

Business models for product life extension

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Abstract

Products are being used for shorter and shorter times, which causes environmental degradation and an increasing scarcity of natural resources. On the other hand, businesses face pressure to succeed in the highly competed global market. This master's thesis aims to show, how businesses could manufacture or use longer lasting products and be profitable at the same time – the objective of this thesis is to find out, how business models could enable the extension of product lifespans.

The literature review of this thesis presents the background of planned obsolescence, a phenomenon which has led people to ask, why products no longer last. Whether it is physical or technological obsolescence, consumers can or will not use products as long as they used to. Also previous research around the business model concept and sustainable business models is discussed. The reasoning behind what makes a business model a good unit for analyzing product life extension is explained in the methodology section. The empirical part of this thesis focuses especially on what the characteristics of such business models are that have made product life extension possible.

This research is conducted as a multiple case study, in which altogether five different business models from different industries act as the case studies. The data is collected from multiple sources: two semi-structured interviews are conducted, and secondary data from e.g. company websites, newspapers and government institutions' websites is collected. The data is analyzed according to three business model features: value proposition, revenue model and customer interface. Afterwards the features of the case business models are compared to those of their competitors.

The research indicates that there are numerous factors that influence the success of business models which extend product lifespans. On the basis of the case study it can be concluded that such factors as ageless and aesthetic product design, efficiency and experience in running a service supply chain, offering a service instead of a product (servitization), powerful brand stories, reuse and recycling of products and materials, and warranty as a quality promise can help companies in producing and using longer lasting products, as well as in profiting from them. Nevertheless, the suitability of these factors may be industry and even business specific.

Moving to a more service-centered way of consumption could offer a solution to the environmental problems and scarcity of resources we are facing on the planet. Servitization seems to work especially for B2B types of companies, but product-service systems for consumers seem to be more difficult to achieve. The cooperation of businesses, consumers and governments is needed in order to be able to use and produce longer lasting products.

Keywords business models, product life extension, planned obsolescence

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Tiivistelmä

Tuotteita käytetään yhä lyhyempiä aikoja, mikä aiheuttaa ympäristön pilaantumista sekä luonnonvarojen niukentumista. Toisaalta yritykset kohtaavat paineita menestyä hyvin kilpailluilla, globaaleilla markkinoilla. Tämä maisteritutkinnon tutkielma pyrkii näyttämään, miten yritykset voivat tuottaa tai käyttää pitempään kestäviä tuotteita, ja olla kannattavia samaan aikaan – tutkielman tavoitteena on selvittää, miten liiketoimintamallit voivat mahdollistaa tuotteiden eliniän pidentämisen.

Tutkielman kirjallisuuskatsaus esittelee suunnitellun vanhenemisen käsitteen, joka eritoten on saanut ihmiset kyseenalaistamaan tuotteiden lyhyet käyttöiät. Fyysinen tai teknologinen vanhentuminen on aikaansaanut sen, että kuluttajat eivät voi tai eivät halua käyttää tuotteita niin pitkään kuin aiemmin. Myös aikaisempaa tutkimusta liiketoimintamallin konseptiin ja kestävä kehityksen liiketoimintamalleihin liittyen käsitellään. Se, miksi liiketoimintamalli on hyvä yksikkö tuotteiden pitkäikäistämisen tutkimista varten, perustellaan metodologia-osuudessa. Tutkielman empiirinen osuus keskittyy erityisesti olemassa olevien pitkäikäistävien liiketoimintamallien ominaisuuksiin.

Tutkimus toteutetaan monitapaustutkimuksena, jonka tutkimustapauksina toimivat viisi erilaista liiketoimintamallia eri aloilta. Aineisto kerätään monesta lähteestä: kahden puolistrukturoidun haastattelun lisäksi kerätään sekundaariaineistoa muun muassa yritysten, sanomalehtien ja valtion verkkosivuilta. Aineistoa analysoidaan kolmen liiketoimintamallin osan perusteella: arvolupauksen, ansaintalogiikan ja asiakasrajapinnan. Tämän jälkeen yritystapauksien liiketoimintamallien osien ominaisuuksia verrataan kilpailevien yritysten liiketoimintamalleihin.

Tutkimus osoittaa, että lukuisat tekijät vaikuttavat pitkäikäistävän liiketoimintamallin menestykseen. Monitapaustutkimuksen perusteella voidaan todeta, että tekijät kuten iätön ja esteettinen tuotesuunnittelu, tehokkuus ja kokemus palvelutoimitusketjun hallinnoinnissa, palvelun tarjoaminen tuotteen sijasta (palveluistaminen), vahvat bränditarinat, tuotteiden ja materiaalien uudelleenkäyttö ja kierrätys, sekä takuu laatulupauksena voivat edesauttaa yrityksiä tuottamaan ja käyttämään pitkäikäisempiä tuotteita menestyksekkäästi. Nämä onnistumistekijät voivat kuitenkin olla ala- ja jopa yritysکوhtaisia.

Siirtyminen yhä palvelukeskeisempään kuluttamiseen voisi vähentää kohtaamiemme ympäristöongelmia ja luonnonvarojen niukkuutta. Palveluistaminen näyttää toimivan eritoten B2B-yritysten tapauksessa, kun taas kuluttajille tarjotut tuote-palveluratkaisut ovat vaikeampia toteuttaa. Yritysten, kuluttajien ja valtionjohdon yhteistyötä tarvitaan pitkäikäisempien tuotteiden käytön ja tuotannon mahdollistamiseksi.

Avainsanat liiketoimintamallit, tuotteiden pitkäikäistäminen, suunniteltu vanheneminen

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1. Introduction

1.1. Research problem and background

The globalized market economy has brought our planet to a state where we are using renewable natural resources worth 1.5 earths in a year (WWF 2012). This means that the human population is over-consuming what the planet provides, which puts the livelihoods of future generations at stake. Next to using up the planets limited resources, overconsumption is also damaging the environment in ways that are already visible to our generation. Landfills are filling up, climate is changing and chemicals used in everyday products are causing diseases, as the gross national products need to grow. (Speth 2008; Hawken, Lovins and Lovins 2000).

Capitalism has brought the Western world from deficiency of food and utensils to abundance, where food is produced so much it goes to waste and products have become more or less disposable items. Especially the lifespans of durable goods seem to have shortened dramatically, and whereas the products used to be seen as investments that one had to save a month or two's paycheck for, today they are available for a nominal price. (Slade 2006; Cooper 2010).

