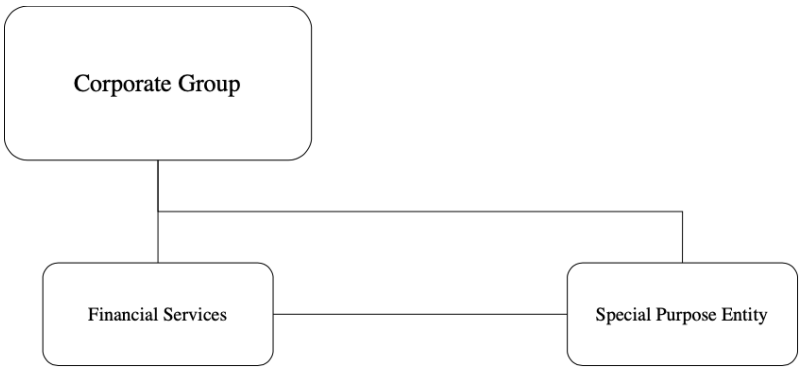

Figure 4.10: Structure of Special Purpose Entity

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The entire purpose of using a structure such as this is to transfer the risk from the corporate group according to VCE and Scania Group, furtermore Rothman (2012) confirms this. This simultaneously allows for more accessible financing in the SPE since it only consists of one type of assets and then becomes less risky for a potential lender. The products are sold to the SPE the same way as a regular transaction to a customer, which is beneficial from more than one perspective (VCE, Personal Communication, March 9, 2020). First, if the SPE goes bankrupt, the corporate

group is protected. Second, the assets are not considered to be part of the corporate group if they would file for bankruptcy. Historically, this has been used to portray companies as more profitable and less risky. Therefore, this possible structure can be perceived as a gray zone even though it is a legitimate solution.

Furthermore, Porter and Heppelman (2015) elaborate on the purpose of a separated business unit and how it becomes easier to attract the right talent, this is considered a great benefit of this structure according to VCE. Furthermore, a stand-alone unit as a SPE is free from the organizational structures and legacy of the manufacturer (VCE, Personal Communication, March 9, 2020). A potential issue with using the structure of a SPE is the size of the manufacturer. If the manufacturing company is not large enough, it is not likely that they have a financial services department, and without this, some other type of financier would have to be brought in to bear the assets (Scania Group, Personal Communication, March 10, 2020).

4.6 The Need of Customer Knowledge

A traditional manufacturing company does not need to have extensive knowledge about the customer's operations in order to sell a product (Volvo Group, Personal Communication, April 30, 2020). However, it is important that the product produced fulfills the customer's expectations and requirements, which make product feedback and research essential. After the products are sold, the customer can use the product however they like, and the manufacturer's only responsibility is potential service agreements and repairs when something break. On the contrary, when offering PBC it is crucial that the manufacturer knows everything about the customer's operations to be able to provide the right offer. Since the customer is going to partly let go of control over their own business they have to be convinced that the manufacturer will know the customer's business and have the knowledge required to ensure the performance offering meets their demands (VCE, Personal Communication, March 9, 2020).

In order to offer a performance-based contract the manufacturer need to know everything there is to know about the environment and conditions the products will face (Volvo Group, Personal Communication, April 30, 2020). This will have an impact on the pricing of the service as well as how much and which type of risk that the manufacturer can expose themselves to. VCE implemented a fully automated infrastructure for one of their customers. There was no automation before VCE proposed their PBC and did not convince the customer to choose this alternative before they could prove they understood the needs of the customer. These skills and knowledge are important to take into consideration and make sure that they exist, in order to create a service package that will satisfy the customer and cover the risks.

4.7 Organizational Inertia

The implementation of new business models is complicated and demands extensive work throughout the entire organization (ABB, Personal Communication, March 30, 2020; VCE, Personal Communication, March 9, 2020). As the organization changes structures and work procedures, new competencies are required, and existing knowledge could suddenly become obsolete. Companies such as Scania Group and Volvo Group, have e.g. many engineers that know everything about combustion engines. How should their competence best be used when industry moves towards electrification. Changes of this magnitude do not happen automatically since current employees cherish their employment and are often afraid of the unknown (SKF, Personal Communication, March 11, 2020; Scania Group, Personal Communication, March 10, 2020). SKF highlights the fact that new contracts, such as the performance-based, needs another sell strategy due to the resistance from the customer's organization. It is essential to ensure the customer understands the value, which VCE experienced during a pitch for PBC with a customer, who turned down the offering since according to them they had 100% uptime. VCE asked how this was possible and the response was that he had two of the same machine. The customer did not realize this reduced his uptime to 50%, and therefore they did not want to purchase performance. From this, VCE realised the importance of taking the customer perspective, in order to create an understanding of their value contribution. Furthermore, the nature of the PBC will inevitably force e.g. the purchasing department to shrink since decisions regarding these matters will be made by the manufacturer. This is something that the purchasing department is aware of, hence new contracts will be turned down if the individual deciding will be affected. The personal preferences will come first even though a PBC could potentially be more financially attractive.

Finding other solutions to this issue is important until the PBC is more accepted and understood (ABB, Personal Communication, March 30, 2020). SKF's approach has therefore been to focus on top management, in order to get the right attention and decision power. ABB did emphasize the fact that manufacturing companies have a large proportion of older employees that have been working at the same company for a long time. Changing the core of the company, which the business model is, could potentially be too difficult without a change of generation in the company. Without old habits and structures, it will be easier for new employees to accept and implement new strategies.

