Service Commodities

When service providers fail to build sustainable competitive advantage

Allan Jensby Larsen | Cand.merc.(MIB) Master Thesis | 22. februar 2016

Supervisor: Jens Frøslev Christensen | 179.299 characters (79 standard pages)

Copenhagen Business School 2016

Queue for Volt's charging service at Bråvalla festival. © Volt ApS 2013

Abstract

Servicizing – the move from selling products to providing services – has been proclaimed by many strategy scholars, practitioners and advisers to be an excellent way of combatting commoditization of products and restore the competitive advantage of companies. All while providing growth, additional value to consumers and reducing the negative impact on society and environment. This thesis seeks to qualify the bold claims of competitive advantage through theoretical application of the established strategy frameworks of microeconomics, competitive forces and the resource-based view.

The frameworks are synthesized to a coherent theory of competitive advantage which is carefully and critically applied to the arguments originating from the sources with generally optimistic view on servicizing. This assessment results in a contingency framework useful for evaluating the potential of servicizing to generate temporary or sustained competitive advantage to the servicizing company or whether the service is likely to become commoditized with little potential for profits.

The usefulness of the theoretical framework is illustrated in four cases of servicizing by both established manufacturers and disruptive entrepreneurs, namely Xerox, Kodak, Better Place and Volt. The cases are analysed using the framework and show how it performs well in describing real-world causes and effects indicating the framework's value for predicting competitive outcomes of servicizing.

The theory suggests that potential servicizers should consider the impact of servicizing both on the industry level and on the firm's existing resource base as well as the effects on resource acquisition and industry dynamics while keeping the temporary advantages and initial costs in mind. The main implication is that servicizing is not universally attractive and that the coveted sustained competitive advantage does not come by itself to servicizers. The second implication is that servicizing may nevertheless be driven by temporary profits but also that the transition is not without challenges. The thesis concludes by suggesting potential avenues for further research in the field of servicizing.

1 Table of Contents

2 Introduction

2.1 Problem Area

Servicizing is one of the hottest buzzwords in contemporary business and management practice and academia: It is proclaimed to be key in the process of decoupling material use and environmental deterioration from economic growth and human welfare (Rothenberg, 2007); companies seeking growth are turning to services as their products become commoditized (Sawhney, Balasubramanian, & Krishnan, 2004); a vast amount of management literature are "almost unanimous" in suggesting that manufacturers should increasingly integrate service offerings into their business plans (Oliva & Kallenberg, 2003, p. 160); celebrated authors tout that companies need to adopt a service approach to their business whether they sell a product or a service (Chesbrough H. W., 2011); and there is a range of case descriptions, business stories and popular anecdotes supporting a positive business case for services (DriveNow, 2015; McAfee, 2014; The Economist, 2009).

In this environment of optimistic claims, stories and academic research, business managers may experience a severe pressure to servicize their businesses to reap the presumed benefits. Yet, we still see product-oriented business enterprises like Apple survive and even prosper (Higgins, 2015), we see excellent manufacturing organizations failing with their service offerings and we see service entrepreneurs facing rough financial conditions. This begs the question of whether servicizing is universally a sound method to escape the so-called commodity trap manufacturers are apparently facing or whether services face the same risks of becoming commodities with prices based on costs rather than on value resulting in low profits or market retreat (Holmes, 2012).

This thesis shows the proclaimed benefits of servicizing and investigates under which conditions these benefits may never show or may be eroded resulting in the aforementioned commoditized services instead of sustained competitive advantage. The thesis utilizes well-established theories of competitive advantage to analyse multiple cases of companies applying a servicized business model with mediocre, inferior or fatal results and contrasting these with an example of successful servicizing.

The thesis should be a reminder that business strategy and constant focus on attaining and sustaining competitive advantage is crucial even - or perhaps especially - when providing a service. Businesses should not expect servicizing to be a permanent panacea for the commodity trap, dwindling margins and decreasing profits. Rather, servicizing is yet another tool in the toolbox of the contemporary manager that is to be applied in the right way and under the right conditions to result in the desired outcome.

The findings of this thesis will hopefully help businesses innovate and deliver profitable service offerings; inspire future research in servicizing; and guide policy makers to implement the right conditions for environmentally sound and socially beneficial business models. The potential societal benefits of servicizing seem well-founded and significant so it would be disappointing if we failed to reach this potential because of excess optimism, lack of understanding or improper government.

2.2 Research Question

The problem area above will be researched through the following research question:

Under which circumstances does servicizing generate competitive advantage?

This overall research question will be answered through the following sub-questions:

1. What benefits should servicizing bring?
2. When does servicizing result in sustained competitive advantage?
3. How does servicizing affect the servicizer in the short run?

2.3 Project Scope

This section explains how the research question investigates the problem area. The questions are specified to explain what the scope of the project is. Finally, the delimitations of this thesis are described. After reading this section, the intentions and limitations of the thesis should be clear along with the link to the problem area.

2.3.1 Research Question: Under which circumstances does servicizing generate competitive advantage?

The overall research question is intended to result in a contingency model for competitive advantage for servicizers. The circumstances that are of particular interest to service providers compared to product sellers are given special consideration. The contingency framework is on an abstract level both taking into account the market conditions and the firm specificities that may affect competition and competitive advantage. The framework should be helpful in identifying whether a specific service case is likely to result in persistent super-normal profits or whether profits will eventually be competed to or below the market rate as is the case for traditional commodities.

The research question will be answered by combining the competitive forces framework (Porter, 1980; 2008) with the resource-based view (RBV) (Barney, 1991; Wernerfelt, 1984) and the relational view (Dyer & Singh, 1998) within an overarching microeconomic structure. The sub-questions guide the answer to the

research question by dividing the findings into three distinct parts. The first sub-question will help us locate theoretical and practical reasons why services should face less pressure to become commoditized providing the optimistic view that we wish to constructively assess and criticize. The second sub-question is the critical assessment of the optimistic claims as seen through the strategic frameworks of sustained competitive advantage. We will thus qualify the specific reasons for servicizing with the general theories and argue why some of the reasons initially given are unlikely to provide sustained competitive advantage. Lastly, whereas the second sub-question is about the sustained competitive advantage of the servicizer, the third sub-question is concerned with the short-term effects of servicizing. We will thus find causes for temporary advantages as well as the barriers which the potential servicizer will have to surpass. The short-run perspective is deliberately given less detailed attention than the long-run. It is mainly included to complement the sustained competitive advantage discussion in explaining why companies may want to servicize even if it is not likely to bring persistent benefits. Conversely, it also explains why some companies fail servicizing due to short-run challenges or do not realize the potential due to immediate negative impact on financial performance.

The next sub-sections detail the three sub-questions and provide a brief explanation of the theories used.

2.3.2 Sub-question 1: What benefits should servicizing bring?

As explained in the problem area, this thesis seeks to challenge the widely held notion that providing services is superior to manufacturing and selling goods. Rather, we develop a contingency framework for when servicizing does or does not result in sustained competitive advantage for the servicizer. The first sub-question will act as a point of departure to explain the "null hypothesis" that services are generally competitively attractive. The question will be answered by a variety of academic work in favour of servicizing. The work includes Allmendinger and Lombreglia (2005), Chesbrough (2011), Oliva and Kallenberg (2003), Rothenberg (2007) and Sawhney, Balasubramanian and Krishnan (2004). Together, these researchers cover the theoretical advantages of servicizing and they provide a compelling case for doing so. They are ripe with examples of companies applying a service focused business model to great success. In the analyses, the case of Xerox is used to highlight the advantages of servicizing for an existing manufacturer faced with commoditization in its primary market. The case of Xerox is compared to the other, less successful examples of servicizing to illustrate some of the differences that played a role in the outcome. Xerox is thus used as an ideal example of the successful servicizer.

With the first sub-question we will see that it is indeed possible to succeed with a service-oriented business and we will have an adequate understanding of the benefits of servicizing. We will then move to critically assess if and when this might not be the case.

2.3.3 Sub-question 2: When does servicizing result in sustained competitive advantage?

The second sub-question is concerned with identifying the factors which may lead to a service market becoming commoditized. The question will be answered through drawing on Porter's (1980; 2008) competitive forces framework to discern whether a service market is likely to be more or less competitive than a product market and how this will hurt or benefit the actors within the market and combining it with the resource-based view (RBV) pioneered by Wernerfelt (1984), Barney (1991) and Dierickx and Cool (1998) in which sustained competitive advantage relies on the firm having some resources that its competitors do not and expanded with the relational view of Dyer and Singh (1998) where pairs or networks of firms can possess interorganizational resources. Consistent with Foss (1997, p. 356) and Afuah and Utterback (1997) the RBV and the competitive forces framework are considered to be complementary and they are combined within a microeconomical frame.

The successful case of Xerox highlighted as part of the first sub-question will be analysed with the combined framework and contrasted to some less successful cases of Kodak, Better Place and Volt. After the display of these contrasting cases it will not only be apparent that servicizing does not always result in sustained competitive advantage. We will also have found a reasonable contingency framework for when and when not this might be the case.

2.3.4 Sub-question 3: How does servicizing affect the servicizer in the short run?

While the second sub-question is concerned with determining the long-term effects of servicizing on the servicizer's sustained competitive advantage, the third sub-question seeks to locate the hurdles that the servicizer may have to overcome and the temporary benefits servicizing may bring. The competitive forces framework and the RBV are concerned with sustained competitive advantage and presume static conditions. Actual markets are rarely static and it may be of less importance to companies and their managers whether or not servicizing results in super-normal returns far into the future if servicizing can bring short-term profits or presents an immediate threat to the company.

Answering the third sub-question will help us determine why some companies might servicize even if it does not seem likely to result in sustainable benefits. Conversely, it may also describe why some companies fail to servicize even though servicizing should result in sustained competitive advantage. Temporary competitive advantage is not of primary interest to this thesis but the third sub-question does add explanatory power to its

subject matter and could potentially be utilized for more dynamic conceptions of competitive advantage in future research.

2.4 Delimitation

Even for the most specific problem area, it is not possible to cover all dimensions and perspectives. In this section, I will go through the intentional limits that have been set in this thesis regarding problem area and research scope. In addition to these intentional limits are the methodological limitations which are unavoidable consequences of epistemology and research resources. These methodological limitations are covered in section 3.2. In other words, this section lists some of the major problems that could have been researched but are intentionally not.

The problem area of this thesis is exclusively about the effects servicizing have on the ability of service providing businesses to build and sustain competitive advantage. The subject is based on an intuitive belief that service providers may just as easily become victims to commoditization as may product manufacturers, backed by anecdotal evidence from both high- and low-profile companies.

One limitation is that it is about services and implicitly not about products. Even if the theory may be applicable to product manufacturers in part or in whole such applications will not be followed or analysed. Another limitation is that the thesis is exclusively concerned with commercial business enterprises. Again, the theory may or may not be relevant for non-profit organisations, public entities and/or private individuals but these potential uses are not intended or verified.

Much of the literature about servicizing is concerned with the move from being a product manufacturer to becoming a service provider (e.g. Oliva & Kallenberg, 2003; Rothenberg, 2007; Sawhney, Balasubramanian, & Krishnan, 2004). It is concerned mainly with the benefits servicizing brings to the established manufacturer and the challenges it finds are usually connected with change management viewing the problem of servicizing *ex ante* and providing advice to businesses considering or undergoing this transformation. While change management is certainly an important issue when considering whether to servicize an existing product business, this thesis is concerned rather with the competitive situation of providing a service than the transformational process. It is not necessarily assumed that the potential servicizer is a manufacturer. Being a manufacturer brings certain advantages and disadvantages to the service business but the management of manufacturing, the change towards servicizing and the requisites, benefits and challenges of manufacturing will not be of separate interest to this thesis.

While servicizing is thought to have the potential to bring significant environmental, social and economic benefits to society, these matters are not of primary concern to this thesis. Insofar as the social benefits are unable to provide value to the service provider they will not be given attention. Even so, many social benefits may be internalized to build the business case for being "green" in which case providing social benefits is indeed valuable to the firm (Orsato, 2009). The thesis is also not explicitly focused on the policy implications of servicizing. Even though more services may be of benefit to society there is made no attempt to make policy suggestions on how to improve the framework conditions for services even if they may be implicitly apparent based on the findings.

The primary concern in this thesis is the potential for sustained competitive advantage with temporary advantages being of secondary importance. The theory developed for temporary effects may therefore not be as developed as for persistent ones.

Finally, the thesis is essentially explorative of the hitherto underresearched area of service commoditization. I acknowledge that the thesis is unlikely to cover every aspect of competitive advantage within service companies. As will be detailed in the methodology section, the thesis is deductively seeking to establish a framework for competitive analysis of service businesses based on extant theories. The cases displayed are intended to illustrate the use of the framework but not to empirically verify or falsify any findings. The cases or the thesis as a whole should therefore not be taken as final proof that the framework is universally applicable. The above restrictions are reconsidered in section 8: Further Research.

2.5 Project Overview

We have now covered the reasoning behind this thesis and the specific problem we wish to research. This sub-section will guide the reader through the progression of the remainder of the thesis.

The next and 3rd section, Methodology, is concerned with the methodology applied to research the problem area. It contains a brief description of the realistic ontology, the rationalistic epistemology and the deductive method, and it explains why these assumptions have been made and determines their implications for validity, reliability and the concept of truth. The section concludes by recognizing the limitations that are implicit in the chosen methodology.

Section 4: Theory opens with introductions to the theories which make up the core of this thesis. First, a range of arguments in favour of servicizing is presented and provisionally organized. Then, microeconomics is introduced to explain firm profits, competitive profit erosion and monopoly and efficiency rents followed by a summary of the competitive forces framework and the resource-based view including the extension of

the relational view. These three sub-sections form the basis of a coherent theory for competitive advantage which is developed in sub-section 4.5 resulting in the generic advantages of servicizing. This theory is applied to the initial arguments in favour of servicizing to develop the specific arguments for servicizing. These contingency models are the key findings of the thesis.

The analysis in section 5: Analysis illustrates the utility of the theory by applying it first to the positive idealised case of Xerox and then to the less successful cases of Kodak, Better Place and Volt. In each case, a brief description and history of the company is made followed by the specific instance of servicizing being analysed. The specific arguments for servicizing are then applied to show how servicizing could potentially result in competitive advantage. This is followed by a brief description of the fate of the company and a little speculation about how things could have been different for the three less successful cases.

The findings of the theory and analysis are discussed in section 6: Discussion where the sub-questions are answered. The research question is answered in the conclusion. Finally, some potential avenues for further research building on, critiquing or detailing the findings in this thesis are suggested in section 8: Further Research before the references.

A number of websites have been used during the research along with the two interviews made with two Volt executives. Static HTML versions of the websites and sound recordings of the interviews can be found on the attached media.

3 Methodology

This section presents the epistemology, ontology, research method and limitations of this thesis. It is argued why the epistemological framework is chosen and why the conclusions are valid and reliable. It is recognized that no epistemology or research method is perfect and the most important limitations are stated along with a brief discussion of how different methodological choices would have affected the limitations. After reading this section, the reader should know how this thesis is going to investigate the research question and should be aware of the shortcomings that necessarily exist.

3.1 Epistemology

Epistemology is “the study or a theory of the nature and grounds of knowledge especially with reference to its limits and validity” (Merriam-Webster, n.d.a). In the context of this academic thesis, epistemology refers to assumptions about nature and knowledge that form the basis for creation of knowledge. After reading this section, the reader should know the basis on which the research at hand is valid and reliable. The

epistemological choice has implications not only for the extent and kind of knowledge that it is possible to produce but also for the way in which such knowledge can be produced. In other words, understanding the epistemology is important for understanding the conclusions that can be made and the methods that can be applied to reach these conclusions.

The epistemology of this thesis is rationalism. Rationalism refers to the epistemological stance that knowledge is achieved through reasoning (Ingemann, 2013, pp. 67-72). It is often contrasted to empiricism in which knowledge is acquired through sensing which in the extreme case limits reasoning to merely ordering or containing the actual knowledge. In rationalistic sciences, the basic criterion of truth is that of consistence in the sense that the arguments made through rationalistic work must be logical and not self-contradictory (Ingemann, 2013, p. 179). An implication of this criterion for the evaluation of the findings of this thesis is that it is important that the reader is able to follow the arguments which are made and to evaluate the validity of the individual premises.

The usual method within rationalistic science is that of deduction, which is also applied in this thesis. The basic definition of deduction is to derive a conclusion by reasoning, specifically inferring a conclusion about particulars from general or universal premises (Ingemann, 2013, p. 68; Merriam-Webster, n.d.b). In the context of this thesis, the deductive method specifically means inferring a specific framework for the analysis of competitive advantage of service companies through synthesizing general theories about competitive advantage and general theories about servicizing and services.

To work deductively, it is implicitly assumed that the existing general theories which are synthesized are able to describe the world validly and reliably. The validity and reliability of the inferred conclusions rests both on the validity and reliability of these general theories and on properly, logically synthesizing of them. In the theory sections 4.1, 4.2, 4.3 and 4.4, a case is made for the general theories' individually based primarily on the reference of scientific sources while sections 4.5 and 4.6 describe the logical steps followed to synthesize the analytical framework. This should provide the reader with the necessary information to evaluate whether the findings of this thesis are consistent and thus should be considered true.

A problem with the rationalistic-deductive method is that its usefulness may be limited. The analysis in section 5 applies the analytical framework to a range of specific cases in order to show how the framework is useful in describing the world. The empirical data underlining the case descriptions originate primarily from either publicly available material from the case organisations or from credible second-hand sources such as academic articles or well-established media outlets. For one of the case companies, Volt, it has been possible

to collect considerable first-hand material through the author's current position in the company. This material has been gathered through semi-structured interviews, casual talks and through normal workday practices.

The cases should not be considered evidence for or against the deductively reached conclusion but rather pragmatic illustrations of the theory and implications. While the case descriptions are based on reliable sources, their accuracy are not of crucial importance to the conclusion of the thesis. The cases serve another minor role by suggesting possible areas in which the theory might be expanded. Such suggestions are not followed in-depth to generate new theory as would be customary within hypothetical-deductive epistemologies such as critical rationalism or critical realism (Ingemann, 2013). Rather they will serve as introductory notes hopefully inspiring such hypothetical-deductive research elsewhere.

The ontology of the empiricism applied in this thesis is realism. While epistemology is the theory of knowledge, ontology is the theory of being – the assumptions made about existence (Ingemann, 2013, pp. 24-25). Realism is the assumption that there exists a world regardless of observers and observations (Ingemann, 2013, pp. 36-37). It is often contrasted to idealism where the subject's observation or construction of the researched object necessarily affects the finding. While these two basic ontologies are often viewed as binary opposites they can also be conceptualized as two extremes of a continuum. The ontology of this thesis is that the world is largely independent from the observers and our observations about it and that it is thus possible to formulate universal theories about it. The ontological stance allows for simplification of complex real-world phenomena which we in this thesis will do through careful deduction within the rationalistic epistemology.

The combination of a realistic ontology, a rationalistic epistemology and the deductive method with examples that are supporting and illustrative but not scientifically rigorous has been chosen as it combines the simplifying power of conceptual models with the usability of predictions and the clarity of examples. It further allows for future theoretical expansion through similar methods while being of use to more empiristic approaches through, for example, the deductive-hypothetical method. For these reasons, the combination is common in the fields of economics (e.g. Frank, 2008; Perloff, 2012) and strategic management (e.g. Barney, 1991; Eisenmann, Parker, & van Alstyne, 2006). While the choice has been made for these reasons, it should be recognized that it implies some limitations which is the topic of the next sub-section.

3.2 Limitations

The ontological, epistemological and methodological choices have consequences for the relevance of the findings in the thesis. This sub-section, describes these consequences and argues why the research is relevant, valid and reliable.

Realism can be seen as a simplifying ontological assumption allowing us to make reasonably practical theories which are simple and universally applicable. Practitioners such as managers and policy-makers should be aware that realism implies restrictions on the actual usefulness of the findings given that the specific situation may have idiosyncratic traits which limit or counteract the general theories. In other words, ideal realistic findings may not fully apply in a world which is not perfectly ideal. Complications from applying realist findings may occur when the complexity of the real world is not captured in the simple theories or when the real world is conceptualized as a social construction. As we will see with the cases, the conceptual framework deduced in this thesis can rarely stand alone in analysing the prospect for specific servicizing cases but does provide potentially valuable insight to practitioners.