During the shift from deficiency of the early 1900s to the abundance of the 2000s, something also changed in business life. When the domestic consumption of the United States took a big hit in the 1930s, business men decided something is needed to get people buying again. The invention was to shorten the lifespans of products in order to sell more. This then began the ever-expanding production of cheap consumer products, as well as the creation of needs that people did not know they had before. Consumer mindsets changed thoroughly, and people started to want what was new, not necessarily what was actually needed. (Slade 2006).

The faster than ever replacement of products has nevertheless also gotten many people thinking: what is the sense in just buying new and new products? What would be the alternative? The technologies for creating more durable and longer-lasting products exist. It is however the structure of companies' revenue models and the overall market economy that pose challenges: how can companies remain profitable if they cannot sell as much as they used to? How could companies operate in a way that would harm the environment less, use less natural resources as well as maintain a long-term profitability? Is it possible for

businesses to do this by themselves? Or are governments and other institutions needed for the change?

I am interested in finding out what the possibilities from a business point of view would be to create longer lasting products, so as to diminish the amount of natural resources used and the pressure set to the environment. One way to look at this is to study the concept of a business model, which combines the viewpoint of how a business works to how it interacts with the surrounding world. According to Zott, Amit and Massa (2011), business models offer a systemic perspective on business, which I think is crucial when trying to find out how a systemic change towards product sustainability could be reached in business.

Thus, I propose that in order to find out how businesses could extend product lifespans, create less damage to the environment and still remain profitable, it is important to look at existing business models, which act in such way. The questions that I want to answer with this thesis are: 1) what types of business models are there, that prolong the lifespan of a product? And 2) what are the special characteristics of these business models compared to conventional business models? (With “conventional” I refer to business models, which do not give special attention to how long products last.)

1.2. Research method and data

The first question will be answered both on the basis of existing literature, and empirical research. The second question will be answered mostly on basis of the empirical research, as there is only little existing research on the topic.

The empirical part of the research is conducted as a qualitative multiple case study, where the unit of analysis is a business model, and more specifically, three features of a business model: value proposition, revenue model and customer interface. The case study research strategy suits this kind of a research topic in the sense that the information that is needed is descriptive, and the aim is to compare the business model features. This case study is conducted with the help of a multiple number of sources (interviews, secondary data), which enables a multifaceted description of the cases.

The chosen case examples were the business models of 3 Step IT, Artek 2nd Cycle, Lindström, Patagonia and Victorinox. Three of these were consumer-oriented businesses, and two focused solely on corporate or public organization clients. In addition, the businesses differ in size and industry, which gave the research a wider perspective. Nevertheless, finding even

these five examples was not easy, and it seems that having long product life spans is not a priority for the majority of businesses today.

1.3. Research objectives

The objective of this research is to study the workings of the chosen case businesses that enhance product longevity. This is done in order to be able to identify the differentiating factors of such companies so as to be able to say which elements help companies to succeed with longer lasting products. For now, it seems like the majority of companies succeed especially because they are not thinking or do not care about the lifespans of their products, but about selling more and shorter-lived products. Nevertheless, in order to be able to live on this planet and sustainably use its resources, new possibilities to do more sustainable business must be found (Hawken et al. 2000).

The business model features that are studied here will shed light on what makes it possible for the case companies to succeed as businesses that want to offer their customers solid and durable quality products. This includes also the study of the so called product-service-system companies, which have moved the focus of their business from selling products to selling the services that the products can provide. The so-called servitization could change the economy into a less resource-intensive one, and save also companies' assets for better use.

The field of business models for product life extension is not very widely researched so far, so this research also aims to fill a part of this gap, and provide implications for further research.

1.4. Definitions and limitations

The vocabulary around product lives and their extension is manifold, which is why I will present a short list of definitions of concepts, which are used throughout this thesis.

Product lifespan - According to Cooper (2010, 9): “a product’s ‘technical life’ is the maximum period during which it has the physical capacity to function”. Nevertheless, the maximum period is rarely reached, as repair or maintenance work is too costly or requires a lot of effort, or because consumers choose to let go of the product for other reasons. There is also the ‘service life’ of a product, which reflects the time a product is actually “providing a service” for the consumer. A ‘replacement life’ is “the period from initial sale to the point at which the owner purchase a replacement, regardless of whether or not the original product still functions” (Cooper 2010, 9). Heiskanen (1996) has also mentioned the ‘economic life’ of

a product, which she explains as the time before the point when maintaining a product is more expensive than replacing it.

Product life cycle is a concept used in different ways in different contexts. According to Cooper (2010), it means the successive phases of acquisition, use and disposal when looking at consumption. In a marketing context, one can look at the series of stages (development, market introduction, growth, maturity, and decline) of a certain product. Life cycle assessment again is a technique where the environmental effect of a product is calculated from the extraction of raw materials to waste disposal. (Cooper 2010).

Durability means the ability of a product to perform its required function over a lengthy period under normal conditions of use without excessive expenditure on maintenance or repair (Cooper 2010). According to Cooper, durability is a measure of how long a product continues to function as intended and withstands wear and tear, or resists stress or force, before the product develops a defect that is irreparable.

Longevity is a description of a product's lifespan and differs slightly from the meaning of durability. Longevity is partially defined through other factors than the attributes formed in design and manufacture – it has a meaning that includes user behavior towards a product as well as a wider, socio-cultural viewpoint. In order to fully utilize a product's potential lifespan, deliberate efforts such as careful use, regular maintenance, repair, reconditioning and reuse of functional items, need to be made (Cooper 2010). A product's life can be extended, i.e. its longevity can be enhanced through improving intrinsic durability, influencing user behavior or promoting wider socio-cultural change (Heiskanen 1996).

Planned obsolescence - The Oxford English dictionary (2013) defines planned obsolescence as “the practice or policy of curtailing the life of manufactured products (as by using non-durable materials, frequently changing design, terminating the supply of spare parts, etc.), so as to induce consumers to replace them regularly”. The act answers to one difficult challenge in today's globalized market economy: maintaining a high rate of sales growth. If a company merely sells its products instead of e.g. renting or leasing them, there are no more vested interests in the value of the goods sold (Guiltinan 2009). In addition, if there exists a market for the used versions of the durable good, there is more competition between new and used units, and the price for replacements becomes lower (Bulow 1986). To diminish the effects of this kind of competition, companies may increase the upgrading cycle frequency of products

(Iizuka 2007). According to Guiltinan (2009), this will enable companies to reach more revenues, reduce competition and increase prices of the new, upgraded products.