4.8 Affect on Key Performance Indicators

Both the internal KPIs and the external, of which some can be financial, will experience changes due to the transformation (VCE, Personal Communication, March 9, 2020). However, how manufacturing companies will be financially affected and to what extent by the change of business model is difficult to predict, since the ones

leading the transformation are still in the early stages (Pareto Securities, Personal Communication, March 26, 2020). By starting from a holistic perspective, many of the financial ratios will be affected. Therefore, it is of value to define which ratios that will be the most important, in relation to the nature of the company, to identify changes due to the business model transformation. Two candidates that will be of importance, for all companies, are the Earnings Before Interest and Taxes (EBIT) and Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA), which will change due to the reduction in cash-flow. When the revenue from the products is pushed into the future, they are likely to go down drastically short-term. However, this is natural and will, in the long run, bring a steadier cash-flow for an extended period of time. Furthermore, profitability ratios, such as Return on Capital Employed (ROCE) and Return on Equity (ROE), will likely change depending on how the manufacturer chooses to finance (Pareto Securities, Personal Communication, March 26, 2020). However, these effects on financial ratios might impact some companies more than others and especially if the company is publicly listed. Changes in ratios might imply scenarios that previously have been related to companies performing less profitable, which makes it essential to communicate these to the market beforehand to avoid unnecessary speculation.

As aforementioned, the balance sheet will be heavier with this business model, which *per se* does not solely increase the risk (VCE, Personal Communication, March 9, 2020). However, what constitutes the risk in this case, is if the manufacturing company will end up with a fleet of machines were the value of these machines is close to zero or hard to estimate and therefore could be overvalued (Pareto Securities, Personal Communication, March 26, 2020). This is also brought up by VCE, which therefore aims to over-depreciate, at least as much as possible, in order to never end up in a situation where they assess their machines to be worth more than they actually are. Heavier balance sheet imposes the risk of losing the opportunity of getting credits on similar terms as if they would not have this new business model. Nevertheless, at the same time, according to Pareto Securities, if the creditor realizes the value derived from having a predictable cash-flow every month with the PBBM, the creditworthiness of the manufacturer could be better than before and therefore receive better loan terms. This is possible since the PBBM is more resistant to sudden and temporary declines in cash-flow, and the profitability will be evenly distributed over longer time-periods, which creditors consider to be positive (Pareto Securities, Personal Communication, April 30).

The most important KPI is customer satisfaction (Volvo Group, Personal Communication, April 30, 2020). This is more of an internal rather than external KPI, hence, perhaps even more important. Neither the shift in cash-flow or increased profitability matters unless the customers are satisfied (Volvo Group, Personal Communication, April 30, 2020). A further insight that all interviewees have come to conclude, is that the evaluation methods are, in their words, outdated. The aforementioned metrics to evaluate companies' performance are not fit for business models that deviate from the traditional ones. Areas such as circularity or sustainability are hard to measure in terms of these models where the focus remains on growth and margins.

By using a PBBM, it is possible to increase the profitability over time (Pareto Securities, Personal Communication, March 26, 2020). Larger conglomerates could use their financial services and expand this to act as a bank for internal purposes only, which will become similar to the structure previously proposed with a SPE. The assets must also be made bankable, in other words, have a certain degree of future cash-flow, which implies lower risk than what is the case today. The reason for this, is to be able to attract investors that can invest in products made out of these assets, and thereby reduce the asset stock for the financial services company.

4.9 Transformation Risk

The many risks associated with this business model is hard to identify, due to the lack of previous attempts in the industry. However, some risks are possible to predict, which followed from the conducted interviews. From the aforementioned challenges, it becomes quite clear that there is a risk of not being able to scale this up to the extent needed (Pareto Securities, Personal Communication, March 26, 2020; Scania Group, Personal Communication, February 27, 2020). The finance solutions might not be able to carry that amount of assets, mainly if a SPE is not utilized. Not being able to scale this was the problem for Scania Group when they investigated the possibilities of PBBM (VCE, Personal Communication, March 9, 2020). The financial constraints became too big and blocked too much capital in the balance sheet for Scania Group to be able to provide a pay-per-mile contract. Furthermore, lack of competence as well as incentives has been recognized as a risk that several of these manufacturing companies faces. The transformation this business model would imply might be too big of a change for a large proportion of the current employees. Two risks follow from this, the risk of too much internal resistance from employees, and the risk of not finding enough new employees with the right competence. Therefore, as stated by VCE, Scania Group, and SKF it is of the uttermost importance to clearly state what type of company one wants to become in order to set the right direction.

Moreover, the customers constitute an essential part of this transition to succeed, hence they also become a risk-factor (Volvo Group, Personal Communication, April 30, 2020). It does not matter how well designed a product, service or business idea is if no one of their customers are interested in purchasing the new offer (VCE, Personal Communication, March 9, 2020). However, if the customers suddenly become interested in a new offer like PBC, the companies must have been preparing this beforehand since a first-mover advantage could be beneficial (Scania Group, Personal Communication, March 10, 2020). Since any significant changes have not occurred in the observed industries until quite recently with digitalization and electrification, the people and companies could be too inert.

Manufacturers like VCE have to hedge themselves against investing too much money in something that the customers are not interested in purchasing. Therefore, they

are lowering this risk by starting small on their largest customers in order to see how it works on them. According to both VCE and ABB, the recurrent customers with a relatively long relationship are easier to explain the benefits for, even though the concept is difficult to understand even for them. By only trying the concept with one type of customer, there occurs a risk of drawing conclusions based on misinterpreted information. This can either lead to an indication that PBC works for all customers since it works for key account or the opposite, that the concept gets discontinued since it did not work for key account. For this particular example, their volume might be enough depending on their part of total revenues. However, the risk is important to highlight.

It is not only the customers that give rise to this type of variation risk. The nature of the product also imposes a significant difference in how suitable this type of business model is. VCE claims that products with a lower degree of utilization, but is still crucial to have on sight, is a poor fit for PBC. The product has to be used substantially for this to be beneficial for the customer. Hence, knowing enough about a customer's usage of its products is important to minimize the risk of the customer losing money, which will stain the relationship and potential future relationships.