The rationalistic epistemology and its deductive method implies strict limitations on the kind of knowledge which may be generated. One main limitation is that the research does not generate genuinely new knowledge about the world. Rather, deduction links pools of knowledge in novel ways to reach conclusions which were latently present in the sources (Birkler, 2005, p. 67). This limitation does not imply that deduction is useless. In contrast, deduction may allow us to see the world from a new perspective and open new horizons for practical progress. As the cases should show, the framework deduced in this thesis is indeed useful for describing and predicting the competitive outcomes of servicizing.

Finally, reaching valid conclusions through deduction relies on the initial premises being true. In this thesis, few arguments depend on basic axioms. Rather, they take for granted the findings of existing knowledge and thus stands on the shoulders of previous researchers. If one or more of the constituent theories are wrong, the deduced conclusions may be too. This problem of validity is mitigated by relying only on established and well-perceived theories.

Overall, the ontology, epistemology and methodology of this thesis have implications for the nature, validity and applicability of the findings. Hopefully, the thesis will help inspire further research in the future which could assume another ontology and/or apply different epistemologies and methods to expand our breadth of knowledge and to empower and prepare practitioners to make better decisions.

4 Theory

As made clear in the previous section, the validity and reliability of the conclusion of this thesis rests fundamentally on the validity and reliability of the established theories which are used as well as valid combination and application of these theories. This section is instrumental in affirming the validity and

reliability to the reader. The section contains first a summary of the established theories that are used in this thesis and then the synthesis where the theories are combined in a novel framework used to reach the conclusion to the research question. The theories originate from the academic management literature where they have been through professional reviews and proven their qualities over time. The reason for summarizing them here is partially to educate or remind the reader of the theories, partially to serve as reference point in case the reader should want to confirm the content and quality of the theories but the main reason is to state the interpretation of the theories as they are used in this thesis to allow the reader to verify the consistency of the way the theories are combined and applied.

The first sub-section summarizes the most important arguments made in favour of servicizing and its consequences on business strategy made by a series of proponents for servicizing. The second through fourth sub-sections sum up three of the most important frameworks for understanding competitive advantage, namely microeconomics, competitive forces and the resource-based view (RBV). The fifth sub-section integrates the three frameworks to a coherent theory of competitive advantage which is used to qualify the arguments for servicizing in the sixth sub-section forming the basis for answering the research question.

4.1 Servicizing

There is a trend within business literature suggesting manufacturers to move away from simply producing and selling products with optimal and differentiated price/quality characteristics towards increasingly thinking of the offer to the customer as a service (Oliva & Kallenberg, 2003). The aim of this thesis is to challenge this notion that servicizing is almost unambiguously preferable to merely manufacturing. In this section, we go through the merits of servicizing put forth in prominent academic and business literature as well as the strategic tools and implications it suggests. It will formulate the optimistic view on servicizing which will later be qualified in a contingency framework of competitive advantage.

Oliva and Kallenberg (2003) list three lines of rationales for integrating services into core product offerings usually made by management literature:

1. Economic arguments including significant revenue potential, higher margins on services and more stable income because of resistance to business cycles,
2. A higher demand for services from customers, usually as a result of an increased focus on core competencies resulting in a desire to downscale driving service outsourcing, and
3. Services are more difficult to imitate because they are usually less visible and more labour dependent.

Their article then goes on to state why servicizing within manufacturing organizations have been relatively limited. They argue that manufactures have to overcome three successive hurdles in making the transition: First, they have to believe in the revenue and profit benefits of servicizing. Second, the manufacturer may think that providing services is beyond the scope of their core competencies. Third the firm may deploy the wrong strategy when servicizing.

After establishing the merits and hurdles of servicizing, their study investigates the transition process of 11 German capital equipment manufactures specifically for installed base (IB) services meaning the services that are required for durable manufactured goods to be useful for their entire useful life, e.g. installation and upgrading. They find that the companies successfully servicizing follow the process illustrated in Figure 1.

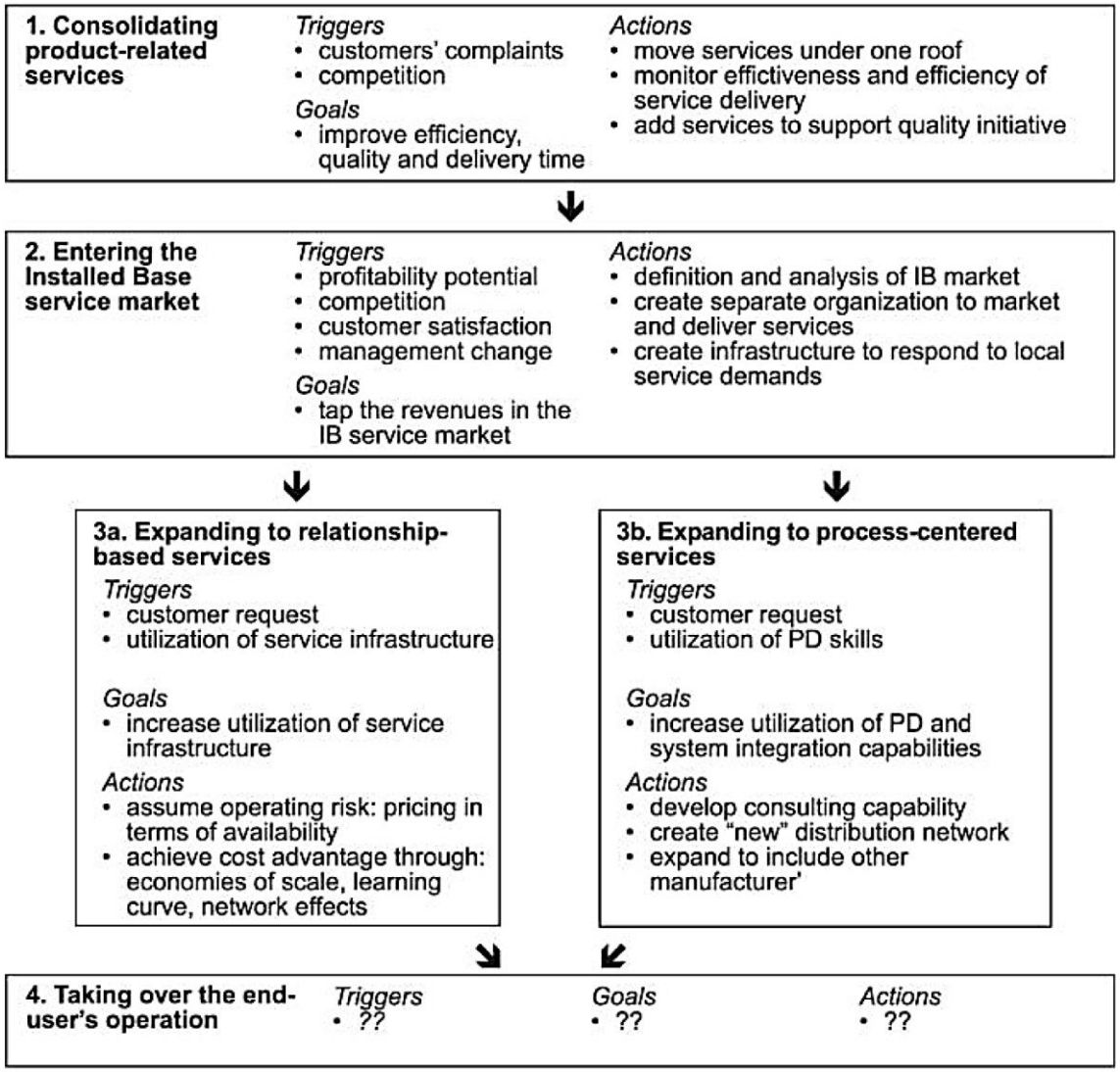

Figure 1: Process model for developing IB service capabilities (Oliva & Kallenberg, 2003, p. 165)

The main strategic learnings from Oliva and Kallenberg (2003) are that successfully servicizing manufacturing firms have servicized through incremental steps of increasingly focussing on services by

organizing all service functions in a single unit and separating it from the manufacturing unit. Servicizing appears to rely on a fundamentally changed business mindset and is unlikely to succeed if services are to be innovated, sold and provided by manufacturers.

In line with the above, Chesbrough (2011) advices companies to change their mindset towards thinking about what they provide as a service even if they actually make products. He has two main arguments for this: The utilization differential and the experience differentiation potential arguments. The utilization differential is the difference between how intensively an asset is used and how intensively it could be used. In his example of transportation, the average consumer-owned car is utilized for approximately 4-5% of the available time. In other words, the car is not fulfilling any purpose around 95% of the time. He contrasts this with a taxi which is potentially in use up to 90% of the time. In the taxi industry, the relatively fixed costs of buying and maintaining a vehicle can thus potentially be spread across much more effective transportation – the end goal in either scenario. Barring other costs and disadvantages, the potential utilization differential of over 85% may provide a compelling business case for the service compared to car ownership.

The utilization differential is a relatively straightforward potential benefit of servicizing many product functions that are currently solved through product ownership. The benefit of decreasing the differential is fundamentally one of increasing efficiency to the potential mutual benefit of the involved parties. Chesbrough's second, less tangible, argument is that services provide experiences to customers and experiences offer a greater potential for differentiation than products do. By simply thinking about an offering as a service instead of a product, the firm has a better potential for innovation to the advantage of both the buyer and the seller.

Rothenberg (2007) makes the case for servicizing much in line with the arguments put forth by Oliva and Kallenberg (2003) but goes into greater detail and provides some examples from three case companies. The advantages she details are:

1. Servicizing helped the case companies attract and retain customers in markets that would otherwise probably decline
2. The move for the companies where generally from products that were becoming commoditized to product/service mixes with higher revenue
3. The companies became able to build closer customer relations, providing three benefits:
    a. The customer is less likely to change supplier
    b. Potential for selling more products and services through knowing customer needs
    c. New customers can be attracted through improved corporate social responsibility

Also in line with Oliva and Kallenberg (2003), Rothenberg (2007) argues that the main hurdle for the manufacturer to overcome is that of cultural change. The challenge is especially pronounced for sales staff that traditionally receives a provision of sales as a significant part of their salary. Such schemes act contrary to one of the main benefits of servicizing, namely the increased efficiency as the supplier and customer become aligned in using less material. The changing relationship may not only be difficult for the supplier but also for the customer. It is common that the staff of the customer will misunderstand the new relationship and resist the supplier's increasing influence on operations.

From the three cases, Rothenberg (2007) categorises six strategies for overcoming the challenges of making the servicizing transition:

1. Building on existing strengths. The change is easier if the firm's employees think of the change as a natural extension of their existing product/service offering rather than a substitution.
2. Redefining the basis for profit in contractual agreements. The relationship must create a win-win situation and an incentive for both parties to increase efficiency.
3. Communicating the new business model. It is important that employees and customers understand the changing relationship. When the mutual benefits are known, resistance is less likely.
4. Changing incentives. The incentives of employees must be aligned with the changed strategy. Sales staff's provision should not be based on the amount of products sold if one of the main goals is to reduce material use. With increased servicizing, compensation should increasingly be based on services.
5. Acquiring new skills. While building on existing strengths is important, most companies will need to get new resources to succeed with the new business model. Her three case companies had to increase their capabilities within customer service, customer understanding and industry-specific process knowledge.
6. Highlighting environmental advantage. Decreasing material consumption is not only increasing efficiency and decreasing costs. Environmental performance is also a potential driver for marketing and customer acquisition and it may place both the supplier and the customer in an advantageous position when legislation and the public impose increasingly strict requirements.

Allmendinger and Lombreglia (2005) argue that the move from selling products to also provide services may not be sufficient in preventing commoditization. Rather, they argue for smart services – services based on awareness and connectivity build into products allowing the smart service provider to act upon information from the smart equipment without having to waste precious resources on unnecessary visits. They provide four reasons for moving to smarter services:

1. They make preemptive strikes based on hard field intelligence possible. For example, you know when a machine is about to break down and can prevent the damage before it happens.
2. Preemptiveness in turn prevents undesirable surprises for customers. Preventing crucial equipment from failing is very valuable for the customer and acting upon the equipment's own data allows the supplier to prevent failure without making superfluous maintenance repairs.
3. Product performance and customer behaviour data provides valuable R&D feedback. The knowledge gained from the smart equipment allows the supplier to improve upon product and service offerings.
4. Customer dependency and long-term customer relationships. Once the supplier has built some amount of knowledge not only about its own product but also about the customer's use of the product, the supplier is able to sell value to the customer beyond what competitors are able to. Increased customer dependency makes the supplier able to price the offer based on value to the customer rather than cost to the supplier.

Allmendinger and Lombreglia (2005) suggest three steps for exploring the business opportunity of smart services. The first is looking at the life cycle of the product as it appears to the customer. The second is to consider the activities that are adjacent to the product. The third is to get perspective on the whole opportunity meaning how the life cycle and adjacent activities could potentially be bundled in a complete solution.

Sawhney, Balasubramanian and Krishnan (2004) introduce another terminology for considering life cycle and adjacent activities in their systematic approach to creating growth with services. The life cycle is framed as the temporal dimension whereas the adjacent activities are conceptualized as spatially separated. By applying the view that the servicizing company can grow either by adding new services to their offering or by reconfiguring the current offering they illustrate the servicizing company's options in the service opportunity matrix depicted in Figure 2.

Temporal expansion means taking the current activity chain connected with the product and expanding it by adding new links to the chain either before, after or in between the existing links. Spatial expansion means adding services to the offering that are part of separate activity chains yet connected to the supplier either through the original product, the suppliers brand or another asset of the supplier that could be of value to the customer. Temporal reconfiguration is equivalent to the IB services investigated by Oliva and Kallenberg (2003) where the product manufacturer seeks to gain revenue by providing a service that is normally the responsibility of the customer and which may or may not traditionally be sourced from a third party. Where temporal reconfiguration is about taking over activities related to the main activity chain of the current offer, spatial reconfiguration is taking over activities in adjacent existing activity chains.

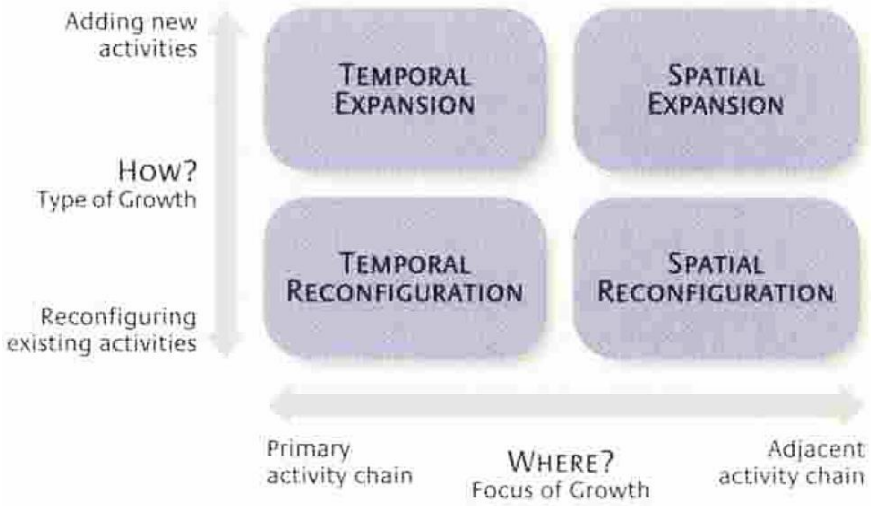

Figure 2: The service opportunity matrix (Sawhney, Balasubramanian, & Krishnan, 2004, p. 36)

4.1.1 Summary

An extensive amount of literature suggests servicizing as a way for manufacturers to escape the commodity trap. This sub-section summarizes the theories above to eliminate duplicates and for ease of reference.

The arguments in favour of servicizing can be categorized, loosely following Oliva and Kallenberg (2003) as:

1. Economic
    a. Revenue potential
    b. Higher margins
    c. Stable income
    d. Increased efficiency through utilization differential, preemptive actions, better capital/labour/consumables mix and/or reduced transaction costs.
2. Market conditions
    a. Increased focus on core competencies leading customers to outsource services
    b. Pressure to lower material use to decrease costs and/or improve environmental performance
3. Competitive
    a. More labour dependent and less visible
    b. Organizational complexity
    c. Improving scope for differentiation and innovation
    d. Improved customer relations, increasing customer dependence
    e. (Smart) Services generate valuable knowledge

These pro-servicizing arguments will be critically assed and qualified in section 4.6 by applying a theory of competitive advantage developed in section 4.5 through the combination of microeconomics, competitive forces and the resource-based view which are the topics of the next sections.

The challenges of servicizing can also be separated into three groups:

1. Cultural
    a. Product-focused culture in R&D, production, sales etc.
    b. Lack of belief in value of services
    c. Resistance from employees – especially provision paid sales staff and product-focused engineers
2. Resource-based
    a. Lack of service skills
    b. Lack of service infrastructure
3. Strategic
    a. Resistance of current service providers and providers of complementary products and services
    b. Resistance from customers

As for how to overcome these challenges, the above authors suggestions can be summed up in two steps:

1. Building the business model
    a. Considering the product's current life cycle/temporal expansion and reconfiguration
    b. Considering adjacent activity chains/spatial expansion and reconfiguration
    c. Exploiting the efficiency potential – environmentally and economically
2. Aligning the organization
    a. Separating services from manufacturing
    b. Building on existing strengths
    c. Changing incrementally
    d. Redefining relationships
    e. Changing incentives
    f. Acquiring needed resources
    g. Communicating clearly

4.2 Microeconomics

Microeconomics is "the study of how individuals and firms make themselves as well off as possible in a world of scarcity and the consequences of those individual decisions for markets and the entire economy." (Perloff, 2012, p. 23). In this thesis, microeconomics is particularly used to describe the economic arguments in favour of servicizing and to explain and combine the competitive forces framework presented in section 4.3 with the resource-based view of section 4.4. The rest of this section will introduce the general microeconomic model of firm profitability adapted to the case of providing services in contrast to the usual focus on producing goods. This is followed by the predictions about markets with perfect competition where sustained competitive advantage is impossible. Finally, two sub-sections are devoted to explaining super-normal rent generation namely monopoly profits and efficiency rents. The section about competitive forces is concerned with sustained competitive advantage as monopoly rents whereas the resource-based view is concerned with efficiency rents all of which is based upon fundamental firm profits.

4.2.1 Firm Profits

The most fundamental function to describe firm profits is:

$$\Pi = R(Q) - C(Q)$$

Where $\prod$ is profit, R(·) is the total revenue function, C(·) is the total cost function and Q is the quantity of products produced and sold (Frank, 2008, p. 339). For the sake of simplicity, it is usual to assume that the firm produces a quantity of a single product, Q, and sells it at a single price, P, in which case:

$$R(Q) = Q \cdot P$$

Which means that:

$$\Pi = Q \cdot P - C(Q)$$

The assumption that Q is both the number of products sold and produced is reasonable when considering products that can be stored practically indefinitely or for which the cost of production is incurred as the product is consumed. However, if the product is perishable or becomes obsolete, the quantity sold may be lower than the quantity produced. In this case, we need to distinguish between the quantity sold, Q_s, and the quantity produced, Q_p, meaning that:

$$\Pi = Q_s \cdot P - C(Q_p) \text{ where } Q_s \leq Q_p$$

In the case of services, it is common that the primary cost driver is the maximum capacity, Q_c, of the system while the actually sold quantity, Q_s, is a secondary cost driver meaning that:

$$\Pi = Q_s \cdot P - C(Q_c, Q_s) \text{ where } Q_s \leq Q_c$$

The implications of this formula is *ceteris paribus* that profits of the service providing firm increase when:

1. The quantity sold increases

2. The price increases
3. The cost function improves, in the sense that the cost of maintaining a given capacity and/or providing a given quantity decreases
4. The difference between maximum capacity and actual quantity decreases

The first two of which increase revenue while the last two decrease costs.

Given normal microeconomic assumptions including competition, profits will tend to move towards the market rate as competition eliminates supernormal rents. In such cases, all companies will earn normal rents in the long run and none can be said to hold competitive advantage. As we will see later, the competitive forces framework and the resource-based view tout that competitive advantage can be created and sustained through strategy. In the following sub-sections, we will go through the two primary types of supernormal rents explained by microeconomic theory, namely monopoly profits and efficiency rents after outlining the normal rent scenario of perfect competition.

4.2.2 Perfect Competition

The general condition for optimal profits is to produce the quantity for which marginal profit is zero. That is where:

$$\frac{d\Pi}{dQ} = 0$$

In other words, the profit maximizing firm produces until the next unit would result in a loss. In the classical model,

$$\Pi = R(Q) - C(Q)$$

where both revenue and costs are reliant on the quantity, the profit maximization problem can be reformulated to marginal cost being equal to marginal revenue:

$$\frac{d\Pi}{d\mathrm{Q}} = \frac{d\mathrm{R(Q)}}{d\mathrm{Q}} - \frac{d\mathrm{C(Q)}}{d\mathrm{Q}} = 0 \Rightarrow \frac{d\mathrm{R(Q)}}{d\mathrm{Q}} = \frac{d\mathrm{C(Q)}}{d\mathrm{Q}}$$

Meaning that at the optimal level, the last produced unit costs the same as it increases revenue.