Because extending product lifetimes is a complicated matter not only technologically but especially in a business sense, this study has been conducted under a set of assumptions. Product life extension can be seen as a highly technological issue, but this thesis takes the existence of technologies that make product life extension possible as default. Because products actually used to last longer before, and because technology has only gone forward, the business perspective seems to be the biggest obstacle for companies to not create longer lasting products. Asking how a company can remain profitable even when producing or using better lasting products than before is above all a business-related question.

In addition, it is not completely clear and not the focus of this thesis to point out, if the actual lengthening of a product's lifespan is beneficial for the environment. The expectation is that it is, but complicated calculations that consider the material flows and energy use of the products and their competitors need to be carried out in order to be sure. These calculations have not been conducted in this thesis project. For some case examples this has nevertheless been done by external parties, such as governmental research institutes.

This study encounters also limitations. First of all, the generalizability of the results from the five case examples is not necessarily very strong. The companies present different industries and very different types of businesses, which is why the conclusions must be looked at very carefully. The limitations of the research strategy are studied in more depth in chapter 3.2.

1.5.Thesis structure

After this introduction I move on to discuss business models for product life extension. Chapter 2 will explain the background behind why I need to be asking my research questions: why has product obsolescence become a normal design attribute for companies and what can be done about it? In addition, I will present the research behind business models, which serves as the unit of examination when I look at what businesses can do about planned obsolescence. Chapter 3 will show the details on how I have conducted this research. It explains what has influenced my research design decisions and also what the limitations of the research type are.

Chapters 4 and 5 present the findings I have made through the empirical materials I have used. Chapter 4 focuses on describing the case study business models: the companies are presented in an alphabetical order with an overall look at the company as well as descriptions

of the chosen business model features: value proposition, revenue model and customer interface. Chapter 5 goes through these business model features from the point of view of product life extension: in this chapter I compare the case example business model features to what can be seen as the status quo of their respective industries and try to find the defining differences in the case companies' way of doing business. Chapter 6 presents the conclusions that I make when combining the information acquired through the literature review, and the empirical research. I also combine the results into the bigger picture and societal discussion that has been going around in the recent years, and which was already lightly touched upon in this introductory chapter.

2. Literature review on product life extension and business models

The growth of gross national products has been the measurement of human development for decades now, and worked as a tool for governments for directing the way in which businesses should operate. The statutory *raison d'être* of companies is to create profit for their shareowners, which, in many cases, has led to short-sighted decision-making especially in publicly listed companies. Quarterly capitalism drives also planned obsolescence activities, as sales growth is one of the influencers of the stock price.

According to Stahel (2010), the industrialized world sees durability as an obstacle for mass consumption, where growth in production and sales volumes are possible only through a diminished lifespan of products. Some researchers have viewed obsolescence in a positive light, saying longer lives for products would “lock society into a stock of products inefficient in their use of energy”, and that planned obsolescence is the driver of technological advancement, which is needed (Fishman, Gandal and Shy 1993). Heiskanen (1996) is more critical on updating appliances prematurely and argues that consumers will gain more in energy-efficiency if they delay replacements, given that innovation continues at the same rate.

According to Cooper (2005), the literature on sustainable development recognizes the need to address resource throughput, but the role of longer product lifespans is rarely mentioned in connection to it. When sustainability is promoted in design, it is usually promoted through ways like reducing water and energy use and increasing the use of recycled materials. These advancements have not improved the durability or longevity of products (Consumers International 1998 in Cooper 2005). Cooper notes that increased product longevity could be achieved through better durability (designing products to last) or through an improved maintenance through careful use, repair, upgrading and reuse.

According to Stahel (2010), companies can profit from more durable and better performing products by designing new business models, which focus on selling performance. This way companies can exploit the effort they have put into more durable products, by selling the function (i.e. results or performance) the products provide, and earning higher profits. Through the design of longer lifespans companies can also reduce the amount of waste they have to take care of.

This literature review aims to shed light on why product obsolescence has become a problem, and what the possibilities to fight this problem are. Especially, what could businesses do in

order to remain profitable while selling or utilizing longer lasting products? What could this kind of a business model look like?

2.1.Planned obsolescence

According to Cooper (2010), public discussion on product life spans has historically concentrated around the concept of planned obsolescence. I will discuss this concept in further detail in this subchapter: the history behind planned obsolescence, the present drivers for it, as well as the ways to fight it according to academic literature.

2.1.1. The history of and research on planned obsolescence

Slade (2006) discusses the history of planned obsolescence in his book *Made to Break*. He mentions that already in the 1870s the U.S. was suffering of overproduction, when large amounts of unsold goods were filling up warehouses. According to Slade (2006, 9-10), American business men did not solve the overproduction problem by producing less, but by selling more – and so advertising was created. Advertising came not only to boost sales, but to increase repetitive sales, which was created through different manufacturing strategies: branding, packaging, creating disposable products and changing the styles of nondisposable products so as to make them obsolete in the minds of consumers. (Slade 2006).

Planned obsolescence was introduced as a possibility to stimulate economic activity and fight the declining markets (Packard 1960, Slade 2006). According to Slade (2006, 29), obsolescence was first introduced through the American car industry, as Ford and General Motors' competition grew fiercer. Ford's T model, which Ford designed to be as durable as possible, could not compete with GM's yearly changing models. GM seemed to create growth in sales whereas Ford's sales rates were dropping, and Ford eventually decided he had no choice but to follow GM's strategy and start producing new models to the market yearly. Slade (2006) points out that after the rest of the car industry started mimicking GM, also other industries in the U.S. copied the lessons of designing less durable, new-looking models and making the old ones seem obsolete.

As the 1930s' depression hit, manipulation of manufacturing for obsolescence was even seen as a means of revitalizing the economy (Cooper 2010). Then again the 1950s have generally been seen as the birth decade of the modern consumer society, and the infiniteness of resources seemed to enable what Cooper (2010) names the 'throwaway society'.

Packard's (1960) critique on the consumerist culture, *The Waste Makers*, highlighted the environmental effects of planned obsolescence, which had already then led to public discussion surrounding resource use and waste (Cooper 2010). Packard also talked about the intentional, 'psychological obsolescence', which meant that consumers were being falsely manipulated – obsolescence was slowly turning from a word meaning “something that wears out” into something that is meant to increase consumer spending intentionally.