Brought up by Scania Group, Sandvik and VCE, the most important risk-associated question is who is going to own the assets. From this, the risk of positioning occur, which is hard to derive further since it is very industry-dependent. However, to what degree the manufacturer shall interact, compete or cannibalize on customers or their current business model must be analyzed further.

4.9.1 Pricing Risk

Almost all of the risks can be connected to the financial risk since it in the end can affect the profitability. A common problem for all industries trying to implement this business model is how the pricing should be done. Since these contracts span over long time-periods, the risk of miscalculating the price is extensive, which could be devastating (SKF, Personal Communication, March 11, 2020). This could be illustrated by looking at SKF and their partnership with BillerudKorsnäs. When SKF is trying the concept on the first paper mill, it is important to have the pricing right from the start due to several reasons. If the customer is satisfied with the PBC and the trial is leading to more contracts, it is difficult to increase the price for the next plant since this will disappoint the customer. Furthermore, if the pricing has been done wrong, the costs for that mistake could get out of control. Clauses could be added to the performance-based contract, but this could also impose a risk since the customer might not accept that (VCE, Personal Communication, March 9, 2020).

4.9.2 Performance Risk

Up until this point, the companies that have implemented this at an early stage have been able to manage the demand since the rate of gaining new customers is relatively slow (VCE, Personal Communication, March 9, 2020). However, since IFRS 16 is to be implemented from January 2020, an increase in demand for performance-based contracts could be expected. However, due to the massive impact on the manufacturer's cash-flow and increase in assets, it could be difficult to provide PBC to many customers at short notice.

Another risk that arises from this is availability, in other words, the ability to deliver performance. Highly related to this is the quality of the products, which becomes a central aspect of importance (VCE, Personal Communication, March 9, 2020; Scania Group, Personal Communication, March 10, 2020; ABB, Personal Communication, March 30, 2020; Sandvik, Personal Communication, March 30, 2020). In the performance-based contract between the manufacturer and the customer, the terms of a guaranteed level of uptime is agreed, which is the most crucial for the performance provider to deliver (VCE, Personal Communication, March 9, 2020). The studied companies manufacture products that, in general, have high-quality standards but are at the same time often exposed to tough environments (Sandvik, Personal Communication, March 30, 2020; VCE, Personal Communication, March 9, 2020). Therefore, with PBC it now exists incentives to improve quality even further since it is in their interest to keep the maintenance costs as low as possible. Maintenance, spare parts, and service now become a cost for the manufacturer, which is illustrated in figure 4.2. As an effect by the improvement in quality, the Research & Development cost is likely to increase, hence the costs need to be monitored to keep up the profitability (Pareto Securities, Personal Communication, March 26, 2020).

Furthermore, a change in customer behavior has been identified from previous service attempts. When Rolls-Royce changed their business model to power-by-the-hour, the airlines began using the engines for braking during the landings since the airline did not own the engine itself. Hence, the tire ware could be minimized which saved money for the customer, but increased the ware on the engine (VCE, Personal Communication, March 9, 2020). This can be threatening for the uptime if the customer uses the machine in new unexpected ways, because of a lack of ownership. Several of these potential hazards can be monitored and agreed upon in the performance-based contract, but since this is a new structure of making business it is impossible to cover all potential pitfalls beforehand, and therefore this is considered a risk (VCE, Personal Communication, March 9, 2020).

5
Discussion

5.1 Disoriented Industry

From the beginning of this research, it has been evident that the subject is relatively unexplored both in terms of literature and in the industrial environment. After extensive literature research and multiple interviews, it is clear that few people know much about the concept. No one of the manufacturers interviewed precisely knows how this concept should be enrolled or even if it will work in their industrial setting. This also applies to the companies that have come the furthest in the implementation, even though they seem to be on the right track. Furthermore, due to the lack of knowledge regarding the concept, few companies are exploring the possibilities of PBC. Even though SKF, ABB, Sandvik,and Volvo Group have discussed this for a long time, it seems like the PBBM never really takes off. The uncertainty and risks associated with entering new unexplored areas, together with massive organizational changes, are likely to be the main obstacles. These changes could be to extensive, something that the industry may not be ready for.

Looking at the manufacturers, it seems like VCE has a plan and is pursuing it. SKF believes there will be an industrial change in the near future, but have not come as far as VCE. In contrast, Sandvik still sells all their products the traditional way, which they explain relate to the complicated nature of their product. Furthermore, ABB has been successful in what they called "full-service agreement", but according to themselves, this was not considered as performance, although Stahel (2010) defines this as a great example of the concept.

Analyzing the different strategies, it is clear that there is a lack of homogeneity regarding PBC in the industry, which is also reflected in the academic world. The implementation of the contracts will, of course, be more complicated if the industry is doubtful about how the contract should be formulated. This is obvious when, according to VCE, it is a challenge making the customers understand how the concept actually works. A version of the *prisoners dilemma* has occurred were neither the manufacturers or the customers will benefit from the PBC unless they both decide to give it an honest chance. When the general perception is that few manufacturers put enough effort into the change towards a PBBM, it is likely that the pace will continue to be slow.

The findings further imply that companies have different opinions about which risks that is most important to take into consideration. Many agree on the growing amount of assets is a significant problem, others are emphasizing the resistance to change, competence, internal and external structure. Therefore, it is difficult to find all potential issues or challenges that can occur when transforming the business model, but identifying the areas of highest importance can potentially provide a path to follow.