Given perfect competition, the firm is a price taker meaning that it is not able to increase its prices (Frank, 2008, pp. 337-338). Raising prices in the face of competition would lead all customers to the competitors offering the lower market price eliminating the firm's revenue. In this case, marginal revenue is equal to the market price:

$$\frac{d\mathrm{R(Q)}}{d\mathrm{Q}} = \mathrm{P}$$

Meaning that the firm facing perfect competition should produce until the cost of producing the next unit would exceed the market price.

Producing and selling at this level may in the short run result in economic profit for the firm. However, in the long run, such profits will lure in new companies or entice competitors to expand their production with the effect that the aggregate supply shifts to the right leading the equilibrium price to decrease as the equilibrium quantity increases. Such rightward movement will tend to decrease the equilibrium price until the price is equal to the long-run average cost in which case none of the incumbents generate a profit but where there is no expansionary pressure on production capacity (Frank, 2008, pp. 350-353). In other words, competition eliminates the opportunity to generate supernormal profits.

4.2.3 Monopoly Profits

In the absence of competition, the firm is able to set its own prices either directly or indirectly through limiting the quantity produced. In the extreme case of a perfect monopoly, the monopolist is able to choose the point on the demand curve at which profit is maximized. The condition for profit optimization continues to be that marginal profit is zero meaning that marginal cost equals marginal revenue. However, marginal revenue of the monopolist is not equal to price.

This is due to the traditional downward sloping shape of the demand curve also referred to as the law of demand (Frank, 2008, p. 25; Perloff, 2012, p. 34). When a monopolist is faced with a downward sloping demand curve, an increase in price is met with a decrease in quantity demanded or, conversely, an increase in quantity demanded can only be reached through a decrease in prices. This means that selling an additional quantity ΔQ on top of Q_0 can only be the result of lowering the price by ΔP from P_0. Selling the marginal unit not only increases total revenue by P_0 but it also decreases total revenue as the monopolist has to sell all units $Q_0 + \Delta Q$ at the new lower price $P_0 - \Delta P$. The overall effect is that marginal revenue is:

$$MR_{Q_0} = P_0 - \Delta P - \frac{\Delta P}{\Delta Q} Q_0$$

Which is lower than the new price $P_0 - \Delta P$. The decrease in marginal revenue due to the lower price can be reduced through price discrimination but it is unlikely that the effect can be completely removed through perfect price discrimination (Frank, 2008, pp. 389-397). The result is that unlike for the firm in perfect competition, the monopolist's marginal revenue is lower than the price. At this level, the price may be above the long-run average cost meaning that the monopolist generates a profit. In the absence of competition, there is no rightward pressure on supply from new entrants so the monopolist is able to sustain the profits.

Five factors may enable a firm to become a monopolist (Frank, 2008, pp. 373-376):

1. Exclusive control over important inputs
2. Economies of scale
3. Patents
4. Network economies
5. Government licenses or franchises

Economies of scale and network effects are of particular importance for this thesis, and it is noted that these are "by far the most important of the five factors for explaining monopolies that endure" (Frank, 2008, p. 376). Economies of scale occur when the long-run average cost curve is downward sloping at all feasible levels meaning that it is always cheaper to have a single firm produce the entire output than if multiple firms were to produce the same quantity. Economies of scale are mostly seen when there are large initial or fixed costs and small marginal costs. As we will see, this could be the case for services where maintaining the capacity is often costly but the cost of an additional user is negligible.

Network effects occur when the perceived value of a product for the buyer is increasing with the number of units already sold often referred to as the installed base. A single firm may better serve the market when the value increase of a large installed base is a significant fraction of the total value of the product. For services, such network effects may be especially likely to occur if it includes a peer-to-peer element or in the case of two-sided markets (Eisenmann, Parker, & van Alstyne, 2006).

Perfect competition and monopoly form the two extreme market structures. Either are unlikely to exist in the real world. The key theoretical learnings are that in perfect competition each firm is unable to sustain supernormal rents in the long run while the monopolist is able to sustain such profits. Actual markets are likely to fall somewhere between these two extremes. The extremes and some of the commonly cited names for the market structures in between are shown in Figure 3. In general, the further you are to the right in the figure, the greater is the opportunity to generate monopoly profits. However, the exact market outcome depends on the specific assumptions about the market. For example, a duopoly (where exactly two firms serve the entire market) may not generate any monopoly profits if the Bertrand model of competition is used (Frank, 2008, pp. 429-430).

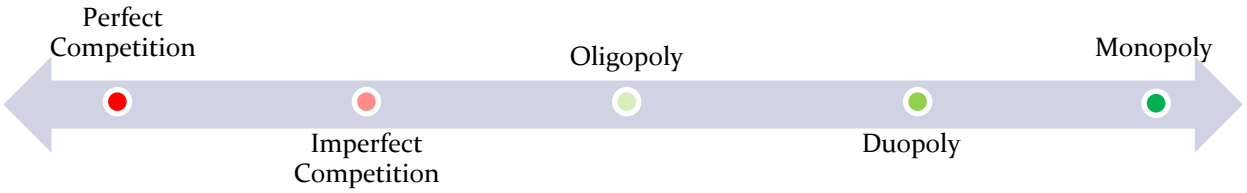

Figure 3: Market structures

4.2.4 Efficiency-, Differential- or Ricardian Rents

Efficiency rents, also referred to as differential rents or Ricardian rents after the classical economist David Ricardo were originally conceived as the "portion of the produce of the earth, which is paid to the landlord for the use of the original and indestructible powers of the soil." (Ricardo, 1817, p. 49). That is, original Ricardian rents are the economic benefits landlords can derive solely from owning land. Ricardo derived that the rent of a particular land site is equal to the produce of the site in excess of the produce of the least productive land in use given equal inputs of labour and capital.

For example, let us assume three grades of land, A, B and C. Grade A land can be cultivated to produce 100 units, B can produce 90 and C can produce 80, all assuming the same cost of producing the stated amounts. With little demand, all production could be carried out on grade A land. If a landlord was to attempt to earn rents on his land, no one would be willing to pay it as the farmers would be able to use other grade A not yet being cultivated. If demand for produce was so large as to require more than all grade A land to be cultivated, landlords would be able to demand rent on their grade A land as the farmer would otherwise have to retort to use grade B land and produce only 90 units. The rents in this scenario would be 10 units for all grade A land and zero on grade B land. Finally, if demand was so large as to outstrip the possible production of all grade A and B land, grade C land would be cultivated and the rent of grade A land would increase to 20 units while grade B land could attract a rent of 10 units.

Ricardian rents are thus the rents flowing to owners of land with a productive capacity above the marginal land currently in use and the rent is exactly the difference in productive capacity between the two. In this thesis, as is customary, the notion of Ricardian rents is expanded from the example of rent on land to include the rents flowing to any asset. In general terms, rents flow to owners of assets that have a productive capacity above the marginally employed asset and the rent will be equal to the difference between the two. In other words, rents flow to owners of assets that are more efficient than the least efficient employed assets and such rents are referred to as efficiency rents. To earn efficiency rents it is therefore necessary that less efficient assets are currently employed. Further, for a firm or individual to collect the rents it is necessary that the asset or its production can be appropriated.

The resource-based view is exploring the mechanisms for generating and extracting efficiency rents through acquisition of efficient assets as we will see in sub-section 4.4. The competitive forces framework described in the next sub-section is an in-depth analysis of when monopoly rents are possible.

4.3 Competitive Forces

The competitive forces framework is one of the dominant frameworks for analysing the competitive advantage of firms and for formulating strategy. It was conceived by Porter (1980) and is embedded within industrial organization economics. In the framework, profits of firms are monopoly rents that flow to companies when competition is imperfect. Maximizing profits is a question of finding an industry with favourable conditions and subsequently altering or protecting the conditions. Firm strategy is largely a question of finding the right market(s) and navigating the market forces. The firm itself is of less strategic importance except for affecting the competitive forces for example by reaching economies of scale through capital investments effectively raising entry barriers.

The monopoly rents that make up supernormal profits flow to companies in industries where the competitive forces are weak. The stronger the competitive forces, the closer the industry is to perfect competition and in perfect competition rents will be equal to the normal rate in equilibrium. The five competitive forces are:

1. Threat of entry
2. Power of suppliers
3. Power of buyers
4. Threat of substitutes
5. Rivalry among existing competitors

Each competitive force will be detailed in the following sub-sections based on Porter (2008).

4.3.1 Threat of Entry

If a particular industry shows supernormal returns, players from outside that industry are attracted to that industry in order to gain part of the returns. In the absence of entry barriers such entry would continue until returns are normal. Merely the threat of such entry is enough to induce extant industry players to compete to the extent that supernormal rents are eliminated and entries discouraged. Thus, entry need not actually take place in order for the monopoly rents to disappear. Barriers to entry reduce this competitive pressure through eliminating some or all of the effective monopoly returns available to entrants compared to incumbents. Porter (2008, pp. 81-82) recognizes seven major sources of barriers to entry:

1. Supply-side economies of scale
2. Demand-side benefits of scale
3. Customer switching costs
4. Capital requirements
5. Incumbency advantages independent of size
6. Unequal access to distribution channels

7. Restrictive government policy

Further, expected retaliation from incumbents shape the actions of potential entrants. Entry is discouraged if potential entrants believe incumbents will retaliate forcefully.

For incumbents under the threat of entry, erecting barriers to entry and signalling forceful retaliation is of strategic importance. Potential entrants have to consider the costs of surpassing the barriers and the implications of retaliation. A common way for entrepreneurs to get around the barriers are to attack from a new angle where the barriers are lower or non-existent while large corporations will sometimes surpass the barriers through sheer brute force and leveraging existing resources and complementary markets.

4.3.2 Power of Suppliers

Even if an industry is monopolistic on the revenue side, profits may be eroded if suppliers are able to capture large parts of the value on the cost side. Whether suppliers are able to do this depends on the relative bargaining power of the suppliers compared to the buyers. According to Porter (2008, pp. 82-83) suppliers are powerful if:

1. They are more concentrated than the industry they sell to
2. They do not depend heavily on the buying industry
3. Industry participants face high switching costs compared to the suppliers
4. Products of the suppliers are highly differentiated
5. Their products are not easily substituted
6. They can credibly threaten with integrating into the buying industry

4.3.3 Power of Buyers

Similar to the power of suppliers an otherwise attractive industry may not earn monopoly rents to its participants if the buyers are able to capture most of the value. This may happen when buyers are in a superior position to bargain with the industry players and can thus demand better cost/quality ratios to the extent where supernormal rents are eliminated. The same principles apply as for the power of suppliers in reverse but in addition, their effect is especially pronounced when the buyers are price sensitive which is likely to be the case if (Porter, 2008, pp. 83-84):

1. The product from the industry makes up a large fraction of the buyers cost structure
2. The buyer is under pressure on profitability or cash flows
3. The product is of little importance to the buyer’s output
4. The product does not play a significant part in other costs of the buyer

Intermediate customers such as assemblers or distributors can affect the power of buyers if they are able to influence the above parameters directly or if they are able to indirectly shape the end users' decisions.

4.3.4 Threat of Substitution

The availability and costs of substitutes cap the maximum price an industry can demand for its products. Similar to the threat of entry merely the threat of substitution is enough to curb monopoly rents of a market. Substitutes can be difficult to define but they are almost universally present to various extents. Keeping track of substitutes and especially potential substitutes can prove difficult or impossible as seemingly unrelated industries may provide substitutes with innovation. Substitutes may also originate from societal or social changes which can be both sudden and difficult to predict. The threat of substitution is high when (Porter, 2008, pp. 84-85):

1. Substitutes offer good price/performance rates compared to the industry product
2. Switching costs to the substitute are low for the buyers

4.3.5 Rivalry Among Existing Competitors

Similar to the threat of entry, returns move towards the normal rate as incumbents compete against each other within an industry. The effect on profitability depends on both the intensity and the basis of competition. Intensity of rivalry is greater when (Porter, 2008, p. 85):

1. Competitors are numerous and similar
2. Industry growth is slow
3. Exit barriers are high
4. Rivals are committed

Intensive rivalry is especially destructive when it is based on price which is likely to be the case when (Porter, 2008, pp. 85-86):

1. Competing products are similar and switching costs are low
2. Fixed costs are high and marginal costs are low
3. Capacity is expanded in large increments
4. The product is perishable or liable to become obsolete

Competition on other factors than price is less likely to erode profitability as it often leads to increased value for the customer and lower threat of substitution. When different rivals compete on different dimensions, competition may even be a net gain to the industry as more customers become likely to find an attractive offer.

4.4 The Resource-Based- and the Relational View

While the competitive forces framework is concerned with the availability and appropriability of monopoly rents, this section will explain the resource-based view (RBV) which is focused on gathering efficiency rents through the appropriability of Ricardian rents from efficient assets referred to as resources. The first sub-section is about the original RBV considering firm-specific resources' ability to generate efficiency rents while the second sub-section covers the relational view where interorganizational resources may generate relational rents for a pair or network of entities.

4.4.1 The Resource-Based View

The RBV is a model of business strategy that emphasizes that companies are profitable because they have marked advantages on cost and/or quality (Teece, Pisano, & Shuen, 1997). Such advantages allow the asset holders to generate efficiency rents. If efficiency rents can be upheld in the face of competitive imitation, the firm is said to possess sustainable competitive advantage. Barney (1991, p. 102) defines the sustainability of competitive advantage:

> *"[W]hether or not a competitive advantage is sustained depends upon the possibility of competitive duplication. […] [A] competitive advantage is sustained only if it continues to exist after efforts to duplicate that advantage have ceased. In this sense, this definition of sustained competitive advantage is an equilibrium definition"*

The definition is applicable for static situations and acknowledges that sustained competitive advantage can be eroded by discontinuous changes in the market structure, so-called "Schumpeterian Shocks" which may invalidate previously valuable resources or make hitherto worthless resources suddenly valuable.

Sustained competitive advantages originate from firm-specific resources that are valuable, rare, inimitable and non-substitutable (Barney, 1991) also referred to as VRIN resources. Each of the four properties are necessary for a resource to be able to provide sustained competitive advantage but each alone is not sufficient. If a resource is not valuable, it does not provide any advantage to the company. If a resource is not rare, competitors have access to the resource and competition will eliminate the potential for efficiency rents. If a resource is imitable, competitors can acquire the resource in which case competition will again eliminate rents. Finally, if competitors can substitute the resource by acquiring or applying other resources, competition will once again run its course and eliminate rents.

It is implied that VRIN resources cannot be traded in efficient markets. Rather, they must be accumulated over a period. Further, there must be some characteristic of the resource which makes it costlier or time consuming for potential competitors to imitate a firm's asset stock. Such characteristics are called isolating

mechanisms. They are: time compression diseconomies, asset mass efficiencies, interconnectedness of asset stocks, asset erosion and causal ambiguity (Dierickx & Cool, 1998).

Time compression diseconomies is the notion that the accumulation of a resource shows diminishing returns when the input of time is held constant. In other words, obtaining a similar resource in half the time requires more than double the input of other factors and is thus more expensive. Late imitators will have to pay a higher cost to obtain a resource than the first-mover.

Asset mass efficiencies are when resource accumulation show increasing returns to scale based on the existing resource stock. In cases where the accumulation of further resources depends on already possessing some, and especially when a critical mass is needed, the imitator might be hard-pressed to catch up. Interconnectedness of asset stocks is when accumulation of a stock is dependent on the level of other stocks of resources possessed. An imitator may have difficulties accumulating a resource if they have not already obtained the resources necessary to generate or utilize the interconnected resource. Asset mass efficiencies and interconnectedness of assets stocks are commonly observed as learning curves.

Assets erode over time if they are not maintained. Fast erosion lowers the asymmetry between the current holder of resources and the potential imitator. Asset mass efficiencies or interconnectedness may, however, make the current holder able to maintain a given asset stock more efficiently than an imitator. Otherwise, high asset erosion should tend to limit the inimitability of a resource.

The previous mechanisms influence resource accumulation when rational actors have perfect knowledge. The last mechanism, causal ambiguity, is a barrier to imitation as potential imitators are not able to discern either which resource is important or how it is accumulated. In this case, the potential imitator does not know which resource to accumulate or how to do so. It should be noted that causal ambiguity also affects the resource holder often making it difficult to explain or replicate its own success.

4.4.2 The Relational View

An important expansion to the RBV is the relational view pioneered by Dyer and Singh (1998). They posit that while both the competitive forces framework and the traditional RBV have expanded our understanding of competitive advantage they have also failed to describe how interfirm resources may be the cause of interorganizational competitive advantage. They identify the following four sources of super-normal interorganizational profits:

1. Relation-specific investments
2. Interfirm knowledge-sharing routines

3. Complementary resource endowments
4. Effective governance

Relation-specific assets refer to assets which have a higher value when entered in a specific relation than when employed independently. Assets can be relation-specific through location such that the asset holds particular value because it is placed close to other assets in the relationship which may reduce transportation and inventory costs. Second, they can be physically specific meaning that the asset is customized to fit with outputs or other assets in the relationship which may result in increased quality or differentiation. Finally, human assets may be specific such as to allow for improved communication, resulting in fewer costly errors. The potential for investing in relation-specific assets is likely to depend on the length of safeguarding which limits opportunism and the total volume of trade between the relationship participants (Dyer & Singh, 1998, pp. 662-664).

Interfirm knowledge-sharing routines offer the potential for relational rents through relationship partners such as buyers and suppliers inspiring innovation in relationship partners for mutual benefits. The extent of knowledge-sharing is likely to depend on the ability of each partner to absorb knowledge from other partners and on the alignment of partners to increase transparency and reduce free-riding (Dyer & Singh, 1998, pp. 664-666).

Relational rents flow from complementary resource endowments when the combination of existing idiosyncratic resources of different companies generates greater profits than the resources do individually. Searching for synergies between interorganizational asset endowments is likely to be costly. The ability of firms to generate these kinds of relational rents depend on their ability to search for such synergies which is predicted to be the result of prior alliance experience, investments in internal searching capabilities and the firms' position in information-rich networks. Further, the ability of relationships to generate interorganizational rents depend on the compatibility between the partners including systems, processes and cultures (Dyer & Singh, 1998, pp. 666-668).

Effective governance is both a potential source of relational rents on its own such as through decreasing independent transaction costs but it is also a modifying factor to all of the other sources of relational rents through eliminating adverse effects such as opportunism and free-riding. The potential for rents is increased when governance structures are aligned as to minimize transaction costs and maximize value creation and this will generally be achieved more efficiently through self-enforcing safeguards rather than third-party ones and through informal rather than formal self-enforcing safeguards (Dyer & Singh, 1998, pp. 669-671).

In addition to the traditional isolating mechanisms of causal ambiguity and time compression diseconomies, Dyer and Singh (1998, pp. 671-673) identify four mechanisms that may cause relational rents to be difficult to replicate by other. The mechanisms which specifically protect relational rents are: Interoganizational asset interconnectedness, partner scarcity, resource indivisibility and institutional environment.

Interorganizational asset interconnectedness is similar to the isolating mechanism of interconnectedness of asset stocks. It is protection from competitive replication through cumulative incremental interorganizational investments in relation-specific assets. The mechanism works on the basis that present and future investments rest on prior investments and is thus a kind of interorganizational path-dependency. Potential competitors seeking to replicate the relational rents will find it difficult or impossible as they do not possess the prerequisite interorganizational basis.

Partner scarcity is as isolating mechanism when the lack of suitable partners prevents potential imitators from replicating the valuable partnership. This mechanism would generally tend to benefit first-movers to the detriment of late entrants as the supply of partners may have dried up by the time the late entrant would like to enter a partnership.

Some relational rent generating resources are the result of a partnership between different entities but the resources may not be separately attributable to the individual entities. Such indivisibility limits the redeployment of resources outside of the partnership and is therefore causing the resources to be idiosyncratic.

Finally, relational rents may be difficult to replicate due to idiosyncratic institutional environments. Some cultures or legal systems may facilitate the creation of some partnerships better than others. Rent generating partnerships in such cultures or systems are protected from potential relational imitation by entities in other, less facilitating environments.