The discussion raised by Packard quieted down a bit coming to the 70s, but the Organization for Economic Co-operation and Development (OECD) raised the question back up with a report on product durability and its effects on waste management in 1982 (Cooper 2010). With examples of non-repairable and non-maintainable durable goods (like disposable razors) and life-lengthening innovations that had actually been restricted by manufacturers (like light bulbs) the OECD was able to bring awareness to the issue without the problematic evidence on deliberate lifespan reduction by companies. (Cooper 2010).

Consumer behavior regarding product disposal and replacement was also studied during the 70s and 80s (e.g. deBell and Dardis 1979, Hanson 1980). A key finding was that different products experience different kinds of treatment by consumers: some are only used and then disposed of when broken or irreparable, whereas others were lent, stored, sold, donated or traded in. Also product owners' decision making concerning the items' disposal was seen as being under many influences (Cooper 2010). Coming to the 1990s, the United Nations Conference on Environment and Development in 1992 raised awareness on the environmental impact of consumer goods, which according to Cooper (2010) stimulated discussion on longevity in the context of sustainable design, the utilization of products and waste reduction.

The research on product design according to people's needs and feelings has continued in the 21st century, and e.g. Mugge, Schoormans and Schifferstein (2005) argue, that a design strategy that ensures a strong person-product relationship can postpone consumers' product replacements. According to them, designers can encourage a product's irreplaceability by stimulating memory formation associated to the product or by creating unique and personal products, which can create a long-lasting relationship with and a feel of meaning for the product. Van Nes and Cramer (2006) on the other hand propose that the effectiveness of product lifetime extension depends on the replacement motives of consumers. According to Cooper (2010), also studies related to waste behavior have been carried out through studying second-hand markets (such as eBay in Ellis and Haywood 2006).

Especially marketing research has discussed planned obsolescence in the past decades. In the most recent years, it is the growing emphasis on continuous product development that has brought the concept back into discussion: shorter replacement and disposal cycles for durable products have led to problematic environmental effects (Guiltinan 2009) and consumers as well as the media are starting to question the ethicality of ever-shortening product lifespans. Guiltinan's (2009) study recently brought up planned obsolescence in the context of business ethics.

Guiltinan (2009) proposed a twofold framework of the pathways into creating products that have a shorter lifetime:

Obsolescence practice	Definition	Meaning
Physical obsolescence	Limited functional life design ('death dating')	Enabling the use of an appliance after a certain date. Standard practice in the 1950s and 1960s (Slade 2006).
	Design for limited repair	Price of repair designed to be higher or near the price of new – encourages consumer electronics disposal and replacement.
	Design aesthetics causing reduced satisfaction	Products, which appear faultless when new, leave a pristine and polished appearance, but turns quickly damaged in everyday use – users become dissatisfied and dispose of them prematurely (Cooper 2005).
Technological obsolescence	Design for fashion	Changing fashion influences many durables replacement decisions. Designers apply fashion thinking to many consumer electronics.
	Design for functional enhancement through adding or upgrading product features	The development of technology allows companies to improve products by adding benefits or increasing the level of performance on existing benefits. The demand cross-elasticity depends on the new level of performance.

Figure 1: The ways to obsolescence (Guiltinan 2009).

Cooper (2010) again categorized four different modes of planned obsolescence:

Obsolescence type	Description	Example product
Aesthetic	A product that becomes faded, dirty and worn out, or goes out of fashion.	Clothing, white kitchen equipment that show wear and tear
Social	Behaviors change and people stop using a product altogether, or legislation prohibits the use.	Hula-hoops, Rubik's cubes, corsets; chlorofluorocarbons in refrigerators
Technological	A product becomes old as a newer one has better technological qualities.	Gramophones to iPods, typewriters to computers
Economic	Repair, maintenance, reuse or upgrade is too costly.	Sofa, cameras, low cost electrical and electronic appliances

Figure 2: Types of obsolescence (Cooper 2010).

Whichever the categorization, the researchers agree that there are several drivers for the different types of planned obsolescence.

2.1.2. Drivers of planned obsolescence

There seem to be an abundance of drivers for planned obsolescence. These can be seen as divided into internal and external drivers when looking at company decision making.

Guiltinan (2009) introduces two new product development strategy drivers, which enable the production of shorter lasting products. These drivers endanger the environment and influence the state of planned obsolescence:

- i) *Creative destruction* is the frequent introduction of replacement products, which make it possible to replace functioning durable products. Companies need to defend their market share by continuous innovation, and designers and engineers are able to include wanted benefits or styles into new products.
- ii) *Choice of materials* is the designers' and engineers' choices of components and materials influence the recyclability of new products. Depending on those making the design decisions, either the promotion of sustainable innovation or excessive consumerism follow.

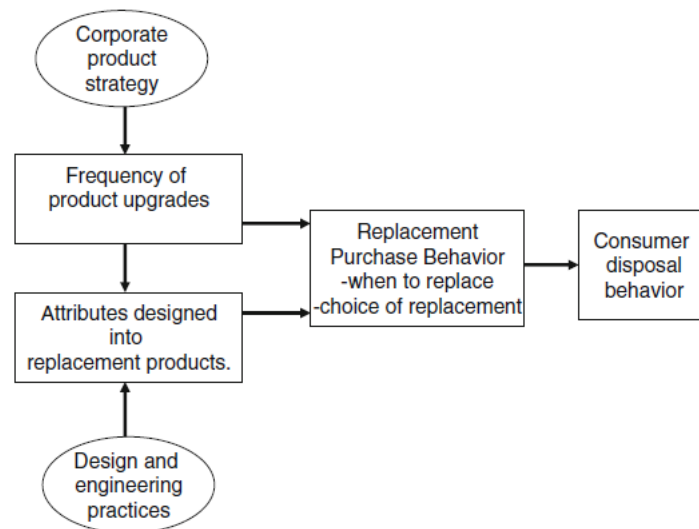


Figure 1. Product obsolescence and the environment: decisions and influences.

Figure 3: The decisions and influences affecting product obsolescence and the environment (Guiltinan 2009).

According to Guiltinan (2009), the challenge of durable goods producers is to maintain a high rate of sales growth. Good sellers saturate their markets at a fast pace, which gives incentive to planned obsolescence. If the company sells its products instead of e.g. leasing or renting them, there are no more vested interests in the products, but instead in the next round of goods to sell (Guiltinan 2009).