5.2 Business Model

A change towards a PBBM has substantial financial implications for both the customer and the manufacturer, which have to be taken into consideration. The two parties benefit from the contracts in different ways, although the combined outcome should be positive for them both in order for the contracts to be attractive. From a customer's standpoint, a decrease in CAPEX and OPEX opens up the possibility to invest in the growth of the company and thereby increase their market share. The manufacturer, on the other hand, will have to utilize the fact that they have total control of the asset and thereby the possibility to prolong the life span of the product with continuous maintenance. Both SKF and VCE agree that monitoring and digital technologies are necessary if the manufacturers are going to be able to maintain control over the assets remotely. This technique has decreased in price, which also enables the manufacturers to use more measuring points for more accurate measurements. This will enhance the data quality, which also can be utilized when new contracts are developed.

Although the PBBM sounds straight forward, one of the main challenges for the manufacturers has been to explain to the customer how the concept works. This task has been extra challenging for the manufacturers that have not yet come that far into the process of PBC, and therefore lacks knowledge themselves. The difficulties have been the fact that the customer does not own anything, which has brought the feeling of decreased control. VCE emphasizes that the contracts are first tested on key account customers, due to the already established relations and the possibility to test it small-scale. In the case of smaller customers, they identify significant risks when trying a business model radically different from the traditional. Volvo Group highlights the fact that the customers that are willing to try the PBC have to be confident in the manufacturers knowing their industry and operations in order to give away control. Knowing the customers is, therefore, key in the PBBM, something that is not as important when dealing with traditional transactions.

It is not only about finding new ways to make more money that has made the manufacturers look into the PBBM. All companies have to find innovative ways to satisfy their customers need in order to be competitive. These business models have to be developed before the customers start to ask for them since the development and implementation take time. It is, therefore, important to simultaneously work on these models, which VCE and SKF have been doing. By converting a fraction of their

customers, from regular transactions to PBC, enables them to learn and develop but still make money on their traditional sales. The trend in the private sector is to own fewer products and only pay for what is used. Since this shift towards PBBM changes the company radically, it is crucial that time has been spent to be prepared if the market demands these types of contracts. If the interest suddenly arises and the manufacturer does not have the opportunity to provide this solution, it will be challenging to adapt due to the profound changes that have to be made.

Even though much focus is put on the potential cost savings that the customer can make one of the main arguments for PBC is what VCE calls "peace of mind". By letting the customer focus on their core business, the manufacturer will take care of the machines and make sure that the right equipment is in place. This mindset has been collective among several manufacturers during the study and focuses on the fact that the parties are better of taking care of the things that they know best. This reduces the probability of unexpected downtime, which can be expensive.

5.3 Managing the Financial Risk

SKF, VCE, and Scania Group all emphasize that one of the most important risk factors regarding the financial aspects of PBC is the pricing model. The contracts are supposed to run over several years and still be beneficial for both the manufacturer, and the customer. In order to create these contracts, the operating environment has to be studied meticulously to ensure that the planned service and repair schedules will be enough to ensure the contracted uptime. Since the industries are so specific, there are no guidelines on how to price the contracts in the most efficient way, which makes it difficult to standardize. The key is to know the environment where the products will operate, in order to make qualified estimates about the ware and tare that they will face. However, the question is if this is possible when looking for more than a decade into the future. If a contract turns out to be unprofitable, the manufacturer can not do anything about it until the contract ends.

Since many of the manufacturers only deliver the product, the customer has their own crew operating the machines. This is why sensor technology and other digital solutions are essential in order to monitor how the products are used, and thereby avoid being held accountable for damages made by the customer. It might be necessary to invest more resources into educating the customers about how to use the equipment more efficiently to reduce damages. Industry knowledge is also important when promises regarding uptime are being given, since some manufacturers will be held accountable if the production will halt. Smaller companies may conclude that they will not be able to compensate the customer if they can not deliver the contracted up time that the customer requires. This could potentially hinder some companies from offering these contracts and give larger manufacturers an advantage.

Even though VCE has seen IFRS 16 as a driving force for the growth of PBC, it will be hard to know how important this factor will be in the future. The new ac-

counting standard was implemented to increase financial transparency, which some argue that the PBC is reducing due to assets not being visible in the balance sheet. This could in the future lead to new regulations in order to restore the transparency IFRS 16 aimed to create. It could, therefore, be risky to build up a demand for the PBC based on a change in accounting standard, which is why manufacturers instead should focus on the practical advantages that the customer will experience with the PBC. Furthermore, when changes are being made in the balance sheet, financial ratios will not show the same as they used to. This will be a problem short term, but when most of the manufacturers are offering PBC, the comparability of the ratios will be restored.

If analysts know this and take this into account, there is no need to conclude too early about how well a company that sells PBC is, based on old valuation metrics. To highlight this, the inventory turnover makes a good example, since with PBBM, the inventory base will increase drastically in connection with the vanishing of the transactional sales of these. The ratio is of no value until all have the same pre-requisites. Furthermore, there are likely to be variations in both gross profit and operating margin, especially the operating margin, which is used as a ratio to compare within the same industry. Since it measures the profitability after expenses from sales, which most likely is a cost that will increase due to the deep relationship commitment of performance-based contracts, this is no longer suitable as a comparable ratio. Furthermore, other profitability ratios, such as ROE and ROCE, will be affected depending on how the manufacturer chooses to finance the business model. This will not have a concerning impact if the manufacturer chooses the structure of SPE since this is a separate legal entity with its own profit and loss responsibility. Return on capital employed has been emphasized during several interviews to be a vital ratio to keep track of. Along with the profitability ratios, there are solvency ratios that get affected by the choice of financing. The debt ratio and debt-equity ratio are two ratios that, among others, measures the leverage of the company and how they have been financing its growth. Since this business model requires significant financial power, and if this power comes from interest-bearing credit, these will be profoundly affected compared to companies within the same industries not conducting this transformation. These are a few examples of ratios that will most likely be affected, but there are more ratios and metrics to keep in mind.