Dyer and Singh (1998, p. 674) have made a comparison between the competitive forces framework (referred to as the industry structure view), the traditional RBV and the relational view which is brought in Table 1 for convenient reference and to sum up the strategic frameworks described above.

Dimensions	Industry Structure View	Resource-Based View	Relational View
Unit of analysis	Industry	Firm	Pair or network of firms
Primary sources of supernormal profit returns	Relative bargaining power Collusion	Scarce physical resources (e.g., land, raw material inputs) Human resources/know-how (e.g., managerial talent) Technological resources (e.g., process technology) Financial resources Intangible resources (e.g., reputation)	Relation-specific investments Interfirm knowledge-sharing routines Complementary resource endowments Effective governance
Mechanisms that preserve profits	Industry barriers to entry • Government regulations • Production economies/ sunk costs	Firm-level barriers to imitation • Resource scarcity/property rights • Causal ambiguity • Time compression diseconomies • Asset stock interconnectedness	Dyadic/network barriers to imitation • Causal ambiguity • Time compression diseconomies • Interorganizational asset stock interconnectedness • Partner scarcity • Resource indivisibility • Institutional environment
Ownership/control of rent-generating process/resources	Collective (with competitors)	Individual firm	Collective (with trading partners)

Table 1: Comparing the competitive forces framework, the RBV and the relational view (Dyer & Singh, 1998, p. 674)

4.5 Generic Advantages of Servicizing

This section integrates the theories outlined above to form a coherent framework that allows for strategic analysis of servicizing. The framework provides a way to estimate whether a particular company will be able to enjoy sustained competitive advantage through servicizing or whether the service is predicted to eventually earn market rents or even sub-normal rents.

4.5.1 Combining Competitive Forces with the RBV

The competitive forces framework outlined in section 4.3 and the RBV described in section 4.4 will be combined around the microeconomic profit function of the firm from section 4.2 to form a coherent framework of sustained competitive advantage. This framework will help us identifying the potential advantages and disadvantages of servicizing.

Table 1 above showed some of the key differences between the strategic frameworks presented above. The frameworks are concerned with different strategic issues but they are not mutually exclusive (Foss, 1997, p. 356). The following integration utilizes the different features to form a coherent framework that allows for deeper analysis than each of them used individually does.

In section 4.2.1 we found that the overall profit of a firm is total revenue less the total cost as described by this formula:

$$\Pi = Q_s \cdot P - C(Q_c, Q_s) \text{ where } Q_s \leq Q_c$$

Which implicates that profit increases when:

1. The quantity sold increases
2. The price increases
3. The cost function improves, in the sense that the cost of maintaining a given capacity and/or providing a given quantity decreases
4. The difference between maximum capacity and actual quantity decreases

The first two of which increase revenue while the last two decrease costs. Four of the five competitive forces concern the revenue part of the profit function while the bargaining power of suppliers is concerned with the cost function. According to Barney (1991) resources must be valuable, rare, imperfectly imitable and non-substitutable (VRIN) to be capable of providing sustained competitive advantage. A resource is valuable when it somehow affects the profit function positively. This may be the case either if it (1) improves revenue and/or (2) decreases costs. Figure 4 illustrates how competitive forces affect the profit function while the red arrows in illustrate the effects of valuable resources.

Resources can be categorized into two groups:

a) Efficiency-enhancing
b) Industry-enhancing
    I. Conferring industry-wide benefits when owned by a subset of participants
    II. Conferring industry-wide benefits when owned by all participants

Efficiency-enhancing resources can confer sustained competitive advantage to the owner of the resource only when it provides a relative advantage meaning that the resource must be VRIN (Barney, 1991). An example could be a unique method of production that lowers cost. If all competitors are able to replicate the effect, industry costs would fall and competition would eliminate the advantage gained.

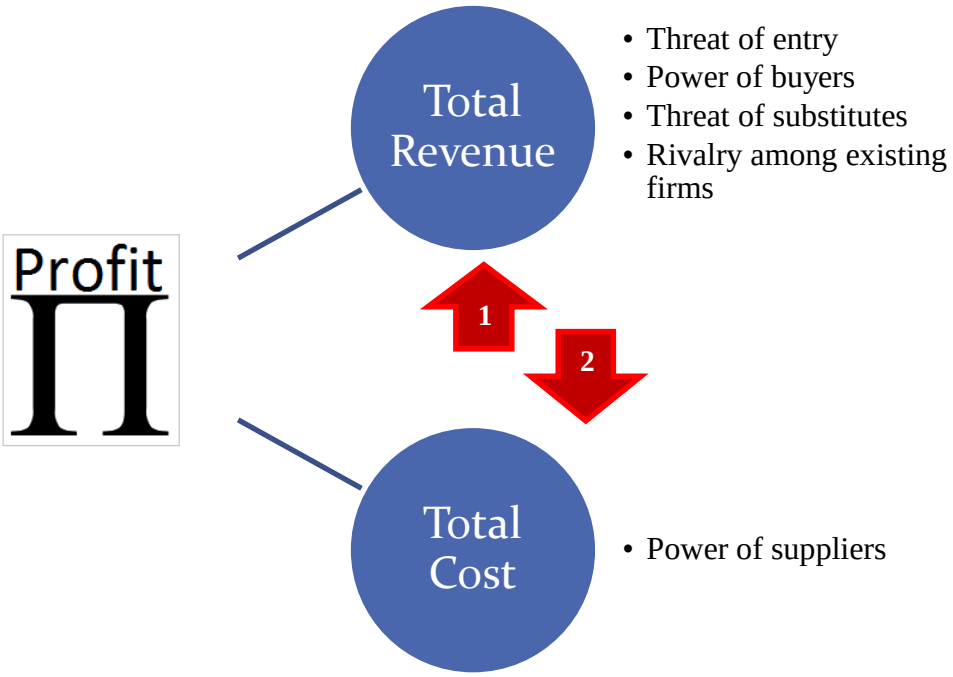

Figure 4: Resources, competitive forces and the profit function.

Industry-enhancing resources improve the overall attractiveness of the industry when owned by (I) some or (II) all participants. An example of (I) could be an army of lawyers owned by a single company deterring entry into the industry effectively protecting the whole industry while (II) could be elaborate distribution networks raising barriers to entry for potential newcomers. Industry-enhancing resources need not be rare, imperfectly imitable or non-substitutable. Relational resources can be both efficiency-enhancing to only the partnership participants or be industry-enhancing. The latter is especially likely if the partnership spans an entire industry. The existence of industry-enhancing resources explains so-called co-opetition between companies where competitors simultaneously compete and co-operate (Nalebuff & Brandenburger, 1997). They compete using efficiency-enhancing resources and co-operate to create industry-enhancing resources.

It is worth noting that a resource may change category as an industry evolves. The example of a cost-reducing method of production may be efficiency-enhancing when not universally adopted (if it fulfils all four of Barney's conditions) but may turn into an industry-enhancing resource if owned by all industry participants as it lowers product cost increasing the number of potential buyers, raising barriers to entry and reducing the pressure of substitution.

A simple way to visualize a company's competitive situation is through using the Market-Position Matrix (MPM) shown in Figure 5.

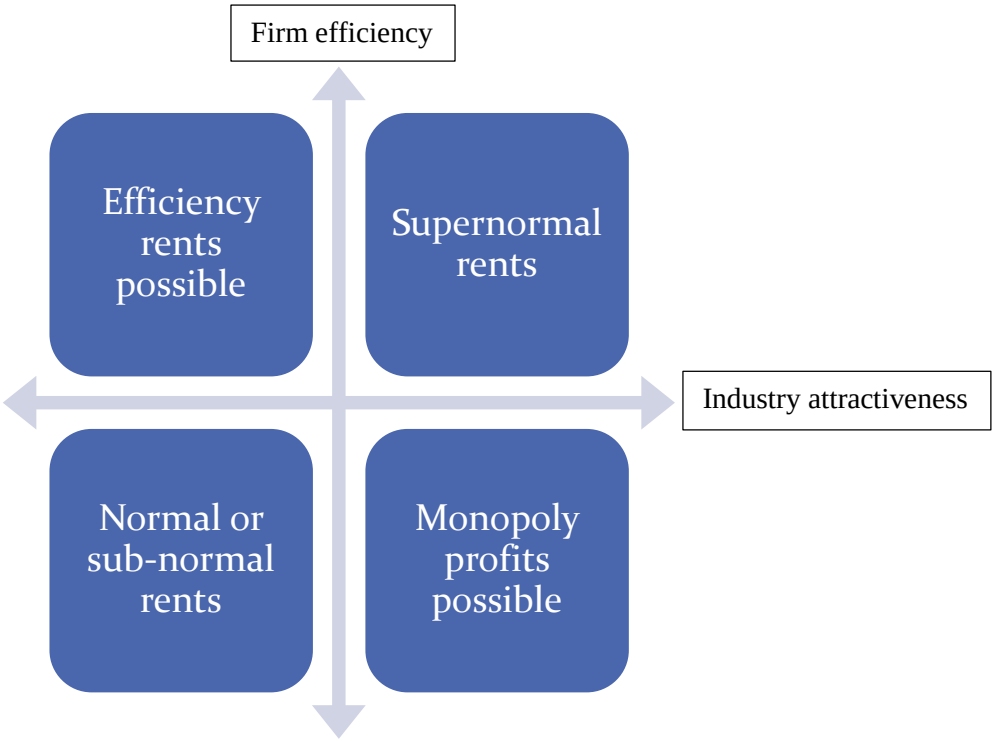

Figure 5: The Market-Position Matrix (MPM)

In the MPM, the horizontal position is the aggregate of the competitive forces including industry-enhancing resources while the vertical position is determined by the relative endowment of efficiency-enhancing resources of the company in question compared to its competitors. Profits will tend to increase as a company moves Northeast. Southwest movements should erode profits leading to commoditization. Northwest and Southeast movements have ambiguous effects on profitability.

A company may be forced or compelled to servicize for reasons that do not provide sustained competitive advantage. This could be the case if servicizing may lead to short-run profits without providing sustained benefits or if servicizing is or becomes a requirement for market participation. In the second case servicizing will not lead to supernormal rents but may shield the servicizer from making a loss. For example, adopting a new non-VRIN process which lowers production cost allows the innovator to earn a profit until its competitors imitate the innovation and compete the efficiency gain away to the benefit of buyers. The innovative process is now a requirement for competitive participation but does not lead to persistent supernormal rents while early adopters earned temporary profits. Effects that facilitate short-run profits or are requirements for participation are enablers of servicizing.

The above synthesis of the competitive forces framework and the RBV allows us to formulate the generic effects which may make servicizing able to generate competitive advantage:

0) Enablers – do not provide sustained competitive advantage:

   a) Servicizing opens for short-run profits
   b) Servicizing is a requirement for industry participation
1) Competitive forces – tend to move the industry to the East in the MPM:
   a) Servicizing alters the industry, weakening the competitive forces
2) Industry-enhancing resources – tend to provide 1a benefits:
   a) Servicizing generates industry-enhancing resources
   b) Servicizing utilizes existing industry-enhancing resources
3) Competitive position – tend to move the company North in the MPM:
   a) Servicizing generates VRIN resources for the servicizer
   b) Servicizing relies on the servicizer's VRIN resources

For example, servicizing may fundamentally change market conditions by reducing the bargaining power of buyers. This would be an example of an 1a effect increasing the potential for Porterian monopoly rents. An example of a 2a effect would be that servicizing allows the industry participants to learn more about their customers over time leading to 1a effects such as customer lock-in. An example of 2b would be if servicizing allowed industry participants to use existing resources in new ways which could decrease the attractiveness of substitutes thus driving 1a effects. Servicizing leading to first-mover advantages such as learning curves or network effects would be an example of 3a. Correspondingly, 3b would be if servicizing allows the servicizer to utilize existing resources that are rare, inimitable and non-substitutable in a valuable way. 3a and 3b effects tend to cause the servicizer to improve its position compared to its competitors.

An example of an enabling 0a effect could be servicizing resulting in greater efficiency granting the servicizer a temporary advantage until its competitors duplicate the strategy. Over time, such effects may turn into 0b effects as market participants either servicize or fall to their comparatively more efficient competitors.

Servicizing may bring about multiple effects at once and may entail opposing effects tending to counteract profit-enhancing effects. From a management perspective, sound strategic action would include evaluating what effects servicizing would cause and how the firm is positioned to take advantage of potential 3b effects. When servicizing, strategic decision-makers should consider how the positive effects are maximized and the negative effects held to a minimum through means such as obtaining key resources and locating correctly within the industry.

The above discussion is an abstract framework for predicting the effects of servicizing on a company's competitive advantage. The following sub-section will go through the concrete arguments for servicizing

brought about by the pro-service literature from section 4.1 and categorize them according to the generic effects.

4.6 Revising the Advantages of Servicizing

In section 4.1.1 we found that the arguments for servicizing can be categorized into economic, market condition and competitive. With the knowledge gained from microeconomics, the competitive forces framework and the resource-based view we will now go through each of the specific servicizing advantages to see how they fit the generic strategic models.

4.6.1 Economic Advantages

4.6.1.1 Revenue Potential

Revenue potential is an 0a enabler of servicizing rather than a cause for sustained competitive advantage. Porter (2008, p. 85) has noted that growth in a market may limit the intensity of rivalry among incumbents. Thus, revenue potential may indicate industry attractiveness. Yet, high growth is unlikely to last forever meaning that revenue potential is at best weakening competitive forces temporarily.

4.6.1.2 Higher Margins

Initial high margins may lure companies to servicize and thus act as 0a enablers of servicizing. Persistent high margins must be the result of competitive advantage rather than being a cause for it.

4.6.1.3 Income Stability and Predictability

Ceteris paribus, stable and predictable income is more attractive than volatile and unpredictable income as risk carries a premium in most markets (Frank, 2008, pp. 511-512). Thus, more stable and predictable income is equal to an increase in effective income and is therefore equivalent to the revenue potential argument in section 4.6.1.1. Similarly, relatively stable and predictable margins and earnings are equivalent to higher margins as discussed in section 4.6.1.2. In either case, stability and predictability is an 0a enabler of servicizing. Finally, stable and predictable demand may be a cause for efficiency as the firm is better to plan ahead, make timely investments and utilize its capacity more efficiently. The effect of efficiency potential on competitive advantage is covered in the next sub-section.

4.6.1.4 Efficiency Potential

Apart from the potential efficiency gains from more stable and predictable demand, the servicizing literature suggest several distinct possible sources of efficiency gains. One is the utilization differential. Another is that

(smarter) services allow for more efficient service provision through for example smarter maintenance. A third reason is that services may allow for more a more efficient mix between lifetime capital, labour and consumable use. Finally, servicizing may align buyer and seller enabling the more efficient mix or reducing transaction costs related to opportunism.

The effect of efficiency gains on a firms' sustained competitive advantage depends in part on whether the gains originate from existing VRIN resources and in part on the competitive forces at work in the market. If the efficiency gain is the result of VRIN resources, the servicizer gains a 3b advantage compared to its competitors. If the resources required to improve efficiency are widely spread, easily imitable and/or substitutable, the efficiency gain may decrease the pressure of substitutes possibly resulting in 1a effects where the market becomes more attractive. Such an effect will only arise if substitution is currently the limiting force, otherwise, the other four forces will compete the gain away such that the efficiency gain becomes a 0b prerequisite for being in the market. Until this happens, temporary efficiency gains may act as 0a enablers inducing a firm to servicize in order to reap short-term profits. The effects on competitive advantage given various contingencies are shown in Table 2.

	Other competitive forces dominate	Substitution is the dominating force
Depends on VRIN resources	Servicizer gains competitive position compared to competitors (a 3b effect)	Servicizer gains competitive position compared to competitors (3b) and substitutes (1a)
Does not depend on VRIN resources	Servicizing becomes the industry standard (0b). Efficiency gains are captured by buyers, suppliers and/or entrants but the servicizer may reap temporary benefits (0a)	The competitive pressure from substitutes on the market is lessened (1a) and the servicizer may reap temporary benefits (0a)

Table 2: Competitive outcome of efficiency gains

4.6.2 Market Conditions

4.6.2.1 Increased Outsourcing Because of Core Competence Focus

Increased demand for services due to managerial trends of focussing on core competencies is a driver for revenue potential discussed in 4.6.1.1.

4.6.2.2 Pressure to Reduce Material Consumption

The pressure to reduce material consumption is twofold. One argument is that it is needed to reduce costs, the other is that it is required to improve the environmental performance of the company and/or its buyers.

Material consumption reduction resulting in reduced cost is an example of an economic efficiency gain as discussed in section 4.6.1.4. Alternatively, servicizing may improve environmental performance without directly resulting in economic benefits. This could be the result if capital or consumables are replaced by labour which may reduce the environmental footprint without reducing costs.

Better environmental performance may serve a range of purposes. One is the branding value which may be used as part of the marketing strategy or for attracting or keeping employees and investors. In this case, environmental performance is equivalent to a somewhat hidden efficiency gain increasing the value or lowering the effective cost of the end-product. Another reason for reducing the environmental footprint may be the compliance or anticipation of stricter rules or requirements from the public. Compliance may be a 0b effect – a condition for staying in the market. Anticipating and complying with rules in advance may be more efficient than waiting and reacting. Advance compliance may thus provide the servicizer with an efficiency advantage which is likely to be temporary and would thus be a 0a effect. Strict rules may impact the competitive forces if they tend to increase barriers to entry or reduce possible substitution in which case they might result in 1a effects where the market becomes more attractive.

4.6.3 Competitive

4.6.3.1 Labour Dependent and Less Visible

The proponents of servicizing argue that services are less visible and more labour-dependent and thus harder to imitate (Oliva & Kallenberg, 2003). This suggests that resources required for delivering services should be more inimitable and thus more likely to be VRIN resources able to provide sustained competitive advantage through 3b effects. This is in line with the causal ambiguity isolating mechanism. It is a requirement that the resources are also valuable, rare and non-substitutable for this argument to be effective.

4.6.3.2 Organizational Complexity

Another reason that servicized offers may be harder to imitate is that they require different forms or extents of organization. Most of the pro-servicizing authors noted that making the service transition is especially difficult because the manufacturer is forced to restructure, rethink its compensation scheme and implement a new culture. Such transitions are not easy and it is not given that competitors will be able to transform successfully. Servicizing will often succeed only if hitherto separate departments or functional groups collaborate or if the internal hierarchy is changed.

A company being able to transform its organization as required to servicize while its competitors are not would provide the company with a VRIN resource resulting in 3b effects from which the servicizer can

capture efficiency rents. If competitors are equally able to transform or if they find a way of servicizing without the transformation or if new entrants are able to imitate the servicizer's organization, the gain from increased organizational complexity does not conform to the VRIN requirement and servicizing merely results in temporary 0a effects.

This argument seems to be a specific instance of causal ambiguity. It may be difficult for imitators to see how the organization and culture facilitate servicizing or how to replicate these features. A problem is that ambiguity also makes it difficult for the initial servicizer to build the resource.

4.6.3.3 Differentiation and Innovation

One of Chesbrough's (2011) key arguments for adopting a service mindset is that it allows for greater differentiation and innovation. The innovation argument is essentially the same as the increased revenue argument: Through innovation, new markets may be discovered or created. These markets may open for generating extra revenue. As discussed in 4.6.1.1, extra revenue cannot in itself result in sustained competitive advantage. Innovation may also increase efficiency through for example process innovation. The potential of efficiency to be a source of sustained competitive advantage is discussed in 4.6.1.4.

According to Porter (2008), it is preferable that rivals compete by differentiating rather than competing on the same dimension – especially it is in the interest of incumbents that competition is not price-based. Innovation may lead to differentiation which reduces the rivalry among incumbents and limits buyers' bargaining power. Innovation from servicizing may therefore confer 2a advantages to the market of the servicizer to the extent that it results in a more differentiated range of offers.

4.6.3.4 Customer Relations

By servicizing, the relation to the buyer often goes from being one of relatively few discreet transactions following tough negotiations to one with a nearly continuous flow of transactions and interactions without explicit boundaries. Such relationships may bring about efficiency effects through lower transaction costs and improved solutions as detailed in 4.6.1.4. Further, expanded customer relations may have a value in itself. A deep relationship is potentially an effective way of increasing customer switching costs which should tend to decrease the bargaining power of buyers and the risk of intense price competition between rivals (Porter, 2008, pp. 83-85). These 2b effects tend to improve the attractiveness of the market.