Furthermore, Bulow (1986) has studied the production behavior for durability under different economic market conditions: a monopolist that is not threatened by entrants will produce inefficiently short-lived products, whereas an oligopolist has an incentive to either uneconomically reduce or extend durability, depending on the technologies and market conditions (Bulow 1986). This is due to the fact that an oligopolist's competitor has to think their strategy according to the oligopolist's product durability – if one oligopolist is offering an extended durability, it may mean less sales for others. According to Bulow (1986), the antitrust policy (the U.S. competition law) requires companies to sell rather than rent their products in order to reduce monopoly power.

Also the existence of second hand markets pose a threat for companies that sell durable goods, as then there is additional competition between new and used products and their sellers. If the products are durable enough to last until second hand markets, they become a drag on the prices of new replacement products (Guiltinan 2009). This of course entails the assumption that people are going to replace their products at some point in any case. In order

to diminish the competition from the second hand market, companies update the products to create new sales. In Iizuka's (2007) study, textbook publishers revised book editions more frequently as the competition from used textbooks increased. However, textbooks may contain information that has outdated (fact-based books), whereas some products may serve the same function for decades.

Guiltinan (2009) summarizes the internal benefits of planned obsolescence for companies in three points: 1) it stimulates revenues because consumers replace old products faster; 2) it reduces competition from second hand markets; and 3) it enables an increased price for replacement products by virtue of making used or owned products less competitive.

The benefits from planned obsolescence from manufacturers' viewpoint are clear. Nevertheless, there are additional external drivers for it, which have driven the development of planned obsolescence further. Firstly, there is the competitive pressure for companies to engage in technological obsolescence, and secondly, consumers set pressure for it, too. Consumer behavior has an impact on the rate of disposal and replacement as well as on what is expected of the corporate sector. I will look at each external driver separately.

Competitive pressure – Sonntag (2000) points out that faster product cycles are a defining force in business strategy today, and that these fast-to-market strategies have to grow in order to compete, which requires a bigger market demand to begin with. That is why consumer needs are also created through advertising. According to Sonntag (2000), one solution proposed for this is to move from material intensive to knowledge-based economy and to decouple industrial activities from negative environmental impacts. Nevertheless, the approach has overlooked the issue of how much increasing competition affects the growth in consumption overall (Sonntag 2000). The gains in resource efficiency seem to be left behind by the rising trend in aggregate consumption: the energy efficiency of television sets increased by a factor of 3.5 between 1970 and 1995, but the aggregate energy consumption of televisions doubled within the same time (Hirschl 1998 in Sonntag 2000).

As firms have been able to massively reduce the production process times as well as the time needed for production to adapt to demand and competitive forces, the handling of orders and deliveries have become extremely fast (Sonntag 2000). Also the implementation of new product concepts and lowered unit and capital costs have resulted in a very flexible production system as a whole. This again, according to Sonntag (2000), amplifies the economies of scale, and makes the growth imperative hard to realize. Faster product

replacement and increased consumption of products are able to provide a quick answer, but not a sustainable solution. Nevertheless, if a company does not develop new product concepts to the place of its old ones, it is likely that competitors will (Guiltinan 2009).

In terms of brand loyalty, firms also create new technological add-ons for their products in order to not lose their existing customers – new customers are usually more expensive to gain than the ones that are already familiar with the firm's products. One example is the mobile phone operators' competition, where a new free phone is offered every 2 years as an incentive to renew mobile service contracts with the same operator (Guiltinan 2009).

Consumer behavior - According to Guiltinan (2009), the success and consequences of technological obsolescence are ultimately dependent on consumers, who decide if and when they want to replace functioning durable products with new versions. Technical product obsolescence is a significantly more important driver for replacement timing than physical obsolescence. This means that people want to replace products with more technologically advanced ones before they actually become useless (Guiltinan 2009).

Grewal, Mehta and Kardes (2004) again note that replacement intervals are actually shorter for unforced (technological obsolescence) decisions. Grewal et al. (2004) show that there are several attitudes that link to durable goods purchase behavior, such as social approval, utilitarian and "value-expressive" functions. The amount of value that consumers attach to upgrades seems to also be time-dependent. More frequent introductions of upgrades can be seen as hints of higher rates of improvement between the upgrades, thus creating a heightened sense for consumers that the durables they possess are already out of fashion (Boone, Lemon and Staelin 2001). This indicates that more frequent introductions motivate faster replacement not giving a bigger thought on the actual level of product improvement. Guiltinan (2009) summarizes the phenomenon by saying that replacement buying behaviors are complex, heterogenous and possible more because of heuristics and extrinsic values than because of consumers' realistic cost-benefit tradeoff calculations.

According to Guiltinan (2009), there seems to be little proof that consumers consider durability a key buying motive. Cooper's (2004) study shows that consumers who buy premium appliances do not buy them because they think they are of higher durability, and that they often do not think durability is a critical attribute on a product. Product durability is also seen as a quality rather than an environmental issue (Cooper 2004).

According to Guiltinan (2009) there are few expectations for the fact that consumers would start taking the environment into account in their purchasing behavior. This is because consumers generally lack information on the environmental effects of their purchases, and because consumers believe that it is the manufacturers who should design the environmentally considerate products, and the distributors who should look for such qualities – consumers believe they can only have little impact (Niva and Timonen 2001). Guiltinan (2009) points out that if competitors do not offer products with environmental attributes, consumers can also not buy them, which signals that both the supply and demand side of economy need to be involved in the creation of more durable and longer-lasting products. Guiltinan (2009) brings policy makers into the picture by claiming that in order to fight planned obsolescence effectively, “policy must address both consumption behavior and production practices simultaneously”.

Cooper (2010) summarizes that longer lasting products and a resource-wise sustainable world can only be created through a systemic response across many societal sectors: changes are needed in public policies, in corporate design and marketing strategies, in consumer values, attitudes and behavior, as well as in socio-cultural norms.

As a conclusion, the combination of an increasingly competitive, global environment and the basic economic motivation for obsolescence have created a certain kind of path-dependence for product development strategies, which aim toward faster replacement of durables (Guiltinan 2009). Next to the driving forces of planned obsolescence, there are also further barriers that prevent or complicate the design of longer lasting products.

2.1.3. Designing longer lasting products

This subchapter focuses on factors that need to be considered when designing longer lasting products.

According to Cooper (2005), products are subject to technical specifications, which determine their qualities, such as resistance to wear, repairability and upgradeability. The ones that are designed for durability are constructed from highest quality materials and carefully assembled – their design enables an easy repair because the components and parts are accessible (e.g. Cramer and Nobel 1997). Also the way a product ages is important for the design process: wood ages better than plastic; with prestige and dignity (van Hinte 1997 in Cooper 2005). Thus, making products aesthetically appealing may also promote longevity (Cooper 2005).