The nature of the product will inevitably have a high impact on how much risk the manufacturer can be exposed to. Sandvik explains the difficulties associated with selling machines to the mining industry, which makes it problematic to take on too much risk. These machines are working in extreme conditions and are basically worn out after a few years. With the harsh climate comes unexpected problems that could be difficult to realize beforehand and thereby being held accounted for. SKF, on the other hand, have their bearings in a controlled environment where both the bearings and their surroundings are monitored strictly. This makes it easier to control the health of their product and deliver uptime with fewer errors. It could be concluded that some products probably will be too complicated to sell by performance since the risks involved is simply too large for the manufacturer.

5.4 The Right Structure for the Right Scenario

The different ways of how to structure a SPE are probably infinite, but the key take away is that it is likely to be the smoothest option for the manufacturers to transform. The SPE makes it easier to finance the contracts, either via financial services or an external financier. Since the SPE lacks the rigid structure and legacy that a corporate group has, it will also be easier to conduct the PBBM there over transforming the manufacturing company. With a structure like this the risk for the corporate group decreases, which is desirable in most new ventures.

Since the PBBM is thought to replace the traditional business model, it is a matter of definition if the company choosing the SPE transforms or not. If a large manufacturer decides to use a SPE to solve their financial issues regarding the PBC it could then be argued that the manufacturer itself have not fully transformed, since they sell their products the usual transactional way but to an internal entity. However, looking at the manufacturer and the SPE from a holistic perspective, it could be argued that the two entities have transformed on a group level. The traditional transactional sales still occur internally between the manufacturer and the SPE, but the customer is offered a performance-based contract. Furthermore, the internal resistance from managers and employees will be lower when using a SPE since the right competence is easier to attract in order to pursue the transformation. Even though the SPE reduce the internal resistance, the resistance from the customers still exists and have to be managed.

In a TBM, there are no incentives for the manufacturers to create products with "too good" quality since this only cannibalize on the revenues from services. To exemplify, one of the oldest light bulbs is 117 years old, and if all the light bulbs would have had the same product life, the number of units sold would not have been particularly high. However, in a PBBM, it is suitable to increase the quality of the product since service and repair is the manufacturer's responsibility. When using a SPE, the incentives for developing higher quality is the same as with TBM, absent, since the products will be sold to the SPE as a regular transaction. A misalignment between the two entities arises since the SPE moves towards "pay me when the product works" and the manufacturer still creates products that are thought to generate revenue from the aftermarket. If both entities do not have the same goal regarding quality, it is difficult to see that the SPE would be financially successful, which is essential to be aware of.

Moreover, the size of the manufacturing company constitutes an essential factor to consider when thinking about using the SPE structure. The interviewed manufacturers all are sufficiently large to have a financial services department to handle financial arrangements for the customers, which could be difficult for a smaller manufacturer. It might still be possible to have the SPE structure, but the company has to be large enough to attract interest from an external financier, otherwise, this

structure loses its advantages. Hence, it seems like it would be more suitable for larger manufacturers such as Volvo Group, Scania Group, Sandvik, SKF, or ABB to use a SPE due to the possibility to attract investors. If the manufacturer chose to offer PBC in the original manufacturing company, it is important to be aware of the effects that it will have on the cash-flow and balance sheet, and progress slowly with learning by doing. VCE is currently using this strategy since the PBC only constitutes a small part of the total revenue, which the company have the financial capacity to manage at this early stage.

5.5 Importance of Defining What Type of Company

The discussion of whether a company should pursue the transformation could be argued for and against without any clear answer. If the thesis is about to give some verdict, it will be as with many other scenarios, it depends. It might seem easy and boring, but this is not necessarily the case. The reason why it depends is what has been the concluding insight from all the interviewees, "what type of company do we want to be". Does a company want to manufacture products, or does it want to be a service provider? After that, all the questions whether how this should be structured and rolled out appeared. This sets new demands for the organization if one chooses to change, and the former relations to the customers will need to move towards partnerships and away from any arm-length distance.

Furthermore, the studied manufacturing companies have historically been outstanding in product development and not in finance. Hence, the lead of this business model is customer experience, peace-of-mind, and that the customers should stick to their core competencies. Maybe the manufacturers should do the same and perhaps there should be another actor in between these, and thereby the manufacturer can stick to their core competencies.

However, sticking to the manufacturers doing a business model transformation, it is essential to find out if the revenue derives from the operations or the financing. This is likely to depend on the performance-based contract and the opportunity to own the assets in-house and, therefore, not obvious even for those who have implemented this already to a small degree. Thereby, the importance of setting out the right direction and getting the company along, will matter to a high degree. For this to succeed, it might become a matter of severe cuts and new investments in order to assure that the employees believe in the vision, otherwise, this might become a silent killer. Underestimating the power of culture is dangerous. The manufacturers are proud producers, and the customers are proud owners of the products, which constitute a part of their legacy. The former possibility to customize the products to the customer's specific needs could be challenging to continue to deliver. Being able to standardize the products and, at the same time, make the customer believe that they still get the previous level of customization will be a challenge. It is vital

to bear in mind that no customer will give up their operations unless they believe the manufacturer will perform better. With that said, the knowledge required to take over that responsibility might be too extensive for this business model actually to be beneficial.