Tight customer relations can also be an important resource for the individual firm allowing it to gain an edge on its competitors. This would be the case if the company has relations with substantial buyers which makes the company able to operate on a more efficient scale and to move quickly along the learning curve. The

potential servicizer is thus more likely to benefit from servicizing if it has a favourable position to capture key buyers in long-term relationships that rivals will have a hard time challenging. As such, 3b effects may be realized if the company has an advantage in locking-in customers. Finally, deeper customer relations may lead to increased knowledge generation which is the topic of the next sub-section. In any case, effects from customer relations are most appropriately analysed using the relational view and may be of mutual benefit.

4.6.3.5 Tacit Knowledge

Examples of tacit knowledge required for and/or generated through servicizing includes greater awareness of the buyers' situations, the ability to customize offerings to the individual buyer, maintenance capabilities and data about usage and utilization. Tacit knowledge is often well isolated by the mechanism of causal ambiguity. This precious trait is often also what makes tacit knowledge difficult to build, acquire and manage.

The potential servicizer must carefully consider whether servicizing requires or generates tacit knowledge. If successful servicizing depends crucially on resources that are difficult to acquire it must make a plan for how they are acquired. If servicizing is likely to generate tacit knowledge, the servicizer should consider how it can profit from this knowledge down the road. If servicizing both requires and generates tacit knowledge, servicizing is likely to result in a winner-takes-it-all market with the first successful servicizer gaining a favourable competitive position due to the learning curve. Of particular importance is the focal firm's initial endowment of relevant resources compared to its competitors. If the firm has an advantage in the servicized market from the start its competitors are fighting an uphill battle and victory is probable. When competitors possess the same knowledge or are able to imitate or substitute it, tacit knowledge application or generation is unlikely to confer the servicizer with sustained competitive advantage. Yet, it may result in short term profits and it may make the market larger or more efficient with the overall effect of making the market more attractive as discussed in section 4.6.1.4. Key strategic considerations and likely competitive outcomes are shown in Table 3.

	Does not require tacit knowledge	Requires tacit knowledge
Generates valuable tacit knowledge	Can the knowledge be applied elsewhere? Servicizing may improve the servicizer's position in other markets leading to 3b effects in those markets.	How is the focal firm's relative endowment of necessary tacit knowledge? Winner-takes-it-all market. The firm with superior initial endowments including first-mover-advantages is likely to win through cumulative 3a and 3b effects.
Does not generate valuable tacit knowledge	Does servicizing add other value or competitive advantages? Tacit knowledge will not improve the competitive advantage of the servicizer by itself.	Are competitors able to obtain the tacit knowledge over time? Servicizing is likely to result in short-run 0a profits to the well-resourced firm. If tacit knowledge cannot be imitated or substituted by competitors, the servicizer may sustain 3b advantages.
Green text = Key strategic consideration of the potential servicizer. Blue text = Likely competitive outcome of servicizing.		

Table 3: Dynamics of tacit knowledge

4.6.4 Specific Arguments for Servicizing

As we have just seen, the arguments for servicizing summarized in section 4.1.1 are compatible with the theories of competitive advantage in different ways and to various extents. This section provides an overview of the arguments as viewed through the lens of the analytical framework synthesized in section 4.5.

By applying the joint framework of microeconomics, competitive forces and the resource-based view we can now make a different categorization with some arguments driving others and with some potentially causing sustained competitive advantage while other merely provide temporary benefits:

- Market Arguments
    - Revenue potential (0a)
        - Income stability and predictability
        - Outsourcing
        - Market innovation
    - Higher margins (0a or an effect of other conditions)
    - Differentiation (2a)
- Efficiency Arguments (0a, 0b, 1a and/or 3b depending on source of efficiency and dominant competitive forces)
    - Utilization differential

    - Demand stability and predictability
    - More efficient capital/labour/consumables mix
        - Reduce material consumption
    - Process innovation
    - Customer relations
- Resource Arguments
    - Labour dependent and less visible (3b)
    - Organizational complexity (0a or 3b depending on competitors' or entrants' ability to imitate or substitute the organisational complexity)
    - Customer relations (2b and/or 3b)
    - Tacit knowledge (0a, 3a, 3b and/or 3b in other markets depending on whether servicizing generates and/or requires tacit knowledge)
        - Customer relations

We now have a generic framework for describing when servicizing might help escaping the commodity trap and specific arguments of what to look for in a particular case. We will now apply these tools to analyse a set of successful and less successful cases. The analysis will illustrate how the theoretical framework is useful for identifying the effects of servicizing on a servicizer's competitive advantage.

5 Analysis

In this section, a series of companies and product/service offerings are analysed using the theory of the previous section. The sub-sections of the analysis each cover one case and finds the fundamental strategic reasons why it was or was not successful in creating a sustained competitive position. Recall that Barney's (1991) notion of sustainability is adopted. Rather than looking at the *ex post* calendar time frame of the company's success, we find the underlying *ex ante* factors effectively preventing other organizations from eroding the company's advantageous position. This entails that the so-called successful cases are not predicted to retain their position for any specific period, but rather that they are likely to do so absent of significant change – so-called "Schumpeterian Shocks" (Barney, 1991, p. 103). One of the cases, Kodak, is an excellent example of a company that had a sustained competitive advantage in its market, photographic film, for more than a hundred years and it is possible that Kodak would still be a thriving enterprise had it not been for the Schumpeterian shock of digital photography.

Each of the following sub-section is concerned with one specific instance of servicizing. Each case starts out with a brief history and description of the company and market in question and the specific instance of

servicizing analysed. Then follows the analysis of the case using the framework devised in the previous theory section, first by going through the specific arguments for servicizing which apply to the case and then finding arguments which would tend to negate the positive effects. At the end of each case will be a few speculative words about how the future might look or how the situation could have been different with a focus on what the company could have done differently.

We will start out with the case of Xerox which highlights how almost all of the specific arguments for servicizing helped the once-dominating icon of copying overcome the threat of commoditization. The case shows how the framework works and acts as a reference point for the rest of the cases. The second case is that of Kodak which tried servicizing as a response to the emergence of digital photography but ended up facing bankruptcy. Kodak and Xerox serve as examples of large incumbents servicizing their offers to fend of Schumpeterian shocks with various success. Next up is the entrepreneurial case of Better Place, a well-funded, high-profile venture seeking to bring electrical cars into the mass-market through a creative charging service solution which ended up failing dramatically. We round up the list of cases with the small start-up Volt who reinvented smartphone charging at music festivals but is threatened by commoditization in the market it created.

Together, the cases demonstrate the theoretical specific arguments in favour of servicizing and show that servicizing may be an appropriate escape hatch to the commodity trap. Yet, they also expose that servicizing does not guarantee success or even survival and they reveal some key learnings about how competitive advantage can get eroded in service markets.

5.1 Xerox

Xerox Corporation is a U.S.-based multinational Fortune 500 corporation in the information technology services industry (Fortune, 2015). The history of Xerox goes back to 1906 where the Haloid Company was founded originally making photographic paper (Xerox, 2016). The breakthrough of the company was the invention of dry printing, dubbed xerography, in the mid-20th century. Applying xerography, the company was able to make the first commercial office copying machine, the Xerox 914 in 1959 (Xerox, 1999, p. 1). The 914 was a large success and took the company from obscurity to almost immediate celebration. Throughout the 1960s and most of the 1970s, Xerox was highly successful leasing copying machines on which they enjoyed a near-monopoly due at least in part to a thicket of patents.

In the mid-70s Xerox was forced to license out its technologies due to antitrust issues (Chesbrough & Rosenbloom, 2002). Competitors were quick to emerge into the very lucrative market. Kodak and IBM attempted to imitate Xerox' business model by approaching potential customers with a large copying

demand. Meanwhile, Canon approached the market differently. Rather than leasing large copying machines with high output to large organizations through direct sales people, Canon made small devices intended for home or small offices and sold them through dealers as it did with its cameras (Markides, 1997). While Kodak and IBM did not gain significant market shares, the Japanese manufacturers proved to be a bigger challenge to Xerox. In a few years, Xerox' market share dropped to 13% and margins were low due to the efficiency of the Japanese competitors (Bianco & Moore, 2001).

Facing this classic example of product commoditization, Xerox moved back towards servicizing in the 1990s. In 1994, Xerox started branding itself as "the document company". The focus of the company went from producing and selling document-printing devices to one of managing the flow of information in client organisations. In 2001, Xerox Global Services was launched as a consulting division helping its customers optimize office productivity (Rothenberg, 2007). The business model applied to many of its customers is one in which Xerox retains ownership and responsibility of the printing devices located with its customers. They effectively take over the responsibility of planning, buying, installing, maintaining, restocking and decommissioning printers and copiers from their customers. Together with the customer they assess the specific needs of the customer and suggest plans for optimizing printing activities and office productivity. In the end, the customer pays an agreed price per print. In the process, the customer will usually end up with significant savings on total printing costs. While falling printing costs does not sound promising for a printer manufacturer, Xerox effectively takes a share of the realized savings and has been able to capitalize on the long and deep relationships they develop with their customers in an example of relational rents (Rothenberg, 2007).

Other companies traditionally making and selling copying machines and/or printers such as Hewlett-Packard, Canon and Ricoh have entered the managed print market but are far from catching up on Xerox' position of almost half the market (Gartner through Credit Suisse, 2011, p. 336) indicating that Xerox has some resource that the competitors have failed to replicate.

The Xerox case is directly cited by Rothenberg (2007) and for good reason. The case shows almost all of the theoretical advantages of servicizing and does so with a company going from being highly successful to face severe commoditization and back to being profitable through thorough and fundamental servicizing of its business model. All while being a spectacular company renowned for its innovation and invention throughout the 20th century including not only xerography and other printing technologies but also ubiquitous advances such as the graphical user interface of computing directly associated with the success of Apple and Microsoft, the Ethernet technology pioneering local-area networking and the spin-off of a long range of companies including Adobe and 3Com (Chesbrough & Rosenbloom, 2002).

Using the method developed in the analytical framework of sections 4.5 and 4.6.4, we will now see why the servicizing of Xerox has been a success. The following specific arguments apply to the case of Xerox servicizing from being a printer and consumables manufacturer to delivering managed print services:
Market arguments:

- Revenue potential (0a effects)
    - Increasingly stable and predictable income from long-term full-service contracts with periodical payments.
    - Outsourcing: Managed print services fit well into the management mega-trend of outsourcing non-core operations. Some of the tasks traditionally handled by the buyer were taken over by Xerox increasing the revenue potential of the servicized market compared to the product market alone.
- Differentiation: Xerox' services help them differentiate themselves from their product competitors. Even after competitors have emerged, the custom nature of delivering managed print services is a valuable differentiation which should tend to weaken the competitive forces (a 1a effect).

Efficiency arguments:

- Utilization differential: When changing a client to managed print services it is common that the total number of printing devices is reduced dramatically. Each installed printer will be used more intensively reducing the costs of installing and maintaining a large number of devices while achieving the same or better printing performance. Competitors should be equally able to benefit from the utilization differential making it a 0a or 0b effect.
- More efficient capital/labour/consumables mix: The lower number of more intensively used printing devices will often reduce the lifetime per-print cost of maintenance and may well use more efficient consumables too (Rothenberg, 2007, p. 85). As will the alignment of incentives between Xerox and the buyer. Previously, Xerox would follow a razor-and-blade model where they earned relatively high margins on consumables incentivizing them to sell less efficient printers. As Xerox retains the ownership of the printers, they are built to last and constructed with maintenance and recycling in mind. Through recycling, Xerox is able to reduce lifetime costs. If competitors are equally capable of making efficient printers the competitive effect is either 0a or 0b. If Xerox has a VRIN advantage in making efficient printers, servicizing nets a 3b competitive advantage.
- Customer relations: The alignment of incentives with the buyer brings potential efficiency gains through lower transaction costs in an example of effective governance. Stable customer relations over time is also a key driver of decreasing the utilization differential and achieving the more efficient capital/labour/consumables mix. Again, if competitors are equally able to align incentives, this will only provide a 0a or 0b effect. If they are not, it represents a 3b advantage for Xerox.

- Even if Xerox' competitors are equally able to realize the efficiency gains of servicizing making Xerox unable to gain 3b effects, the increased efficiency might decrease the pressure from substitution potentially resulting in 1a effects of making the market more attractive.

Resource arguments:

- Organization and complexity: By being the pioneer of managed print services, Xerox got a head start on competitors on configuring the organization to the servicized market including reorganizing various departments and revising their compensation schemes. They also got a lead in managing the complexity associated with delivering an efficient product-service system compared to the comparatively simple product-sales system traditionally in use. Such organizational changes may be difficult for competitors to replicate due to causal ambiguity and/or time compression diseconomies resulting in 3b effects for Xerox.
- Customer relations: By servicizing their market, Xerox effectively turned their market-leading position within the commoditized printer market into a very valuable resource (a 3b effect). Xerox had an advantage in the size of their installed base and by turning them from the traditional transaction-based relationships into long-term service relationships they built significant switching costs for their customers resulting in 2b effects for the market.
- Knowledge generation: From the introduction of managed print services, Xerox had complementary assets in the form of knowing how to make printing devices. This knowledge was evidently not VRIN as its product competitors were able to produce printers of about the same quality about as efficiently. This was one of the main causes of printers being commoditized in the first place. By being the first to servicize the market, Xerox gained first-mover-advantage by generating knowledge about printing habits and office efficiency which had so far not been valuable to printer manufacturers. This service knowledge complemented the existing printer knowledge and it was quickly generated by the expanding customer relations. This has created a sizeable VRIN-advantage of tacit knowledge that Xerox' competitors are still trying to imitate but which is likely protected by causal ambiguity, time compression diseconomies, asset mass efficiencies and interconnectedness (a 3a effect). The office efficiency knowledge and the existing customer relations are also exploited through delivery of new product-service offers (a 3a effect in other markets). Today, Xerox has expanded its scope from printing related offers to including outsourcing of general non-core but specialized business processes such as HR Services and Customer Care (Xerox, n.d.). Such processes would not make much sense to a printer manufacturer but to a company offering essential business services on a relational basis it suddenly fits right in.

We can now see why servicizing was a success for Xerox. The key driver of commoditization was that a relatively large number of printing device manufacturers were producing and selling similar products. With

no substantial way of differentiating, the primary focus of competition was on price, eliminating the possibility of monopoly rents. As Xerox' competitors were at least as able to produce printers and patents were rendered ineffective, Xerox did not possess VRIN resources that allowed it to capture any efficiency rents. In fact, some competitors may have had a relative advantage in manufacturing processes or strategic business model (Markides, 1997) tending to make Xerox earn sub-normal rents.

By introducing managed print services, Xerox overcame both of the competitive issues. Managed print services allow for far more differentiation through the customized nature of the market. The outcome of the offer is priced based on value rather than on cost with comparable or superior value delivered by means requiring fewer costs due to efficiency improvements. As such, the servicizing of the market has moved it to the right in the Market-Position Matrix (MPM). Meanwhile, servicizing redefined the resources needed to compete. Whereas Xerox were at parity or a slight disadvantage to its competitors in printer manufacturing, they had somewhat superior knowledge of the market, a better brand to the existing office supply managers and a leading (but diminishing) position in the number and size of customers. Servicizing did not remove the value of being able to manufacture printers efficiently. Rather it utilized exactly the resources that Xerox had which were rare, inimitable and difficult to substitute and made them valuable moving Xerox up in the MPM. Isolating mechanisms have made Xerox able to perpetuate its lead providing a sustained first-mover advantage.

The result of servicizing the printing device market is that the market is more attractive and Xerox has an advantageous position in it. The position of Xerox in the MPM is thus moved Northeast, escaping the commodity trap. Since Xerox' introduction of managed print services, other printer manufacturers have followed. So far, none of them have overtaken Xerox' leading position. Even if one or more competitors are able to match Xerox' offer, Xerox would still be in a better position than before the transition because of the rightward move of the market. Since the service transition, Xerox has expanded into related business services which are non-core to Xerox' customers but still benefit from specialization which Xerox is able to profit on through economies of scope resulting in relational rents for both parties.

5.2 Kodak

The Eastman Kodak Company is an American multinational technology company focused on imaging. Today, its main focus is on professional printing and motion picture films (Kodak, n.d.a). Historically, Kodak is most famous for its involvement in photography. The history of Kodak goes back to 1881 where George Eastman and Henry A. Strong partnered to create the Eastman Dry Plate Company based around the production of gelatin dry plates, an innovation to the photographic plates used for taking photographs at the time. In 1885, the company introduced the photographic film and in 1888 the name Kodak and the slogan of

"You press the button - we do the rest" were introduced. Throughout the 20th century, the company expanded and launched a long series of inventions and innovation primarily within photography and filming including the less flammable safety film, colour film and the super 8 film format as well as more or less related products such as synthetic vitamin A, X-ray equipment, synthetic fibres and printers. Importantly, they also invented the digital camera and made many technological advances within digital photography (Kodak, n.d.b).

During most of the 20th century, Kodak was highly successful producing, selling and developing film and cameras. They enjoyed a near-monopoly for many years but from the 1970s onward they saw increasing competition especially from the Japanese company Fujifilm with whom they competed near-duopolistically until the 21st century with other minor players being German Agfa and Japanese Konica-Minolta (Tsurumi & Tsurumi, 1999). Like in the Xerox case with the entry of efficient Japanese manufacturers, Fujifilm's success was detrimental to the profitability of Kodak posing a long-term threat of commoditization. However, the main threat to Kodak would turn out not to be its photographic film-making competitors. Rather, the more significant threat to Kodak and indeed to the whole film-making industry was the advent and quick proliferation of digital photography.

The digital camera was initially invented by Kodak in 1975. Until the 1990s, digital photography was little more than a curiosity but parts of Kodak realized early what it would mean. In 1979 they made an internal report about how digital cameras would take over starting with government reconnaissance then professional photographers and finally the mass market by 2010. As it would turn out, the report was fairly accurate only being a few years off (The Economist, 2012). In 1991, Kodak introduced the professional Digital Camera System (DCS) and throughout the 90s they continuously innovated digital photography while primarily selling films. In the 90s the film camera market flourished while the digital camera market grew modestly. However, by the advent of the 21st century, digital cameras started to account for a significant share of the sold cameras at the expense of film cameras as shown in Figure 6.

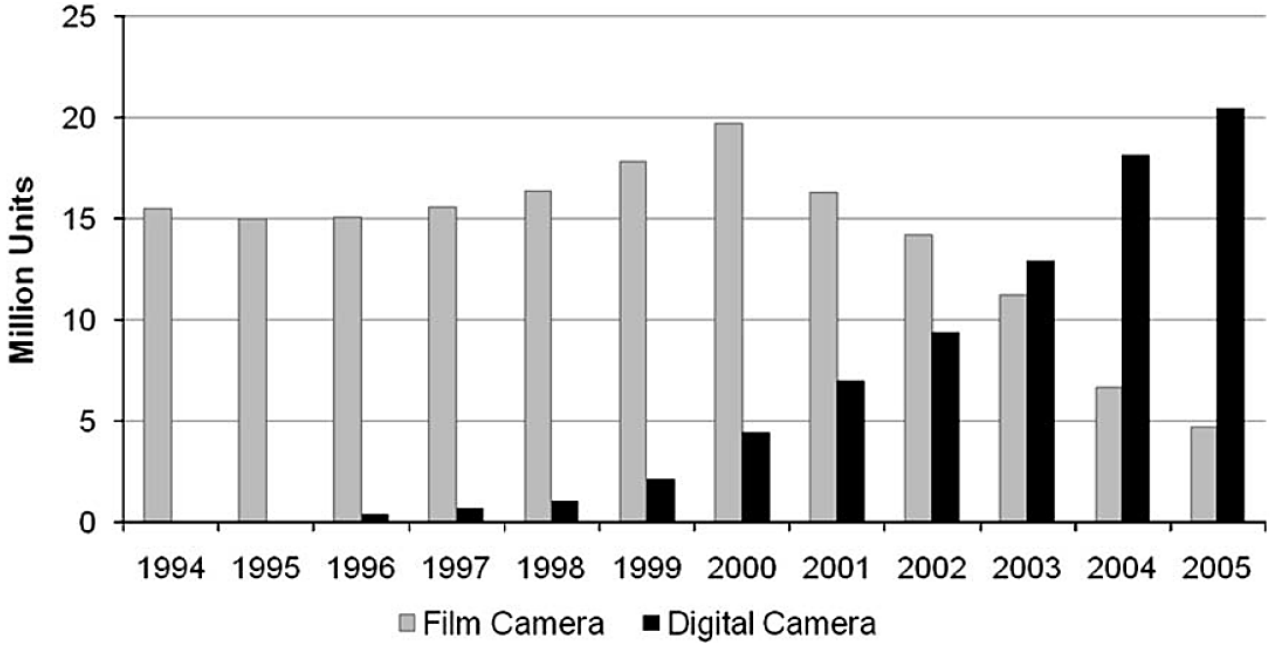

Figure 6: Sales of film and digital cameras (Lucas & Goh, 2009, p. 51)

Kodak's investment in digital cameras paid off in the short run earning them a leading position in digital camera sales until 2007 where they were overtaken by Canon and they stayed in the top 5 up to 2011 (Euromonitor, 2016). However, the transition to digital cameras brought two problems to Kodak. One was that it faced stiff competition from Japanese competitors such as Canon, Sony and Nikon well-established in digital products eroding Kodak's market share and reducing margins in a similar fashion to what happened to Xerox with copiers. The other problem with the transition was that the digital cameras rendered Kodak's long-time successful razor-and-blades strategy of selling cheap equipment in the form of cameras and relatively expensive consumables in the form of film ineffective as digital cameras did not use many consumables.