Cooper (2005) also notes that people may like a product because of its shape: geometrical characteristics, style or features, or signs of quality and detail. A good example of this is the Artek furniture, as will be explained later in chapter 4. Sustainable product design may also have a social side: buying local handcrafted products supports regional development. Involving customers in the production process will, according to Cooper (2005), also make them appreciate products more and make them want to use them for a longer time.

Products may also have a broader effect on people than just offering them the functionality: products express signals in human relationships (Cooper 2005). Products communicate messages about who their owners are or who they want to be (Jackson 2005). People may for example want to replace a product because they do not want to be associated with something that is out of date. Nevertheless, people also become attached to products (Cooper 2005). As mentioned earlier, advertising and design have been created to make consumers buy new products (Packard 1960).

If products should last longer, consumers should develop a greater attachment to their possessions and not want to update them instantly when new models come to the market. However, Cooper (2005) notes that the number of products that people can feel affection towards is uncertain. In order to be able to buy longer lasting products, customers would also need to have information on which products actually are longer lasting than others. Burchardt (2001) notes that it is not easy for customers to make informed decisions on the price-performance ratios of products, and that higher-priced items are often purchased based on trust rather than knowledge. Better information on the durability of products is necessary in order to increase the market share of longer lasting products. Also, as mentioned by Heiskanen (1996) as well, changing the focus of taxation from employment to energy and materials could help make repair and maintenance work cheaper compared to replacement (Cooper 2005).

According to Stahel (2010), consumer products are usually less durable than industrial ones, as industrial users demand function and effective usability from the machinery and equipment. For consumers, fashion and advertising are used to get people to buy new products and replace existing ones, in special on markets that are near saturation. Fashionable products also work as status symbols and bring many consumers the peer acceptance they want. (Stahel 2010).

In order to maintain the functionality of durable products, Stahel (2010) claims that cheap regional or local repair facilities are needed. There are problems in recovering broken products as well: attempting to repair electronic devices may lead to destroying them, and important spare parts may be withdrawn from distribution channels by manufacturers by the time of introducing a replacement product. According to Stahel (2010), component standardization could overcome the problem, but manufacturers make spare parts incompatible with existing ones, and intellectual property rights, which differ from one country to another, forbid third parties from producing them. Non-standardization is also used to protect national markets, but e.g. EU level standards may bring changes to this.

Sometimes the production of parts is outsourced. In this case, independent distributors prefer component standardization, because then they require less shelf space for all different types of spare parts, and can thus also improve logistics and management. They can also achieve lower unit costs through economies of scale. Repairing products would be in a key position to guarantee their durability and performance, nevertheless a built-in resilience for faults can overcome many of the problems related to the repair phase. (Stahel 2010).

The problem with designing durable products is that the ones who benefit most are the owners of the products, not the producers, and the owners are, at least still today, relatively powerless regarding repair after the purchase has already happened (Stahel 2010). The ways to overcome this and other aforementioned obstacles are discussed in the next subchapter.

2.1.4. Measures against planned obsolescence

The reasons for fighting planned obsolescence and prolonging product lifespans are manifold, from the overuse of natural resources to intolerable amounts of waste and emissions. Nevertheless, there are many barriers for product longevity as well. Researchers put pressure on policy makers, businesses as well as on consumers to make product lifetime extension possible.

Policy measures for product life extension

According to Heiskanen (1996), there are several public policy measures for extending product lifespans. One would be the extended producer responsibility (EPR), which means that the producers of goods should be both financially and physically responsible for the environmental impacts of their products at the end of the products' life cycles (OECD 2004). The OECD (2004) explains that there are already several policy instruments for the EPR, such

as product take-back mandates, advance disposal fees, deposit-refunds and recycled content standards.

According to Cooper (2005), the European Union has created an EPR principle, as well as the Waste Electrical and Electronic Equipment Directive (WEEE) and the End-of-Life Vehicles Directive. The EU is also hosting discussions on e.g. increasing the information that consumers receive about the functional life of products (EU 2013).

Heiskanen (1996) also introduces informative policy instruments such as positive, official environmental labels, like the Nordic Swan by the Nordic Environmental Labelling Scheme. The scheme has multiple criteria for the products it considers, and attempts to address the complete product life cycle.

Another public sector instrument is warranty clauses (Heiskanen 1996). The Finnish Competition and Consumer Authority (2002) claims that a consumer can apply for compensation after a guarantee has ended, if the using age of the product in normal use is shorter than what the consumer can expect from the product. However, there is no mention of what the expected using age should be for different types of products.

Heiskanen (1996) doubts the influence of extended product warranties, as they also hold for such household appliances, which have a much longer average life – would that make producers shorten the lifespans to that certain amount of years that the compulsory warranty lasts for? Heiskanen (1996) nevertheless sees possible indirect positive impacts on product service lives: she claims warranties reverse the burdens of proof over product failure, and can also raise consumers' and producers' awareness and change attitudes towards durability. After Heiskanen's (1996) publication, an EU warranty clause has been given: the European Community directive 1999/44/EC says that the supplier of a product is responsible for product faults that appear within two years of the transaction. Signs of a risen consumer or producer awareness are yet to be seen.

Heiskanen (1996) also brings out the fact that by taxing labor instead of materials, capital or consumption, states have chosen a fiscal policy that has strong environmental implications. This is a viewpoint that the promoters of a service economy also stress: if work was less taxed, products could be repaired or maintained cheaper, and the costs could be transferred from buying new products to buying services, or longer lasting products. Another, indirect policy measure that Heiskanen (1996) proposes is to change research and technology policy

towards an emphasis of fighting technological obsolescence or assessing the current technologies overall.

Li and Geiser (2005) studied governmental computer purchasing in the United States, and found that environmentally responsible public procurement (ERPP) is important if policy makers are to achieve an integrated product policy. The extended producer responsibility and ecolabeling mentioned by Heiskanen (1996) were also brought up by Li and Geiser (2005) saying all these three instruments are needed in order to drive an integrated environmental product policy, and that in a governmental surrounding, the matters are highly interlinked and dependent on each other.