Performance-Based Business Model	
Advantage User	Advantage OEM
Less knowledge needed	Access to its own resources and assets
Cost guarantee per unit of performance	Preventive actions
No investment costs	Product life-Quality dilemma
No maintenance costs	Predictable revenue stream
No repair costs	Can improve customer satisfaction
Status symbol	More sustainable business model
Disadvantage User	Disadvantage OEM
No right to increased value	Shift in cash-flow
More dependencies on the OEM	Increase in assets
	Internal resistance
	External resistance

Transactional Business Model	
Advantage Buyer	Advantage OEM
Right to possible increase in value	No shift in cash-flow
Status symbol	No increase in assets
Less dependency to OEM	
Disadvantage Buyer	Disadvantage OEM
No flexibility in utilization	No control after sale
Own knowledge necessary	Loosing out on value capturing
No cost guarantee	Less sustainable
Full risk for utilisation	
Need of capital for the purchase	

Table 5.1: A merger of the conclusions of (Stahel, 2010) and VCE, Scania Group, ABB, SKF, Sandvik, Pareto Securities, Volvo Cars Group, Volvo Group

Table 5.1 provides a clear and straightforward overview of the advantages and the disadvantages for the manufacturer and the customer in each scenario. This table makes it easy for both the manufacturer and the customer to identify which of these that bring the most value and which that implies a risk for their specific case. Therefore, using a tool such as this might make it easier for the manufacturer to

understand the benefits, drawbacks and at the same time oppose a good way to make customers understand how the manufacturer can contribute with value. It is possible to use this as the foundation for some general conclusions and as a guideline to chose whether to keep the same business model or transforming to performance-based.

5.6 Ecosystem Structure

The circular business model is gaining attention since less virgin material is used, which captures more value in terms of economic, environmental, and social. The PBBM captures these aspects as well since the focus is put on continuous maintenance, which prevents parts from being worn out too quickly. With the collected knowledge about the PBBM and its relation to circularity, a hypothesis started to develop. By letting manufacturers have performance-based contracts with each other, there would be no need for time-consuming maintenance and repairs of machines that are not one's own. In the scenario were manufactures would merely own their assets, more time could be spent focus on developing their products and business. This relationship could be exemplified with two companies, such as ABB and VCE, which produces robotics for the industry and vehicles, respectively. VCE possesses robots that they, in turn, buys from ABB for the production of their products. When VCE no longer needs to own the robots, more focus and money could be spent on their core business. In order for this to work, several actors in the ecosystem has to agree over the implementation at the same time, which could be difficult. Also, this force the companies within the ecosystem to be further involved with each other where actors from multiple companies and industries together contribute to the value contribution which Björkdahl (2020) also discuss. The implementation of a PBBM is difficult as it is, hence a movement like this would require new infrastructures that could facilitate the change in external and internal structures.

Furthermore, none of these traditional manufacturers have historically wanted to have more assets in their books than they need to, in order to produce the products that they sell. Hence, the potential pitfalls have not yet been fully sorted out regarding the increase in assets and shift in cash-flow. The most crucial factor to take into consideration regarding ecosystems is to ensure no one ends up as the single loser and that everybody collectively brings value to the table.

5.7 Requirements for Successful Transformation

A set of requirements will be presented as a guideline for what type of company that is suitable to undergo the transformation to PBBM. First and foremost, the company needs to have the right digital technologies in place that enable them to build the offering. Digital technologies, such as sensor technologies, are making it possible to monitor the products, which is crucial. These technologies can sometimes constitute the competitive advantages and, in other cases, be an enabler for

the company to offer PBC. Without this technology, it will be impossible to offer PBC to the customers.

The second requirement relates to the fact that different products are more suitable for PBC than others. The nature of the product is important since products that are constantly being used better fit PBC than products used seldom. This is in line with the aforementioned concept brought up by Stahel regarding the quality of the products and the lifetime of them. To exemplify, both VCE and Sandvik manufacture products of great quality, but the lifespan of Sandvik's mining products, which is four years, is far shorter than the 12 years for VCE. Hence, the environment of which the product operates in has an impact that is important to take into account. Therefore, products that are constantly used, with high quality, and that also have a long life span are suitable products for PBC.

Thirdly, it has become clear that the company requires people, preferably managers or CEO, leading this transformation by acting as champions. Due to the organizational inertia, both internal and external, it is important that somebody can convey a vision for the company as a beginning to the cultural transformation. Furthermore, it is of importance that the shareholders are in line with this vision since it is likely that the profitability goes down before it goes up, and the time passed before being profitable are years away. Therefore a short-term aim is undesired, and instead the focus should be long-term. Furthermore, leaders with a vision are especially important towards customers, such as the case with SKF, were their CEO has negotiated the performance-based contracts with the customers himself. These types of new business models are often rejected by a few of the customer's departments due to the fact that it is something that they are unused to deal with and implies changes.

The fourth requirement is to have the right company culture, where change and development is desired rather then discouraged. Therefore the culture has to be of the character that failing provides knowledge and not punishment. This sounds classic, but that does not make it less true. This is especially important when it comes to drastic changes, which a change of business model is.

The fifth requirement is that the manufacturer must have the financial capacity to keep operations running despite the shift in cash-flow. The time-span passed until it becomes more profitable than a traditional TBM is hard to define, since it depends on the rate of adoption by customers and the capability to roll out by manufacturer. Rolling out these contracts quickly can create tension and will affect the profitability heavily short term, but can in return deliver profitability faster. The same goes for the opposite, where a slower implementation phase does not create as much tension in the short term, but will likely take more time before it becomes profitable. The second option might be more successful since the financial risks become lower, which is favorable when the uncertainties are great. The manufacturer must also have the financial capacity of having a much greater asset stock. If the manufacturer needs some type of financing these asset stocks are most interesting if they are very large in value, hence smaller companies might have trouble getting

finance unless they can bear the liabilities from the assets in their own balance sheet.

5.8 Implementing Performance-Based Business Model

This business model suits a manufacturer that has the right digital infrastructure to monitor the products as well as contributing to an attractive value proposition. These products are of high quality, are continuously used, and have a long product life in order to decrease maintenance and repair costs. Having the right company culture is essential in order to prepare the organization for a change in the business model. With these requirements in mind, the following steps are important when implementing a PBBM into the organization.