Kodak's response to the vanishing market for film was servicizing to deliver something similar to film in the digital market. In 2001 Kodak acquired the online photo service Ofoto (Kodak, n.d.b) with which users could upload, store and share digital photos and order physical items including traditional photo prints and personalised items such as mugs and t-shirts (Sawhney, Balasubramanian, & Krishnan, 2004). This marked Kodak's move into services. Rather than relying on selling cheap cameras and expensive film, they now sold cheap cameras and provided an online photo service expanding their offer temporally in the framework of Sawhney, Balasubramanian and Krishnan (2004) as the services offered by Ofoto were new activities added to the existing activity chain of managing and sharing memories in which Kodak had been the main player throughout most of its history. The temporal expansion is illustrated in Figure 7.

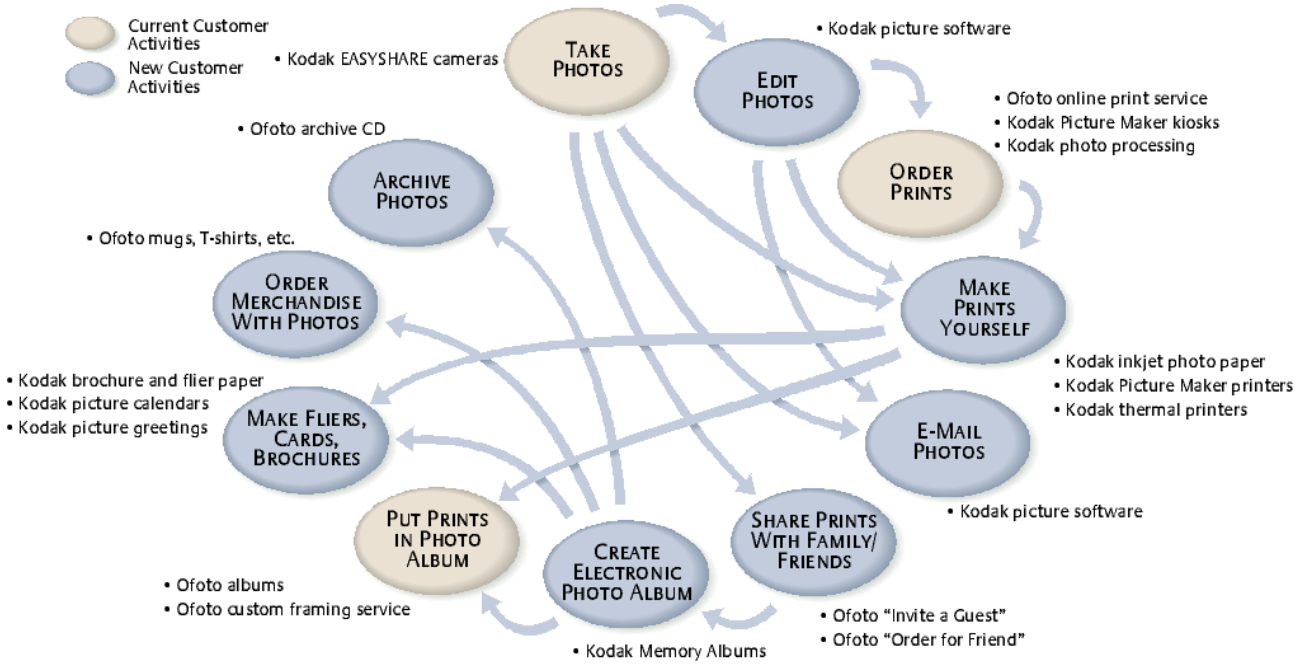

Figure 7: Temporal expansion by Kodak (Sawhney, Balasubramanian, & Krishnan, 2004, p. 37)

Ofoto was later renamed Kodak Gallery and turned out to be a modest success for Kodak. Around 2005 they were among the largest players on the online photo sharing market along with start-up Shutterfly and the Hewlett-Packard acquisition Snapfish (Siliconindia, 2005) and the service was in high esteem in the media (e.g. Stafford, 2006; Boehret, 2007). The service allowed unlimited storage of photos without requiring a paid subscription. The business model was to offer a paid subscription which brought a range of benefits and to require non-subscription users to purchase physical objects to uphold their account. A comparison of Kodak Gallery with some of its major competitors as of 2007 is showed in Table 4 (next page).

The move to acquire Ofoto and integrate its offerings under the Kodak brand is an instance of temporal expansion through servicizing highlighted by Sawhney, Balasubramanian and Krishnan (2004). We will now analyse this instance of servicizing by finding the specific arguments why it should improve Kodak's competitive situation.

Market arguments:

- Income stability: Supposedly, Kodak Gallery users would upload their photos with the intension of storing them there. This would create lock-in for the users and with the requirement to buy something periodically or to subscribe, users would turn into repeat customers generating relatively stable income. As we saw in Table 4, Kodak Gallery was not alone in offering this service, thus it was not a 0a effect.

	Kodak Gallery kodakgallery.com	Shutterfly shutterfly.com	Snapfish snapfish.com	Flickr flickr.com	Photobucket photobucket.com
Optional Subscription Account	Gallery Premier $25/year or $2.50/ month Gallery Premier with Print Super Saver, $50/year	No	Video service is subscription, $25/year or $3/month	Pro $25/year	Pro $25/year or $3/month
Requirement to keep account	1 purchase per year for free account	No	1 purchase per year for free account	No	No
Storage	Unlimited	Unlimited	Unlimited	100MB/ month free, unlimited with subscription	1GB free, 5GB with subscription
Privacy/sign-in	Optional	No	Required	Optional	Optional
Mobile/email upload	Yes/Yes	No/No	Yes/Yes	Yes/Yes	Yes/Yes
Projects (books)	Yes	Yes	Yes	Yes	Yes
High-resolution download	Only with subscription	No	25 cents for one, 5 cents for each additional	Yes	Yes
Cost per print	15 cents	19 cents	12 cents	15 cents	15 cents

Table 4: Comparison of photo-sharing sites (Boehret, 2007)

- Innovation: By servicizing digital photography handling, Kodak Gallery opened up for novel applications of photographs. In the alternative non-servicized scenario, the photographer would be limited to sharing photos either by sending them in mails or by showing them locally on a screen or on prints as with film photographs. Kodak Gallery allowed for these uses but further made new options available. Users could share organized photo albums to select people or to the general public and could even make collaborative projects such that a group of people could combine their photos. Further users could access their full archive of photos in any location with internet access instead of having to rely on bringing physical storage media. Again, these features did not differentiate Kodak Gallery from its online competitors who had very similar offers.

Efficiency arguments:

- Utilization differential: Kodak Gallery could be a more efficient solution to the digital photographer depending on the individual's need and situation. For example, building and maintaining an adequate backup system in case of an accident or malfunction might be costly for the individual person especially as the need for scale and protection might change over time. A cloud solution such as Kodak Gallery may turn out to be more efficient as each individual unit of storage may be more effectively sourced, utilized and upgraded even as the data is sufficiently duplicated in case of

failure. The servicized photo market thus had a potential efficiency advantage over substituting solutions (a 1a effect).

Resource arguments:

- Customer relations: In 2001, at the time of Kodak's acquisition of Ofoto, and in 2005 where the service was rebranded, Kodak was among the most valuable brands in the world (BusinessWeek, 2001; BusinessWeek, 2005) and was almost synonymous with photography. Potentially, the VRIN resource of brand value and recognition could be leveraged and reinforced into digital photography and Kodak Gallery resulting in 3b effects.
- Tacit knowledge: If done right, Kodak Gallery and its long-term customer relations might have been able to generate valuable knowledge for Kodak before it was available to its competitors. Kodak may have been able to quickly discover and adjust to the behaviours of its user base. For example, they may have been able to see trends in the types of photos taken and shared thus indicating directions for future innovation. Had Kodak Gallery been quick to the market and established a significant installed base advantage over their competitors this could have resulted in positive feedback loops of 3a and 3b effects reinforcing Kodak's first-mover advantage. As it was, with Kodak entering the market through an acquisition and having established competitors at that time (Shutterfly was founded on the same day as Ofoto (Helft, 2006)), tacit knowledge was likely to be available to its competitors too and could at best result in industry-enhancing resources (2a effects).

As we have just seen, Kodak's servicizing strategy offered some advantages compared to the status quo of continuing to just sell digital cameras and offering to make physical prints but they were relatively few and weak. The move was not enough to retain Kodak's size and significance within photography. Nor was it even enough to insure Kodak's survival. In January 2012, Kodak filed for bankruptcy with the intention of significantly transforming the company by breaking up and selling off business segments and intellectual properties (de la Merced, 2012). In April 2012, Kodak Gallery was sold to one of its primary competitors, Shutterfly (Mattioli, 2012), while most of the other personal photography businesses of Kodak were sold to its UK pension plan in 2013 (Daneman, 2013). Eastman Kodak emerged from bankruptcy in September 2013 as a company almost entirely focused on commercial printing activities (Fowler, 2013). We will now turn to look at the factors that caused Kodak's attempt at servicizing to fail.

Photographic film, Kodak's main business prior to the ubiquity of digital photography, was nominally primarily a product-based market. Kodak's customers would buy a camera in a single transaction and would then buy a new film whenever they had used up the previous one. Theoretically, the user would be free to find another supplier of film so the relationship between Kodak and the user was based on discreet

transactions in which transfer of ownership of tangible objects took place. The discreet relationship was also true for the development of film.

Yet, effectively the film market showed many traits of a service – with the near-monopoly on film, camera buyers were almost certainly going to buy Kodak film on a recurring basis and aggregate film purchasing patterns were reasonably predictable. Another service similarity of Kodak's film selling and development network were that it required an extensive infrastructure of sales-points and development kiosks resulting in high fixed costs whereas the marginal costs of producing and developing films were relatively low resulting in gross margins on film close to 70-80% (Farago, 2013; Munir, 2012; Wharton, 2012). These attractive traits were much less apparent in Kodak Gallery's business model. Users did not have to pay periodical subscription fees as they could instead purchase a few items a year in discreet transactions and the margins on said products were not going to be high with the range of competitors able to provide similar products. In other words, the photographic film market had been very attractive and Kodak had superior resources within the market which had *de facto* acted as a service market whereas the online photo management market was far less attractive and Kodak was not relatively advantaged to exploit the market. This would normally lead to a situation with normal- or subnormal returns which could potentially have been sustained but with Kodak's severe legacy liabilities and heavy fixed costs structure the earnings were insufficient to make the service survive in Kodak.

Some have noted that the transition to digital cameras changed the typical customer from being a female acting as the family archivist to being a male tech-enthusiast. With the envelopment of the digital camera into the smartphone, photographs have become even more ubiquitous, yet they are shared mostly without printing through social networks such as Facebook, Instagram or Snapchat. These significant changes in customer behaviours have been part of Kodak's demise (Munir, 2012). Entering the realm of speculation, it may not have been impossible that Kodak could have evolved Kodak Gallery into something different alike to Facebook (The Economist, 2012) which could potentially have led to a sustainable position as a social network which is potentially well protected from competition not least through customer lock-in and network effects. Such a change would have required Kodak to realize the potential in big data collection and online marketing as well as the change in photo sharing behaviour. Kodak would arguably have had a strong resource in its established name and recognition which could potentially have given it large advantage in convincing long-time Kodak users to enter social networks whereas older generations have generally been relatively slow adopters. Of course, assuming that Kodak could have predicted the envelopment of digital cameras, the changing customer behaviours and the potential of social media is rather farfetched but using the framework for sustained competitive advantage developed in this thesis would have helped Kodak in analysing whether or not it would be beneficial.

5.3 Better Place

Better Place was a venture-based private company founded in 2007 by Israeli entrepreneur and former SAP executive Shai Agassi (Woody, 2013). Better Place intended to change the personal transportation sector fundamentally. The business model was based on the realisation that electrical vehicles are socially beneficial but individually unattractive due partly to the high cost and low resale value of the large batteries needed and partly to the limited range and long recharging time of said batteries inducing range anxiety (Christensen, Wells, & Cipcigan, 2012). Traditionally, the electric vehicle owner would have to buy the car and battery together and make sure that the battery was always adequately charged. Better Place's innovation was to offer a solution where the owner would still buy a car but would rent the battery from Better Place and become a part of a network of stations where relatively empty batteries could be automatically swapped for fully charged ones in 3-5 min. – about the same time it takes to refill tank of gasoline. The user would also be able to plug their car into compatible charging points which could be installed in custom locations. Charging would be included in the subscription both via battery swaps and through plugging-in the car with prices in five tiers based on the expected number of kilometres driven per year (Christensen, Wells, & Cipcigan, 2012, p. 503).

A crucial part of Better Place's business model was that charging would be managed to take place in the most efficient way. Spot electricity prices vary according to supply and demand. In Denmark, demand peaks in the afternoon and is low during night whereas supply depends on the weather as a significant part of Denmark's electricity is provided by wind turbines. This potential mismatch between supply and demand sometimes cause the spot price of electricity to be negative (Schaps & Eckert, 2014). The availability of variable and cheap wind power was one of the reasons Denmark was chosen as one of the initial locations for testing the offer (Christensen, Wells, & Cipcigan, 2012). Better Place's arbitrage of electricity – charging batteries when power is cheap – would not only benefit the company itself but would also tend to increase the value of variable energy sources such as solar and wind which would in turn benefit the wider society by decreasing the reliance on fossil fuels, improving air quality and reducing greenhouse gas emissions. To the individual user, the total price of driving should be reduced as electrical vehicles are in general cheaper per kilometre than gasoline cars (Christensen, Wells, & Cipcigan, 2012). Meanwhile, the initial cost of buying an electric car would be comparable to that of combustion engine cars as the battery was financed by Better Place and the issue of range anxiety would be eliminated by the network of swapping stations covering traffic hubs in the whole country.

Better Place attracted investments of over $800 million for installation of the necessary swapping stations, charging spots and batteries (Adner, 2013). The business model with facilitating battery swaps depended crucially on car makers producing cars compatible with the system, namely fitting the car-battery interface to

robot-automated swaps. Renault-Nissan agreed to provide cars but only ever made it to deliver their five seat sedan, Renault Fluence ZE. In its six-year history, Better Place did not convince any other automakers to produce compatible cars and in May 2013 even Renault-Nissan announced that they would not focus on the battery swapping technology moving forward (Springborg, 2013). The very limited variety of available car models was likely one of the reasons Better Place never reached mass-market penetration. Combined with a strategy requiring heavy infrastructural up-front investments the company was far from generating positive cash flows. Later in May 2013, Better Place filed for bankruptcy having realized only a few thousand sales globally (Reed, 2013).

We will now use the analytical framework to understand how Better Place believed servicizing transportation would make it prosper in the competitive transport market. Afterwards we will find the reasons Better Place did not succeed and speculate briefly about what could have been done differently.

The following specific arguments for servicizing apply to the Better Place case which should provide competitive advantage compared to the traditional product-sales system of buying a gasoline car or buying an electrical car including battery:

Market arguments

- Income stability and predictability: The rent-and-service business model of Better Place with recurring payments should result in more stable and predictable income compared to the traditional electrical vehicle manufacturer's model of selling car and battery in one transaction. This provides a 0a advantage to Better Place.
- Differentiation: Better Place's offer of battery switching and fixed payments for fixed driving ranges were unique to the personal transportation market and thus offered significant differentiation from competitors and should result Better Place being shielded from price competition, a 1a effect.

Efficiency arguments:

- Utilization differential: Better Place owning all of the batteries in the system allowed them to more efficiently charge and procure batteries. To avoid range anxiety, individual battery owners would probably keep their batteries nearly fully charged at all times. This is not necessarily the best way to ensure the durability of the battery. With Better Place, batteries could be charged in a more protective way and range anxiety would be eliminated by the availability of fast battery swaps. Another significant cause of anxiety for the potential electrical vehicle buyer was the risk of battery deterioration and obsolescence. The capacity of batteries drops over time reducing the maximum range of the electrical vehicle and technology is steadily resulting in better batteries. With individual battery ownership, the owner's range anxiety would increase over time and the resale value of the car and battery would fall relatively quickly. Better Place's model got around both of these

problems. Even relatively worn batteries would still be useful as swapping stations circumvented the range limitations and Better Place would be able to introduce improved batteries as they became available as part of the natural evolution of the system. Batteries so worn as to not be viable for electrical vehicles could continue being useful as power reserves improving Better Place's ability to arbitrage electricity prices (Christensen, Wells, & Cipcigan, 2012).

- More efficient capital/labour/consumables mix: Electrical powertrains can be more cost-efficient than internal combustion engines depending on electricity prices, gasoline prices, charging conditions and driving habits. They are in general thought of as being significantly cheaper per kilometre for the average user (Leistikow, 2013; Christensen, Wells, & Cipcigan, 2012). With Better Place, the capital/consumables mix would increase the amount of capital in form of relatively expensive cars and batteries but reduce the consumables in the form of fuel or electricity. Denmark was chosen as an especially attractive position as gasoline prices are relatively high while off-peak electricity can be cheap, further enhancing the efficiency gains of Better Place's offer.
- Reduced material consumption: Electrical vehicles have the potential to reduce fossil fuel consumption as they can run on sustainable energy sources such as wind, solar and hydro power. The environmental benefits of electrical driving are especially pronounced in places with a high reliance on clean power (Nealer, Reachmuth, & Anair, 2015). The environmental advantage is even larger when an electric network experiences high volatility caused by sustainable energy's reliance on the weather as Better Place's smart charging system allows them to vary demand with supply. Finally, the transfer of greenhouse gas emissions from the transport sector into the electricity sector implies that they become regulated by stricter environmental schemes such as the European emissions trading system, further improving the environmental benefits compared to gasoline cars (Christensen, Wells, & Cipcigan, 2012, p. 500). The environmental impact of private transportation is an important political and public opinion issue in many areas including Denmark. Environmental concerns alone may induce some customers to prefer electrical vehicles and Better Place's model deliver benefits compared to battery ownership.
- Process innovation: While electrical cars in general may be more efficient than gasoline ones, the innovation of offering battery swapping places and smart charging offered an advantage to Better Place compared to other electrical car providers. Their ability to flexibly charge and arbitrage the electricity market would offer them an advantage compared to individual battery owners charging based on convenience.
- The above efficiency gains should provide Better Place with 3b advantages compared to the competing offers if the business model was difficult to replicate or a temporary 0a advantage if competitors were able to replicate it. The critical mass nature of having a sufficiently dense charging

network may be an argument in favour of asset mass efficiencies as an isolating mechanism which should tend to make it difficult to imitate.

Resource arguments:

- Organizational complexity: Compared to selling cars and batteries, Better Place's service system required a more complex organization. Part of their core competencies would be to arbitrage the electricity market based on the expected needs of their customers – an ability requiring tacit knowledge and elaborate systems not found with traditional car manufacturers or sellers thus potentially meeting the VRIN criteria which would tend toward a superior competitive position through a 3b effect. The network also required vast investments in the swapping stations and charging spots. Potential entrants would have to be able to install a costly network to be able to compete representing significant sunk costs. This barrier to entry should tend to increase the attractiveness of the market as a 1a effect.
- Customer relations: The recurring nature of Better Place's business model and the customers' presumed reliance on the proprietary charging and swapping network should result in significant buyer lock-in and the potential for relational rents. Better Place achieved high customer satisfaction ratings (Adner, 2013) which should tend to increase customer loyalty even further and perhaps result in positive word-of-mouth effects. Customer lock-in decrease competition among incumbents, especially price competition thus generating a 1a effect which should tend to make the market more attractive.
- Tacit knowledge: The installed base, close customer relations and the long-term nature of Better Place's business model should allow them to generate tacit knowledge over time which should be difficult to imitate due to causal ambiguity and asset stock interconnectedness. Valuable knowledge would include driving habits which could lead to more efficient electricity arbitrage and data-driven locations of future swapping stations and charging spots, and customer feedback potentially resulting in product- and process innovation which could make their offer more valuable over time compared to competitors and substitutes thus generating 3a effects.