Consumer measures for product life extension

According to Consumers International (1998 in Cooper 2005), consumer organizations do not seem to address issues that have to do with the later phases of product life cycles such as repairing, upgrading or recycling appliances and the timing of replacement. Component standardization as a public policy measure for product life extension was mentioned earlier saying that according to Stahel (2010) it could provide a solution for enabling the repairing of especially electrical products. A nonprofit association CENELEC (European Committee for Electrotechnical Standardization) is lobbying for European electro-technical standards for electrical and electronic goods. The association is not really a consumer organization, but claims that part of its mission is to improve the welfare of European citizens. (CENELEC 2013).

A recent article by Helsingin Sanomat (2013) introduced a consumer-organized repair workshop for broken products. Named Repair Café, the workshop is meant for people to learn from each other and to fix broken objects, clothes and machines. Each workshop has repair experts attending, but the main idea is to handcraft together. (Trashlab Fix 2013)

Nevertheless, the consumer-side efforts for fighting planned obsolescence seem very limited. As long as new products keep on being the cheaper and easier option, consumer mindsets may be hard to change.

Business measures for product life extension

If manufacturers are to become responsible for the disposal of their products, they could benefit from tracking the products throughout their life spans (Cooper 2005). There are already some ways to monitor the use of household appliances through their life spans.

Devices that would have data acquisition units inside them could communicate the information back to the suppliers (see e.g. Klausner, Grimm and Hendrickson 1998, Saar and Thomas 2002 and Simon et al. 2001). Cooper (2005) argues these devices could e.g. help manufacturers improve product reliability and servicing and acquire product use and servicing histories in order to enable appropriate reuse of parts when they are discarded. This could be very useful especially in the case of power tools, because according to Klausner et al. (1998), empirical evidence shows that the lifetimes of motors often exceed the lifetimes of the products that are using them.

Manufacturers could also look at different kinds of business models. Selling services instead of selling products is an option to consider, and according to Cooper (2005), many product-service system advocates have been promoting the option for long now. According to Goedkoop et al. (1999, 20), product service systems are “a marketable set of products and services capable of jointly fulfilling a user’s need. The product/service ratio can vary, either in terms of function fulfillment or economic value, -- technological development, economic optimization and changing needs of people”. Goedkoop (1999) claims that the system change that product-service systems could bring could decouple environmental pressure from economic growth. These business model options as well as others are more closely looked at in subchapter 2.4, and then in the empirical research section, through five case companies.

2.2. Business models

I previously discussed the ways in which companies and policymakers can try to extend product lifetimes. In this subchapter, I will move on to studying business models. Business models can be seen as a preferred unit of analysis when assessing the ways in which businesses can promote product longevity, because business models offer a systemic view to the interface of business and society. I will discuss what business models are, what a sustainability business model could look like, and how business models could work to extend product life cycles.

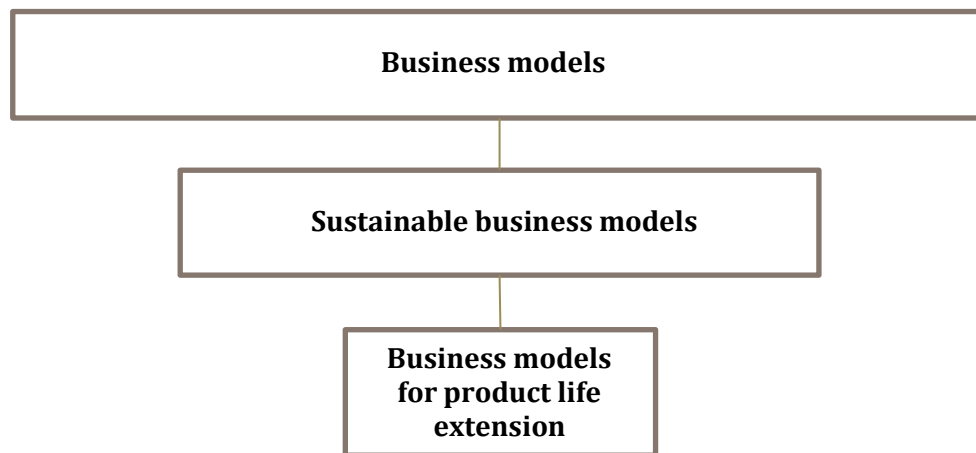


Figure 4: Construction of the literature review on business models.

2.2.1. Defining a business model

Business model as a concept has not been theoretically grounded until recently. Chesbrough and Rosenbloom (2002) made one of the first attempts to define it. They defined it as the medium between technology development and economic value creation: “the business model provides a coherent framework that takes technological characteristics and potentials as inputs, and converts them through customers and markets into economic outputs” (Chesbrough and Rosenbloom 2002, 532). They argue that companies must understand the cognitive role of the business model in order to manage and commercialize a technology – only if the business model changes when the technology does, can value be captured.

More recently, Teece (2010) described the essence of a business model as the manner in which a company delivers value to customers, tempts customers to pay for value, and turns the payments into profit. According to Teece, a business model mirrors what customers want and how; it shows how the company can organize itself to meet those customer needs along with profiting from them. He presents that business models have a central relevance in market economies, where consumer choice, transaction costs and competition exist. Teece also claims that companies need to constantly reinvent and present consumers with new value propositions, which is why business models are never static. A successful business model is one that is differentiated enough, and difficult to imitate by incumbents and new entrants (Teece 2010).

Casadesus-Masanell and Ricart (2010) have compared the notion of a business model to that of a business strategy. According to them (195), “a business model -- is a *reflection* of the firm’s *realized* strategy -- (it) refers to the logic of the firm, the way it operates and how it

creates value for its stakeholders”. According to Casadesus-Masanell and Ricart (2010), a firm always has a business model as it has had to make certain choices in order to function, but a strategy is not ultimately compulsory, as it can be seen as the choices that lead to a certain business model – these choices may always not be consciously made.

Also Chesbrough and Rosenbloom (2002) make three distinctions between business models and strategy: firstly, they claim a business model’s core is in creating value for customers whereas strategy focuses more on competitive threats: current and potential entrants. Secondly, Chesbrough and Rosenbloom (2002) claim that a business model lacks a financial dimension: according to them a business model’s financing is seen as coming from internal corporate resources. They say strategy is clearer about the need of value creation for shareholders. Finally, business models are perhaps more realistic in certain cases about the amount of information available to the company: strategy assumes that there is a lot of reliable information available whereas a business model construct assumes that the knowledge is limited (Chesbrough and Rosenbloom 2002).