First, the manufacturing company has to decide what type of company they are and wherein the value chain they want to be. Recognition is significant, hence the manufacturing company must be able to feel like the company they want to be. Do the company want to be a product developer or do they want to become a service provider is a vital question to answer. Second, when the direction of the company is decided, it is important to look at the competency present in the company, both in terms of internal knowledge about the PBBM, but also external customer knowledge. If the right competence does not exist, it is crucial to acquire this in the most suitable way. The third step in the implementation phase is to start this business model in a small scale. This can take various forms, such as creating a lean start-up within the company, let a group of people start working part-time with the project, or whatever might suit the manufacturing company best. The aim of starting small is that risks, such as incorrect pricing and organizational inertia, are kept to a minimum at the same time as knowledge is created. Either way, by choosing the right employees for the transformation journey the resistance will be kept low until the benefits from the business model reach the rest.

Finally, the manufacturer has to find a scalable solution for their current situation by taking all the previous parameters into account and calculate the possible revenue that can be derived from the PBBM. The decision regarding the utilization of a SPE or other financial investors will then be taken.

6
Conclusion

This thesis aimed to identify challenges derived from transforming the business model from transactional to performance-based. Based on the qualitative analysis, it can be concluded that this transformation requires extensive allocation of resources, both in terms of pure financial and organizational.

Servitization and circular economy provide the opportunity to gain competitive advantage, and since the PBBM is an extension from these two concepts, this follows by nature for PBBM as well. By creating a high-quality product with a longer life span it is possible to extract more value, which is the foundation of the PBBM. This will result in social, as well as economical effects, and a change from consuming to a sharing society will also have positive environmental effects. The PBC takes it one step further where the manufacturer remains the owner of the products and improves the operations, which thereby changes the incentives from "doing the right things" to "doing things right". An enabler for this to be possible, is the digital technologies that allow for monitoring, and PA which increase the value proposition to capture more value.

There are fundamental differences in how the transactional and PBBM is structured. What former constituted CAPEX and OPEX for the customer in the TBM, shift to costs for the manufacturer. Thereby the customer only needs to negotiate a performance-based contract, which becomes the only cost related to acquiring new machinery. It transitions to a "peace of mind" for the customer if it is managed correctly by the manufacturer. Furthermore, the total pivot gives rise to incentives to constantly improve quality and customer experience, since this is directly linked to the manufacturer's profit. In addition to the change in incentives and "peace of mind" for the customer, the drivers of why considering this new business model are to gain competitive advantage, become more sustainable, legal frameworks such as IFRS 16 that radically changes the rules of the game, more predictable and steady streams of income, and increased profits. Prominent to depict, is that the increased profits not only occurs for the manufacturer, but also for the customer under the right circumstances. If this would not be the case, the value proposition would not be attractive.

From this, a set of challenges arises, and the first and most obvious one becomes the non-transfer of assets. Thereby, the asset stock of the manufacturer increase, which leads to a rigid structure. These assets need to be financed since they are not sold to the customer, which either could be done via leverage, which then reduce

profitability due to the interest, or by shareholders equity. If one chooses the latter, the financial ratio ROE will reduce, which is unfavorable from the shareholders perspective, so there is a dilemma of which of these to choose. Moreover, it is inevitable to avoid a shift in cash-flow, which will affect the manufacturer's liquidity short term. Despite the financial challenges as aforementioned, there arise challenges related to the organizational structure, since the current structure is not fit for PBBM. Employees can further constitute a challenge if they do not possess the right knowledge to undergo this change. Important factors which have contributed to their professional identification get turned upside down e.g., metrics related to spare parts and repairs, which previously was a great source of income, but with PBBM becomes a cost.

One way to manage organizational inertia in this setting is by using the SPE structure that intends to deal with the sales of performance-based contracts. Thereby, the original manufacturing organization does not need to go through that big of a shift. The downside by using SPE, is that the manufacturer takes the easy way out and risk of missing out on the quality benefits. Furthermore, the manufacturer do not change to become a performance provider but remain the same. The PBBM further increases the need for customer knowledge because if the customer does not trust in the manufacturer to deliver a better performance, than what the customer are capable of, they will keep doing the way they always have. Furthermore, the manufacturer faces the risks of pricing and performance. Since the agreements are very long, the pricing must be right from the start and in conjunction with too bad performance, the maintenance and repairs will reduce the profit.

It can be concluded that the industry is disoriented regarded this topic. Few people know enough to be confident in the effects of this business model. Hence, the perception of what the challenges are differs depending on from what perspective one is observing. It is possible to derive some definite advantages and disadvantages of keeping the transactional and transforming to the PBBM. This, in conjunction with defining what type of company one aims to become, sets the direction for how to pursue this or not. From this point, there is a set of requirements in need of fulfillment in order to even consider this. A manufacturer must have the right digital technologies to develop an attractive value proposition, the right type of product for this to be suitable, vision from leaders and culture in the company, and finally, the financial capacity. This can be overcome in many ways, but the suggested steps are as follows; first make a clear decision of where in the value chain the manufacturer want to operate, ensure the right competence exists otherwise acquire this, start as a small scale project and finally create a structure to make it scalable in the particular setting.

This thesis is of relevance for both practitioners as well as scholars due to the disorientation of the topic. Observed through the project is that the studied companies share a common realization that change is coming, but in what form and when is unknown. Different approaches are here conducted, from leading the change to solely observing. By actively taking part, one might actually get to form the trans-

formation to its own benefits, but of course to a certain risk, which seems to be intimidating. This thesis can lead to further improved understanding of what the performance concepts actually imply, which might ease the phase of explanation. Only by more attention, will the area of performance-based business model be covered further and thereby better understood by the great mass.