To sum up, Better Place's servicized business model should provide both Better Place and potential competitors with significant competitive advantage effects compared to sales of gasoline cars or electrical vehicles including batteries. This should help Better Place generate supernormal returns in the otherwise competitive industries of car manufacturing and leasing. We will now look at some of the key criteria Better Place would have to meet to implement its business model.

To effectively overcome the range anxiety problem of electrical vehicles, Better Place would have to install an expansive network of battery swapping stations which would allow the user to travel anywhere they wanted without risk of ever being too far from a station. Such a network required massive investments to cover even a small country like Denmark but it would be essential to the potential users and create significant barriers to entry. To fund such an expansion, Better Place relied on investors which would expect a good long-term return on their investments. Such returns would come in the form of a strong market presence with many users making recurring payments. This presents a challenge to Better Place in that they would have to get many customers to fund the expensive installation required to get many customers. Yet, with sufficient funding over an adequate time-frame, setting up the network and generating the users should be possible.

However, to get a significant amount of users, Better Place's offer would have to be attractive. Overcoming the problem of range anxiety is not a sufficient condition for making electrical vehicles attractive to the general public but merely a necessary one. The perceived value of the offer would have to be attractive compared to traditional gasoline car and electrical car ownership. The car market is served by a large number of car manufacturers offering an extensive range of differentiated vehicles ranging from small two-person cars over sedans or
+station wagons to large minibuses or SUVs and from inexpensive mass-produced models to luxurious custom-made ones. The vast differentiation of car models caters to the different needs and tastes of different users. Meanwhile, Better Place's battery swapping system was compatible with only a single car model and supported by only one car maker greatly limiting the potential number of users to the ones finding a five-person Renault sedan attractive.

The problem with finding car makers may in part have been caused by lacking resources of Better Place in the realm of building relationships and the strategic reliance on removable batteries compatible with the swapping stations proved to be a disadvantage when attracting new car makers. The technological lock-in on battery swapping required for the servicized system turned out to be a great limitation in garnering the car makers necessary for reaching mass-market appeal. This is an example of failing to realize partnerships causing competitive disadvantage compared to the gasoline car substitute which is part of an informal network of gasoline stations resulting in significant relational advantage to both gasoline cars and stations compared to alternative fuel types and means of transportation.

The limitations in car variation may have been neglected if Better Place's offer was vastly more valuable than internal combustion engines due to the inherent efficiencies. The cost of driving with Better Place was touted to be about 20% lower than gasoline while the price of the car was similar to that of competing cars

(Godske, 2011). The 20% cost advantage was not significant enough to convince the mass market to adopt the only car model offered.

Finally, Better Place may have burned their capital quicker than needed by trying to get a foothold in many different markets at the same time. While the focus was always on Denmark and Israel, Better place tried to run pilots in many other places such as Australia, Canada, California, China, Hawaii, Japan and the Netherlands (Adner, 2013). With a business model presenting the problem of having to get a large network to get many users to fund a large network, overexpansion is a potentially fatal mistake.

The problems of Better Place can be summed up as such:

- Heavy capital investments requiring many subscribers
- Overexpansion into many markets raising capital needs
- Technological lock-in on battery swapping and lacking relational resources turning off car providers
- Single car provider and single car model limiting the customer potential
- Insignificant cost advantage compared to the disadvantage of car model limitation

It would seem that these problems are not limited to the case of Better Place in the transport market. Any service provider relying on a significant infrastructure should be aware of the capital requirements and the risk of overexpansion and the infrastructure should be robust to handle changing technology and customer behaviour avoiding narrow lock-in. If the potential servicizer's offer limits the users' choice, it should keep in mind how it can offer additional value to make up for the loss of flexibility. Like Xerox, Better Place's servicized offer should be able to serve its customers more efficiently but unlike Xerox, Better Place could not offer the product variety needed to meet the differentiated demands of users.

Entering the realm of contrafactual speculation we will try to suggest what could have gone differently for Better Place. Primarily, having close partnerships with a greater variety of car makers would probably have been of immense value to Better Place. Had they spent their limited resources on establishing such partnerships and perhaps incited the electrical auto industry to create standards for charging and battery swapping, they might have been able to offer a substantially larger variety of vehicles. To convince auto makers, Better Place might have devised a plan for how to compensate the manufacturers. As is, the auto makers stood to gain little from partnering with Better Place but would have to commit resources to standardizing their battery interface. One relatively simple model for such compensation would be a per-mile payment from Better Place to the producers of the cars using its system. Alternatively, car manufacturers could have taken part in servicizing and bundled e.g. car leasing and/or service with the Better Place offer for

mutual benefit. Secondly, Better Place may have benefitted from focussing their efforts on just one market instead of two main markets and many pilots.

With the potential for relational rents between Better Place and its customers and Better Place and the auto industry combined with a supporting public environment, a significant efficiency advantage and large barriers to entry, Better Place's business model seems like it might have had the potential to provide sustained competitive advantage to the company but lack of relational resources and overexpansion led the company to its demise before it took off. The case serves as a reminder that barriers to entry are attractive once a company is in an industry but that they also constitute a real challenge for first-movers.

5.4 Volt

Volt ApS is a small Danish company providing convenient smart phone charging solutions at music festivals and similar multi-day events. It was founded in 2011 by three students from the Technological University of Denmark after having realized that they needed a smart way to charge their smartphones at the Roskilde Festival (Volt, n.d.). Until then, phone charging had taken place in the wardrobes where users had to bring a charger and leave their phone behind for charging. In contrast, Volt rents out a portable powerbank which is able to charge the users' phones in their pockets. When the powerbank runs out of power, the user can swap it for a fully charged one insuring that the user can stay charged for the entire event.

In 2012, Volt tried out the service at the two largest Danish festivals, Roskilde Festival and Smukfest, from the back of an old caravan with a limited number of chargers and a basic IT system developed in-house. The service was popular and sold out on both festivals within 2 days. In 2013, the company expanded massively. An agreement with some major German festival organisers and support from the well-respected Roskilde Festival meant that the company was able to go to 19 festivals in Denmark, Sweden and Germany. Along the way, the IT system was improved and the number of employees grew. The company also invested heavily in physical assets such as containers to be used as booths on festivals and in a large number of powerbanks. The funding came from the founders' own pockets as well as from Roskilde Festival's Orange Innovation and an angel investor.

Before the festival season 2014, the company made the decision to design a powerbank specifically for the needs of the rough festival conditions. The new charger was an overall success as the rate of chargers broken at a festival dropped from above 10% to less than 1% while significantly increasing the capacity of the charger allowing the users to run for longer on the same charger without having to swap and keeping pace with smartphone developments. However, development of the new charger was costly and buying the large stock before the season along with acquiring two new container booths greatly constrained the financial

resources of the young company. The funding came from the existing owners, an additional angel investor and a loan from Vækstfonden, a Danish public investment fund investing in startups through direct investments or relatively risky loans (Vækstfonden, 2015).

In 2014, the company expanded further. A deal with some large international festival and concert organisers brought Volt to the United Kingdom and Switzerland in addition to the existing countries. Small attempts in the United States were also made to investigate the market conditions. In total, Volt brought the charging service to 50 festivals and grew on the ones they visited again.
We will now analyse which specific arguments for servicizing applies to the case of Volt's portable charging service provided at multi-day events:
Market arguments:

- Market innovation: The solution with portable powerbanks and swapping service was a market innovation. Before its introduction people would hesitate to bring their smartphones to festivals as they would almost certainly run out of power over the course of the event and they did not want to hand over their expensive, fragile and easily fenced smartphones to young volunteers at a festival. Thus, Volt's expanded the market for smartphone charging, a 0a effect.
- Differentiation: Compared to wardrobe charging, Volt's approach allows for more differentiated offers. A various number of swaps per day can be included in the service, or a customer can choose to buy just a single charge. It is also possible to book the charging service online which enhances the potential for price differentiation through early-bird offers and referral programmes. Finally, relying on portable powerbanks allow Volt to customize their branding to the specific circumstances of the event. For example, the telephone company 3 was one of the main sponsors of Roskilde Festival in 2015 and Volt offered Roskilde Festival/3 branded silicone sleeves for its powerbanks resulting in increased brand awareness for 3 while offering the customers a unique piece of merchandise which is held in high esteem by some festivalgoers. The differentiation of smartphone charging should limit the extent of price competition, a 1a effect.

Efficiency arguments:

- Utilization differential: Volt's portable charging allows their users increased access to their smartphone effectively decreasing the down-time of the phone. In this case, the main efficiency gain is not that Volt's asset is used more intensively but rather that the customer's asset, the smartphone, is. Compared to the festivalgoers bringing their own powerbank, Volt's solution is more efficient as the powerbanks are used more intensively and at multiple events. The efficiency gain for the customer is a significant 0a or 3b effect depending on whether competitors are able to replicate Volt's business model or not.

Resource arguments:

- Organizational complexity: Compared to wardrobe charging, Volt's solution based on an IT-system keeping track of the swaps of each eligible user is relatively complex. The specific cumulatively developed IT system and organizational routines is a 3b effect due to asset mass efficiencies.
- Customer relations: Volt requires its users to pay a deposit for the powerbank and the full service fee up-front. For users to accept this they have to trust that Volt will be able to pay back the deposit and be able to provide a sufficient service. This trust has been built over several festival seasons and provides a barrier to entry – a 1a effect. To the extent that competitors do not inspire the same amount of trust which may be the case due to time compression diseconomies, it is a 3b effect.
- Knowledge: Volt's proprietary IT system and their relatively long experience in the market have caused Volt to have significant knowledge about their markets and customers. Valuable knowledge includes estimates of how many powerbanks are necessary to provide an adequate swapping system, how to formulate the most successful promotions and the best channels to advertise the service as well as operations-oriented knowledge about how to hire and train highly seasonal staff and how to organize transportation of staff and equipment. Some of Volt's knowledge fits into the VRIN framework enhancing Volt's competitive position (3a effects) while some of it effectively serves as a barrier to entry (1a effects).

Even though Volt's service offers several benefits compared to substituting solutions and even though they may have some extent of VRIN resources, Volt is faced with commoditization. 2015 became the first year in the company's history with a decline in the number of festivals and number of users due to increasing competition or substitution from three sources (Interview B - Nielsen, 2015, 1:18-3:20):

1. Competing companies providing a similar service like PlugGo or Charge Candy (PlugGO, 2015; Charge Candy, 2015).
2. Large sponsors providing some sort of charging service like Telia at Smukfest or EE at Glastonbury (Smukfest, 2015; Glastonbury Festival, 2015).
3. More festivalgoers bringing their own powerbanks.

Typically, festival organizers require compensation from charging providers to grant access to their festivals. The competing companies meant that the compensation asked for by some festival organisers increased significantly and became prohibitively high. A few large sponsors chose to provide some sort of charging service at select festivals. Since the festivals are used to working with sponsors and as the sponsorships they pay are high compared to the compensation from a pure charging company, the sponsors are able to get their way, sometimes excluding other charging solutions. Finally, a larger proportion of the festivalgoers are

starting to bring their own powerbanks lowering the need for portable charging – especially at short two or three day festivals where a charged phone and a powerbank may last for the entire event.

Volt's case highlights two important effects eroding competitive advantage. The first is the disadvantageous bargaining position of the charging companies compared to the festival organizers. This is an example of powerful suppliers as mentioned by Porter (2008, pp. 83-84). The following conditions apply which would tend to increase the festival organizers' bargaining power:

- The festival organizers do not depend heavily on the charging companies.
- Festival organizers do not have significant switching costs. Charging providers may have some switching costs in the form of specialized assets or excess capacity.
- Festival organizers offer differentiated products. To operate most efficiently, charging providers prefer to have their assets in use for as much of the festival season as possible. A festival in one weekend is therefore not substitutable for one in another weekend.
- There is no substitute for getting the festival organizers' access to operate on the festivals.
- Festival organizers could credibly integrate forward into the charging market. Wardrobe charging is often already provided by the festival organizers and much of the complexity of operating portable charging is concerned with finding seasonal labour. One of the main barriers to entry is therefore lower for festival organizers than for most other organisations.

The strong bargaining power of the festival organizers supplying access to festivals compared to the various charging providers eager to utilize their capacity for as much of the season as possible means that the compensations for accessing festivals can rise to a point where almost all of the value created by the charging services are captured by the festival organizers. This makes it difficult or impossible for charging companies to capture monopoly rents. The only way for a charging provider to earn super-normal rents are therefore through the efficiency rents which can be captured if one provider is more efficient at providing the solution than the second most efficient charging provider bidding for the festival.

With sponsors, the situation is even worse for the charging providers. Sponsors go to festival organizers with large marketing budgets seeking to spend money on the festivals in order to generate revenues mostly outside of the festivals. In the case of phone charging, sponsors are usually large telecoms seeking to improve their brand perception and awareness in order to convert more users to their networks or to lower the churn rate of existing customers. Telecoms are among the companies spending the most on marketing (Statista, 2014; AdvertisingAge, 2013) so when they decide to sponsor events they can allocate large budgets to activate their existing customers, acquire new ones and enhance their brand awareness to the public. Some of the most high-profile telecom sponsorships at festivals include 3 at Roskilde Festival (3, 2015), EE at Glastonbury Festival (Glastonbury Festival, 2015) and MTV mobile at a series of Swiss festivals (MTV

mobile, n.d.). The telecoms often improve their network connection on-site and/or offer free Wi-Fi as well as providing various kinds of phone charging solutions. As telecoms go to festivals not to earn money on-site but rather to attract long-term subscribers, they can afford to do so at a loss potentially undermining even any efficiency rents dedicated charging providers could potentially capture. Further, their large budgets allow them to surmount the barriers to entry that exist for the charging market.

Finally, dedicated charging providers are challenged by festivalgoers' increasing use of powerbanks. Volt has seen that potential customers are increasingly likely to bring their own powerbanks to the festivals and rely on them to keep their phones charged for the entire festival. This is especially common on the relatively short festivals of 2-3 days where a powerbank may be sufficient for the entire event. Powerbanks are commodities available in a range of capacities and designs and are available in an increasing number of locations. Their low prices combined with their sufficient performance for short festivals mean that they offer an attractive relation between price and performance compared to Volt-style charging – especially when they can be bought from home eliminating expensive festival compensations. This instance of substitution is limiting the prices Volt can demand and eroding the overall profitability of going to short events.

The combined pressures of powerful festival organizers able to capture much of the value from charging and the threat of substitution from commoditized powerbanks place Volt in a vulnerable position where portable charging at festivals is becoming commoditized. The top management of Volt is currently considering how to cope with the market conditions. Some of the things they are considering include simplifying and/or outsourcing the festival production, scaling down on the less attractive festivals and/or launching mobile charging solutions outside of the festival scene (Interview A - Dam, 2015; Interview B - Nielsen, 2015).

6 Discussion

This section compares the theoretical findings of section 4 to the empirical examples from the analysis and summarizes the findings based on the three sub-questions described in section 2.2. The overall research question is answered in the conclusion.

6.1 What Benefits Should Servicizing Bring?

Through application of the competitive forces framework and the resource-based view (RBV) we have evaluated the arguments given in favour of servicizing to generate sustained competitive advantage to the servicizer either through improving the servicizer's position compared to its competitors and/or through weakening the effects of competitive forces. We have found that many of the arguments are not likely to

result in sustained competitive advantage but that they may provide temporary advantages and/or become prerequisites for operating in the market as discussed in section 6.3 below. The arguments most likely to result in sustained competitive advantage are:

- Increased scope for market differentiation potentially limiting price competition.
- Higher degree of customer lock-in which may reduce price competition.
- Improved efficiency can result in a relative advantage provided that the source of efficiency cannot be replicated by competitors.
- Improved efficiency can result in a lower threat of substitution which is valuable if substitution is the dominant competitive force.
- Increased organizational complexity, dependence on labour, lower visibility and reliance on tacit knowledge may make service innovations more difficult to imitate for competitors or potential entrants.
- Tighter customer relations and tacit knowledge generation may result in snowballing first-mover advantages that makes it difficult or impossible for competitors or entrants to catch up.

In addition, assuming that some types of servicizing relies on significant infrastructure and inspired by the case of Better Place, an argument may be made that servicizing may build lasting barriers to entry and that infrastructure may be a VRIN resource, especially if is shows mass asset efficiency and particularly if critical mass is required.

6.2 When Does Servicizing Result in Sustained Competitive Advantage?

As we have seen with the cases of Kodak, Better Place and Volt, servicizing does not necessarily result in sustained competitive advantage for the servicizer. In general, we can infer that services may not improve the competitive advantage of the servicizer if:

- Servicizing results in stronger competitive forces such as:
    - Lower barriers to entry (as for online photo services).
    - Stronger suppliers (i.e. festival organizers).
    - Stronger buyers (for instance through buyers being able to shop around between online photo services).
    - Attractive substitutes, especially if the servicized offer does not result in significant advantages over non-servicized options (such as powerbanks at short festivals for Volt or gasoline cars for Better Place).

    - Intensive price-based competition (which could be the result of high fixed costs and low marginal costs often associated with operations that rely on extensive infrastructure).
- Servicizing renders existing resources of the servicizer less useful or improves the value of its competitors' idiosyncratic resources (online photo services did not gain much from Kodak's unique resources).
- The service results in lock-in for the servicizer which limits its ability to learn from or adapt to technological or social changes (such as Better Place's reliance on battery swaps, or Kodak Gallery's dependence on physical prints).
- Servicizing requires resources that the servicizer does not currently possess and which potential competitors could be equally likely to obtain such as:
    - Proper organizational configuration.
    - Infrastructure and tools to provide the service.
    - Knowledge about customer needs or behaviour.
    - Tight customer relations.

In particular, we saw that:

- Kodak's position in online photo services was similar to those of its competitors. Unlike the photographic film market, the online photo services market was one of fierce price competition and few barriers to entry greatly limiting Kodak's ability to generate monopoly rents. Kodak also did not possess relevant resources that positioned them advantageously in the market thus not resulting in efficiency rents.
- Better Place was not able to provide a sufficient variety of vehicles in their selection and was therefore unable to provide a compelling offer to the idiosyncratic needs of their potential users. Meanwhile, their capital intensive strategy of launching swapping stations over most of the country meant that they would have to get a significant installed base. Both of these issues were caused by a fundamental strategic lock-in on battery swapping as a viable and efficient means of powering electrical vehicles.
- On long festivals, most of the value of Volt's service is captured by the festival organizers as similar companies bid the compensations up and especially as large sponsors see smartphone charging as a marketing outlet rather than a market. On short festivals, Volt's service is further threatened by the substitution of festivalgoers bringing charged powerbanks which offers a similar value proposition at a lower cost.

6.3 How Does Servicizing Affect the Servicizer in the Short Run?

While short-run effects of servicizing is not the primary concern of the thesis, taking it into account does increase the explanatory power of the framework. Many of the arguments made by the servicizing literature are fundamentally concerned with the short term. They are:

- Revenue potential through:
    - Income stability.
    - Trend of outsourcing.
    - Market innovation potential.
- Temporarily higher margins on services.
- Replicable efficiency gains when substitution is not the dominant competitive force through:
    - Utilization differential.
    - Demand stability and predictability.
    - Efficient capital/labour/consumables mix.
        - Reduced material consumption.
    - Process innovation potential.
    - Customer relations.
- Temporary resource advantages through:
    - Replicable organizational organization.
    - Replicable knowledge.

On the other hand, servicizing may also pose challenges for the potential servicizer to overcome in order to servicize. Such hurdles may act as barriers to entry once they have been surpassed, but until then, they may cause servicizing to be infeasible or its success unlikely. The challenged identified by the servicizing literature can be categorized under the headers of culture, resource-based and strategic as follows:

1. Cultural:
    a. Product-focused culture in R&D, production, sales etc. (visible in the Kodak case)
    b. Lack of belief in value of services
    c. Resistance from employees – especially provision paid sales staff and product-focused engineers
2. Resource-based:
    a. Lack of service skills
    b. Lack of service infrastructure (seen in the Better Place case)
3. Strategic:

a. Resistance of current service providers and providers of complementary products and services
b. Resistance from customers

While the matter of sustained competitive advantage is the primary topic of this thesis, the temporary effects do help explain both the incentives and the failures of some servicizing companies. The challenges involved may explain why some companies have not yet servicized even if it would seemingly bring sustainable benefits.