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A

Appendix 1

A.1 Financial Ratios

Financial ratios is a crucial part when analyzing companies financial situation and performance (S. Goel, 2015). Furthermore, ratios will help in assessing the firms liquidity, efficiency, profitability and growth. Since there exists a lot of of financial ratios it is crucial to choose those of importance for the company and the industry. The most frequent users of financial ratios are creditors, bankers and investors which base their decisions to lend respectively invest or not. Therefore, some chosen ratios will be of importance if the assets will increase due to a change in business model towards performance based contracts. The following areas of ratios are among the most commonly used:

- Liquidity Ratios
- Efficiency Ratios
- Profitability Ratios
- Solvency Ratios

A.1.1 Liquidity Ratios

Liquidity ratios indicates how the near future of a company will be. If the company can meet its short-term debt or faces the risk of bankruptcy (S. Goel, 2015).

A.1.1.1 Current Ratio

The current ratio measures a company's ability to pay of of its short term debt(S. Goel, 2015). This ratio is favoured to be high since by definition this means that the company has greater ability to pay off its liabilities.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

A.1.2 Efficiency Ratios

Efficiency ratios, also known as activity ratios, describes how well a company utilizes its resources to generate output from input (S. Goel, 2015). Input can be in terms of assets, employees, raw material and cash while output can be in terms of sales, growth or margin.

A.1.2.1 Inventory Turnover Ratio

The inventory turnover ratio measures how many times a company's inventory is sold and replaced over a specific period of time (S. Goel, 2015). It indicates how effectively a company manages inventory. Either one of the following examples can be used.

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}} = \frac{\text{Sales}}{\text{Average Inventory}}$$

A.1.2.2 Return on Investment

$$\text{ROI} = \frac{\text{Current Value of Investment - Cost of Investment}}{\text{Cost of Investment}}$$

A.1.3 Profitability Ratios

The key objective and the foundation that all companies build up on is to make profit and thus maximize this. The profitability derives from a firms performance and efficiency. From profitability analysis one can determine the operational health and if a firm is profitable within their core activities it is a sign of healthy operations. Within the field of profitability ratios their are two sub-categories, margins and returns (S. Goel, 2015).

- Margins - Indicates a firms ability to generate profits from sales at different stages (S. Goel, 2015).
- Returns - Indicates general efficiency within the firm generating returns to its shareholders (S. Goel, 2015).

A.1.3.1 Gross Profit Margin

The gross profit margin compares the gross profit of a company in relation to net sales (S. Goel, 2015). It indicates how efficient a firm utilizes resources e.g. raw materials to generate profit. It shows how much money that is left after accounting for COGS which describes the operational health of the firm.

$$\text{Gross Margin Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}}$$

A.1.3.2 Operating Margin Ratio

Operating margin measures the profitability of a firm after office and selling expenses (S. Goel, 2015). It is assessed to be a better indicator of profitability than only looking at a firms core operations due to the reason of including non-core operations. Operating margins is best used within the same industry and when comparing the same company over time or in relation to competitors. This limits the ratio to some extent since different industries can have very different margins.

$$\text{Operating Margin Ratio} = \frac{\text{Operating Income}}{\text{Net Sales}}$$

A.1.3.3 Return on Equity

Return on equity is especially an important ratio for the shareholders (S. Goel, 2015). It derives how much profit that is generated with the shareholders invested capital. It is favourable to have as high return on equity as possible since this proves efficiency in generating profits from the shareholders equity.

$$\text{Return on Equity Ratio} = \frac{\text{Net Income}}{\text{Average Shareholder's Equity}}$$

A.1.3.4 Return on Capital Employed

Return on capital employed is a measure of how well a firm generate profits from the capital employed (S. Goel, 2015). In further explanation it describes the long-term profitability since it show how efficiently assets are performing in relation to the long-term financing. Therefore it evaluates the managements efficiency.

$$\text{Return on Capital Employed} = \frac{\text{EBIT}}{\text{Capital Employed}}$$

where

EBIT = Earnings before interest and tax

Capital Employed = Total assets - Current Liabilities

A.1.4 Solvency Ratios

Solvency ratios measures and indicates the long-term survival of a company (S. Goel, 2015). In more depth it provides information of about a company's ability to pay off long-term debt. It plays an important role for business owners to analyze their financial risk and to analyze how the company is funding its operations. It is most used by long-term creditors that wants to assure the survival before giving credit.

A.1.4.1 Debt Ratio

Debt ratio measures the leverage of a company, in other words how much of a company's assets are funded by long-term debt in relation to equity (S. Goel, 2015). A high debt ratio shows that a company has a lot of debt in relation to equity which would mean that they have a lot of interest rate payments that can minimize the profit and also be of risk in case of an increase in interest rate.

$$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

A.1.4.2 Debt-Equity Ratio

Is also defined as the financial leverage ratio and comprises of debt, can also be both long-term and short-term, and equity which is the company's net worth (S.

Goel, 2015). The debt-equity ratio measures how a company has been financing its growth. A low debt-equity ratio indicates organic growth while a high would indicate by a more aggressive approach by carrying on debt. It is favourable to maintain a low debt-equity ratio since this indicates that the investment is safer and in general a ratio of 2:1 is considered average.

$$\text{Debt} - \text{Equity ratio} = \frac{\text{Long-Term Liabilities}}{\text{Equity}}$$

B

Appendix 2

B.1 Interview Template

- What are your experiences with business models such as Performance Based or other similar?
- With Performance Based Business Models it occur a set of financial implications, can you provide us with your perspective of which these are and how these can be managed?

  Increased amount of assets?

  Shift in cash-flow?
- What are your reflection regarding organisational inertia in relation to Performance Based Business Models?
- How does the demand look like? Is there any resistance from customers? If so, were is the resistance coming from?
- Can you name a set of catalysts that are the driving force behind this incentive to change?
- Since there are a set of financial implications, how will these affect the financial ratios? Does this matter?
- Would you say that your company is able to make this change with current employees and structure or would this demand a bigger restructure due to the vast difference in the way to conduct business?
- What other effects positive or negative, in general, do you identify as important to be aware of
- What are your future hypothesis of were the industry will end up in 10-15 years?

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