7 Conclusion

After the discussion of the three sub-questions we are able to draw the following conclusions:

Sub-question 1: What benefits should servicizing bring?
The literature is abundant with arguments for servicizing. Through careful evaluation we separated and categorized some as drivers for others with the main provisional categories being economic, market conditions and competitive arguments. The provisional arguments were critically assessed drawing on microeconomics, the competitive forces framework and the resource-based view. This resulted in a list of specific arguments for servicizing re-categorized in the categories of market, efficiency and resource arguments. Some of the specific arguments for servicizing may provide sustained competitive advantage under the right conditions while many are conductive for temporary profits. These are the topics of sub-question 2 and 3 respectively.

Sub-question 2: When does servicizing result in sustained competitive advantage?
The specific arguments for servicizing most likely to result in sustained competitive advantage are: Increased scope for differentiation, customer lock-in, efficiency, organizational complexity, customer relations and tacit knowledge. Negative impacts of servicizing could be short-term hurdles, stronger competitive forces, erosion of existing resources or strengthening of competitors' resource base. To provide sustained competitive advantage, the negative impacts of servicizing must be less than the positive impact from the arguments in favour.

Sub-question 3: How does servicizing affect the servicizer in the short run?
All arguments otherwise able to result in sustained competitive advantage will at best provide only temporary benefits if competitors are able to replicate the servicizer's offer or if a strong competitive force is able to capture the benefits. In particular, market and efficiency arguments may not be protected against

competition. Additionally, the process of servicizing will often challenge the servicizer and may threaten the very existence of the company. Particularly, if a servicized market will be protected by barriers to entry, the servicizer should consider why it is able to surpass the barriers more easily than potential competitors. Other short-term challenges include coping with cultural change, acquiring appropriate resources and manoeuvring strategic opposition.

After having discussed the three sub-questions, we are able to answer the overall research question:
Under which circumstances does servicizing generate competitive advantage?

Servicizing may in some cases generate competitive advantage to the servicizer. Whether it will, is contingent both on the properties of the servicized market and on the characteristics of the servicizing company. Commoditization may be the result of competitive market forces eroding the monopoly rents of the market; it may be due to the individual firm's relative lack of valuable, rare, inimitable and non-substitutable resources and therefore the firm's inability to generate efficiency rents; or a combination of both. Servicizing is predicted to result in sustained competitive advantage only when it removes at least one primary source of commoditization either by weakening a dominant competitive force or by utilizing the company's idiosyncratic resources and/or generating valuable ones that will be difficult for competitors to replicate. Even then will it be successful only if such positive effects outweigh the potential losses from not only resource-destroying and market-deteriorating effects but also from the temporary challenges of adapting the organization and its stakeholders to a new business model.

While servicizing does not always result in sustained competitive advantage for the servicizer, it may still be the optimal choice if it entails temporary positive effects. In this case, there is reason to believe that servicizing will become the market default and perhaps even a condition for participation. In contrast, servicizing may well be too difficult, costly or unlikely to succeed in the short run to ever be a viable option for a company even if the long-term effects are predicted to be positive.

Regardless of the reason for servicizing, the company needs to be aware of the challenges such a transition poses to both itself and the market. Servicizing may sometimes be a lucrative strategy but it is often a perilous one.

8 Further Research

This sections contains a series of avenues of further research related to the findings of this thesis and suggestions for how such research could potentially be carried out. The suggestions are not an exhaustive list

and I encourage researchers to apply their own theoretical and practical knowledge to come up with additional research areas.

As has been made explicit, this thesis has been written within a realistic ontology applying a rationalistic epistemology through a deductive method. Further research could be carried out using a different set of assumptions. In particular, the deductive method cannot stand alone as a source of knowledge about the practical world. Deductive reasoning is often used to formulate specific hypotheses that can be tested empirically. This conception of science is often used as the foundation for critical rationalism where the hypotheses should be sought falsified. The more attempts of falsification a hypothesis can withstand, the more likely is it to correspond to reality (Ingemann, 2013, pp. 73-78). Such research could be carried out through a longitudinal study of several companies considering servicizing and making predictions about their performance based on a careful *ex ante* analysis using the framework developed in this thesis and testing the predictions against their actual performance a number of years after their decision whether to servicize or not.

Alternatively, a hermeneutic method resulting in rich, qualitative case descriptions of servicizing companies may be able to uncover deeper aspects of the phenomenon and expand our understanding of contextual factors and interpret the meaning of servicizing to various stakeholders.

Even within the applied epistemology there is plenty of room for deepening our theoretical knowledge about the field. Sophisticated economic-mathematical models could be devised to help quantify the potential between short-term costs and long-term advantages. Such models could in turn form basis for econometrical analysis again linking the findings to the real world. Alternatively, the model could seek to incorporate a wider range of conceptions of competitive advantage. Potentially, continued innovation may result in quasi-persistent temporary competitive advantage as a form of Schumpeterian rent. Such a model may find use in the dynamic capabilities framework (Teece, Pisano, & Shuen, 1997). Alternatively, the game-theories of strategic conflict (Shapiro, 1989) could be applied to explain how servicizing affects how games are played.

Future studies could also seek to enhance our knowledge of the welfare effects of servicizing potentially including environment, consumer choice and employment issues. If servicizing is found to be socially attractive, further research on public incentives for servicizing could be carried out. For example, it is usually difficult or impossible to get patents on service innovations which may limit the incentives for innovation or the current laws may inadvertently benefit products to the detriment of services or limit the potential of the sharing economy (Botsman & Rogers, 2011).

As a final remark to this thesis I would like to direct attention to the potential of increasing the knowledge about the practicalities of transitioning a manufacturer to become a service provider and on founding service ventures. There is a large range of models for optimizing the production of goods including traditional microeconomics, extensive production cost models (e.g. Balakrishnan, Labro, & Sivaramakrishnan, 2012) or lean production methods (e.g. Womack & Jones, 1996). Similar models for services seem to be much fewer and less widely adopted potentially resulting in servicizing falling behind production due to a lack of business literature. Especially if servicizing has the welfare effects that have been proclaimed, it would be sad indeed if servicizing is not pursued due merely to lack of focused research.

9 References

3. (2015, April 29). *Roskilde Festival og 3 giver gratis opladning overalt på årets festival*. Retrieved February 8, 2016, from 3: https://www.3.dk/om3/presse/pressemeddelelser/2015/gratis-opladning-paa-roskilde-festival/

Adner, R. (2013, June 7). Don't draw the wrong lessons from Better Place's bust. *Harvard Business Review*. Retrieved February 2, 2016, from Harvard Business Review: https://hbr.org/2013/06/dont-draw-the-wrong-lessons-fr/

AdvertisingAge. (2013, July 8). *Infographic: Meet America's 25 biggest advertisers*. Retrieved February 8, 2016, from AdvertisingAge: http://adage.com/article/news/meet-america-s-25-biggest-advertisers/242969/

Afuah, A. N., & Utterback, J. M. (1997). Responding to structural industry changes: A technological evolution perspective. *Industrial and Corporate Change, Vol. 6*(1), pp. 183-202.

Allmendinger, G., & Lombreglia, R. (2005, October). Four strategies for the age of smarter services. *Harvard Business Review*, pp. 131-145.

Balakrishnan, R., Labro, E., & Sivaramakrishnan, K. (2012). Product costs as decision aids: An analysis of alternative approaches. *Accounting Horizons, Vol. 26*(1), pp. 1-41.

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management, 17*, pp. 99-120.

Bianco, A., & Moore, P. L. (2001, March 5). Xerox: The downfall. *BusinessWeek*. Retrieved February 12, 2016, from http://www.businessweek.com/2001/01_10/b3722001.htm

Birkler, J. (2005). *Videnskabsteori.* København: Munksgaard.

Boehret, K. (2007, August 1). *How the big photo-sharing sites stack up*. Retrieved February 4, 2016, from All Things D: http://allthingsd.com/20070801/how-the-big-photo-sharing-sites-stack-up/

Botsman, R., & Rogers, R. (2011). *What's mine is yours. How Collaborative Consumption is Changing the Way we Live.* London: Collins.

BusinessWeek. (2001, August 6). The 100 top brands. *BusinessWeek*, pp. 60-64. Retrieved February 5, 2016, from http://www.businessweek.com/pdfs/2001/0132-toprank.pdf

BusinessWeek. (2005, August 1). The 100 top brands. *BusinessWeek*, pp. 90-94. Retrieved February 5, 2016, from http://www.businessweek.com/pdfs/2005/0531_globalbrand.pdf

Charge Candy. (2015). *Charge Candy*. Retrieved February 21, 2016, from http://chargecandy.com

Chesbrough, H. W. (2011). *Open services innovation.* San Francisco: Jossey-Bass.

Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: Evidence from Xerox Corporation's technology spin-off companies. *Industrial and corporate change, Vol. 11*(3), pp. 529-555.

Christensen, T. B., Wells, P., & Cipcigan, L. (2012, September). Can innovative business models overcome resistance to electric vehicles? Better Place and battery electric cars in Denmark. *Energy Policy*, pp. 498–505.

Dam, T. A. (2015, November 16). Interview A - Dam. (A. J. Larsen, Interviewer)

Daneman, M. (2013, April 29). Kodak selling two businesses to pension plan. *USA today*. Retrieved February 6, 2316, from http://www.usatoday.com/story/money/business/2013/04/29/kodak-bankruptcy-selling-businesses-pension-plan/2120695/

de la Merced, M. J. (2012, January 19). Eastman Kodak files for bankruptcy. *The New York Times*. Retrieved February 6, 2016, from http://dealbook.nytimes.com/2012/01/19/eastman-kodak-files-for-bankruptcy/?_r=0

Dierickx, I., & Cool, K. (1998). Asset stock accumulation and sustainability of competitive advantage. *Management Science, Vol. 35*(12), pp. 1504-1511.

DriveNow. (2015, June 29). *Press release: DriveNow - Four years of innovative urban mobility.* Retrieved from DriveNow: https://prod.drive-now-content.com/stage/fileadmin/user_upload_de/12_Presse/Pressemitteilungen_PDF/Englisch/2015/2015.06.09-_DriveNow_four_years.pdf

Dyer, J. H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*(4), pp. 660-679.
Eisenmann, T., Parker, G., & van Alstyne, M. W. (2006, October). Strategies for two-sided markets. *Harvard Business Review* , pp. 92-101.
Euromonitor. (2016). *Company Shares Ranking - Imaging Devices.* Euromonitor International. Retrieved February 1, 2016
Farago, J. (2013, August 23). *Our 'Kodak moments' – and creativity – are gone*. Retrieved February 6, 2016, from The Guardian: http://www.theguardian.com/commentisfree/2013/aug/23/photography-photography
Fortune. (2015). *143. Xerox.* Retrieved January 9, 2016, from Fortune.com: http://fortune.com/fortune500/xerox-143/
Foss, N. J. (1997). *Resources, firms, and strategies: A reader in the resource-based perspective.* Oxford: Oxford University Press.
Fowler, B. (2013, September 3). AP exclusive: Kodak CEO talks company's future. *Associated Press*. Retrieved February 6, 2016, from http://www.apnewsarchive.com/2013/AP_EXCLUSIVE%3A_Kodak_CEO_talks_company%27s_future/id-c6e7c99d5e29464ea46c4d23d527d1ba
Frank, R. H. (2008). *Microeconomics and behavior* (International edition 2008 ed.). New York: McGraw-Hill.
Gartner through Credit Suisse. (2011). *IT Hardware.* Retrieved February 13, 2016, from https://thenextpractices.files.wordpress.com/2011/03/cs-it-hardware.pdf
Glastonbury Festival. (2015, June 4). *Phone charging & wifi at Glastonbury*. Retrieved February 21, 2016, from Glastonbury Festival: http://www.glastonburyfestivals.co.uk/phone-charging-and-wifi-at-glastonbury-2015-order-your-ee-power-bar-now/
Godske, B. (2011, March 3). *Se hvad det koster at køre i elbil fra Better Place*. Retrieved February 3, 2016, from Ingeniøren: http://ing.dk/artikel/se-hvad-det-koster-kore-i-elbil-fra-better-place-117022
Helft, M. (2006, October 30). A dot-com survivor's long road. *The New York Times*. Retrieved February 20, 2016, from http://www.nytimes.com/2006/10/30/technology/30shutterfly.html?pagewanted=print&_r=0
Higgins, T. (2015, January 27). Apple announces record iPhone sales over holiday quarter. *Bloomberg Business*. Retrieved February 18, 2016, from http://www.bloomberg.com/news/articles/2015-01-27/apple-s-record-iphone-sales-top-estimates-for-holiday-quarter
Holmes, A. (2012). *Commoditization and the strategic response.* Burlington: Gower.
Ingemann, J. H. (2013). *Videnskabsteori for økonomi, politik og forvaltning.* Frederiksberg: Samfundsliteratur.
Kodak. (n.d.a). *Our company*. Hentet 20. January 2016 fra www.kodak.com: http://www.kodak.com/ek/US/en/About_Kodak_Top/Our_Company.htm
Kodak. (n.d.b). *Milestones*. Retrieved January 20, 2016, from www.kodak.com: http://www.kodak.com/ek/us/en/corp/aboutus/heritage/milestones/default.htm
Leistikow, D. (2013, June 10). *The eGallon: How much cheaper is it to drive on electricity?* Retrieved February 3, 2016, from Energy.gov: http://energy.gov/articles/egallon-how-much-cheaper-it-drive-electricity
Lucas, H. C., & Goh, L. M. (2009). Disruptive technology: How Kodak missed the digital photography revolution. *Journal of Strategic Information Systems, 18*, pp. 46-55.
Markides, C. (1997). Strategic innovation. *Sloan Management Review, Spring*, pp. 9-23.
Mattioli, D. (2012, April 25). Shutterfly to snap up Kodak site. *The Wall Street Journal*. Retrieved February 6, 2016, from http://www.wsj.com/articles/SB10001424052702303592404577364271258571262
McAfee, A. (2014, May 07). *With services like Uber, why fight a good deal?* Retrieved February 21, 2016, from New York Times: http://www.nytimes.com/roomfordebate/2014/05/06/regulating-the-sharing-economy/with-services-like-uber-why-fight-a-good-deal
Merriam-Webster. (n.d.a). *Epistemology*. Hentet 4. January 2016 fra merriam-webster.com: http://www.merriam-webster.com/dictionary/epistemology

Merriam-Webster. (n.d.b). *Deduction*. Retrieved January 4, 2016, from merriam-webster.com: http://www.merriam-webster.com/dictionary/deduction
MTV mobile. (n.d.). *MTV mobile ist Hauptsponsor der schönsten Festivals der Schweiz*. Hentet 8. February 2016 fra MTV mobile: http://www.mtvmobile.ch/gif-me-more-mtv-mobile/dein-festival-deluxe/
Munir, K. (2012, February 26). *The demise of Kodak: Five reasons*. Retrieved February 6, 2016, from The Wall Street Journal: http://blogs.wsj.com/source/2012/02/26/the-demise-of-kodak-five-reasons/
Nalebuff, B. J., & Brandenburger, A. M. (1997). "Co-opetition: Competitive and cooperative business strategies for the digital economy. *Strategy & Leadership, Vol. 25*(6), s. 28-33.
Nealer, R., Reachmuth, D., & Anair, D. (2015). *Cleaner cars from cradle to grave.* Union of Conserned Scientists. Retrieved February 21, 2016, from www.ucsusa.org/EVlifecycle
Nielsen, R. S. (2015, November 23). Interview B - Nielsen. (A. J. Larsen, Interviewer)
Oliva, R., & Kallenberg, R. (2003). Managing the transition from products to services. *International Journal of Service Industry Management, Vol. 14*(2), pp. 160-172.
Orsato, R. (2009). *Sustainability strategies: When does it pay to be green?* Basingstoke: Palgrave and MacMillan, INSEAD Business Press.
Perloff, J. M. (2012). *Microeconomics* (Sixth Global Edition ed.). Essex: Pearson Education Limited.
PlugGO. (2015). *PlugGO*. Retrieved February 21, 2016, from http://pluggochargers.com
Porter, M. E. (1980). *Competitive Strategy.* New York: Free Press.
Porter, M. E. (2008, January). The five competitive forces that shape strategy. *Harvard Business Review*, pp. 78-93.
Reed, J. (2013, May 26). *Electric car group Better Place files for bankruptcy*. Retrieved February 2, 2016, from Financial Times: http://on.ft.com/13Tr2eB
Ricardo, D. (1817). *On the principles of political economy and taxation* (1. ed. ed.). London: John Murray. Retrieved Nov. 26, 2015, from https://books.google.bg/books?id=cUBKAAAAYAAJ&dq=editions%3Ay8vXR4oK9R8C&hl=da&pg=PR7#v=onepage&q&f=true
Rothenberg, S. (2007). Sustainability Through Servicizing. *MITSloan Management Review Vol 48, No. 2*.
Sawhney, M., Balasubramanian, S., & Krishnan, V. V. (2004). Creating growth with services. *MIT Sloan Management Review, Winter*, pp. 34-43.
Schaps, K., & Eckert, V. (2014, January 9). Europe's storms send power prices plummeting to negative. *Reuters*. Retrieved February 2, 2016, from Europe's storms send power prices plummeting to negative
Shapiro, C. (1989). The theory of business strategy. *RAND Journal of Economics, 20(1)*, pp. 128-137.
Siliconindia. (2005, March 31). *HP to acquire leading online photo service Snapfish*. Retrieved February 4, 2016, from Siliconindia Magazines: http://www.siliconindia.com/magazine_articles/HP_to_Acquire_Leading_Online_Photo_Service_Snapfish-TRL849552750.html
Smukfest. (2015, Aug 06). *Nem opladning i samarbejde med Telia*. Retrieved from www.smukfest.dk: http://www.smukfest.dk/seneste-nyt/nyheder/nem-opladning-i-samarbejde-med-telia/
Springborg, S. (2013, May 1). *Renault-chef svækker Better Place-model*. Retrieved February 2, 2016, from EnergiWatch: http://energiwatch.dk/Energinyt/Cleantech/article5393397.ece
Stafford, A. (2006). *The 100 best products of 2006 - Best products 81-90*. Retrieved February 4, 2016, from PCWorld: http://www.pcworld.com/article/125706/article.html?page=10
Statista. (2014, December). *Industry sectors ranked by advertising expenditure in Denmark in 2013 (in million Danish kroner)*. Retrieved February 8, 2016, from Statista: http://www.statista.com/statistics/451550/advertising-expenditure-by-industry-sector-in-denmark/
Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal, Vol. 18:7*, pp. 509-533.
The Economist. (2009, January 8). Britain's lonely high-flier. *The Economist*. Retrieved February 18, 2016, from http://www.economist.com/node/12887368
The Economist. (2012, January 14). The last Kodak moment? *The Economist*. Retrieved January 21, 2016, from http://www.economist.com/node/21542796

Tsurumi, Y., & Tsurumi, H. (1999). Fujifilm-Kodak duopolistic competition in Japan and the United States. *Journal of International Business Studies, 4th quarter, Vol. 30*(4), pp. 813-830.
Volt. (n.d.). *Volt - portable charging for festival-goers*. Retrieved February 20, 2016, from Getvolt.dk: https://assets.brandfolder.com/my8fpxlb/original/About%20Volt.pdf
Vækstfonden. (2015). *Formål og strategi*. Retrieved from www.vf.dk 19. Aug. 2015: http://www.vf.dk/om-vaekstfonden/formaal-og-strategi.aspx
Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal, Vol. 5*(2), pp. 171-180.
Wharton. (2012, February 1). *What's wrong with this picture: Kodak's 30-year slide into bankruptcy*. Retrieved February 6, 2016, from Knowledge@Wharton: http://knowledge.wharton.upenn.edu/article/whats-wrong-with-this-picture-kodaks-30-year-slide-into-bankruptcy/
Womack, J. P., & Jones, D. T. (1996). *Lean thinking: Banish waste and create wealth in your corporation.* New York: Simon & Schuster.
Woody, T. (2013, May 26). *Another clean-tech startup goes down: Better Place is bankrupt*. Retrieved February 3, 2016, from The Atlantic: http://www.theatlantic.com/technology/archive/2013/05/another-clean-tech-startup-goes-down-better-place-is-bankrupt/276257/
Xerox. (1999, August 9). *The story of xerography.* Retrieved February 12, 2016, from Xerox.com: http://www.xerox.com/downloads/usa/en/s/Storyofxerography.pdf
Xerox. (2016). *The Haloid Company*. Hentet 9. January 2016 fra Xerox.com: http://www.xerox.com/about-xerox/history-timeline/enus.html
Xerox. (n.d.). *Services*. Hentet 18. January 2016 fra xerox.com: https://www.xerox.com/en-us/services