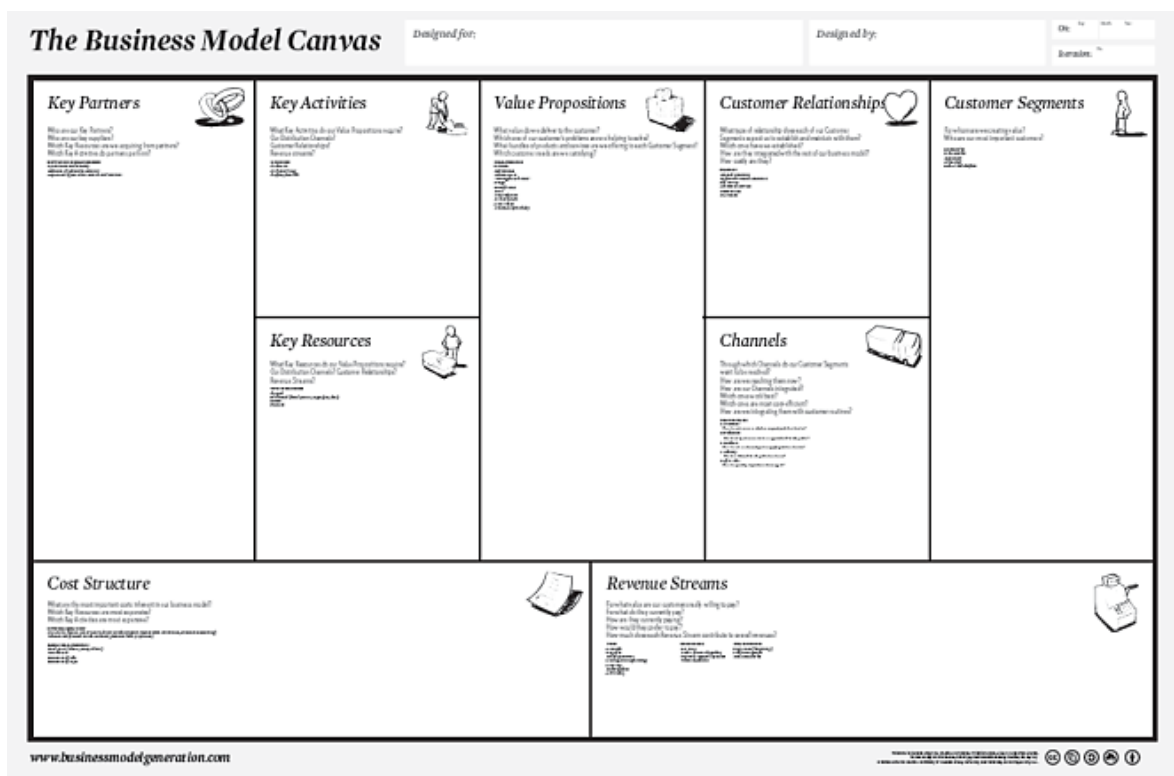
The OECD (2012, 6) sums up by defining a business model as combination of “all the core components of business strategies and operations that create and deliver value to the customers as well as to the firm”.

2.2.2. Features of a business model

Teece (2010) requires that certain areas should be defined in order to reach a good business model design: a target market segment, the benefits that the company’s product or service provide, the used features or technologies and the way they should best be assembled and offered to a customer, not forgetting the design of the business’s revenue and cost structures and value capture.

According to Casadesus-Masanell and Ricart (2010, 198) the elements that compile a business model are “(a) the concrete *choices* made by management about how the organization must operate and (b) the *consequences* of these choices. The choices include (but are not limited to) compensation practices, location of facilities, extent of vertical integration and sales and marketing initiatives”. Casadesus-Masanell and Ricart also define the types of choices a company needs to make relating to its business model: policy, asset and governance choices. Examples of such are e.g. a travel policy for employees, choosing a type of manufacturing facility and choosing a certain structure for contractual agreements respectively.

According to Chesbrough and Rosenbloom (2002, 533-534), business models comprise of a *value proposition*, which is “the value created for users by the offering based on the technology”; a *market segment*, which are the users who find the technology useful; the *value chain*, which creates and distributes the offering and defines the needed assets for supporting the company’s position in that chain; a *cost structure* and *profit potential* for the offering; the *value network* that describes the position of the company and a *competitive strategy* with which the company can gain and hold advantage over rivals. These attributes also justify the financial capital that is needed to operate the business model and to define the path for scaling up. (Chesbrough and Rosenbloom 2002).



Osterwalder and Pigneur (2010) claim that the business model canvas can act as a blueprint for strategy, which can help companies think through and map out their business models.

Osterwalder and Pigneur (2010, 15) claim, that “without such a shared language it is difficult to systemically challenge assumptions about one’s business model and innovate successfully”. Osterwalder (2004) categorized these nine elements of the canvas previously under four pillars: product, customer interface, infrastructure management and financial aspects. The following chart explains the building blocks of Osterwalder’s business model canvas in further detail.

Pillar (Osterwalder 2004)	Business model element (Osterwalder and Pigneur 2010)	Description	Answers the question(s)
Product	Value proposition	The mix of products and services, which creates value for specific customer segments.	<ul style="list-style-type: none"> • What value does the company deliver to the customer? • Which problems is the company helping to solve? • Which needs is the company satisfying? • What product and service mix is offered to each customer segment?
Customer interface	Customer segments	The groups of people or organizations that a company wishes to reach and serve.	<ul style="list-style-type: none"> • For whom is the company creating value? • Who are the most important customers?
	Channels	The way a company connects with its customer segments in order to deliver a value proposition.	<ul style="list-style-type: none"> • Through which channels do the customer segments want to be reached? • How are they being reached now? • How are the channels integrated and which ones work the best? • Which ones are the most cost-efficient? • How are they integrated with customer routines?

	Customer relationships	The relationships the company has with different customer segments.	<ul style="list-style-type: none"> • What type of relationship does each of the customer segments expect to be established and maintained? • Which ones have been established and how much do they cost? • How are they integrated with the rest of the business model?
Financial aspects	Revenue streams	The ways in which a company generates cash from each customer segment	<ul style="list-style-type: none"> • For what value are the customers willing to pay? • What do they currently pay for and how? • How would they like to pay? • How much does each revenue stream contribute to overall revenues?
	Cost structure	All the costs that incur when operating the business model.	<ul style="list-style-type: none"> • What are the most important costs in our business model? • Which key resources and key activities are the most expensive?
Infrastructure management	Key resources	The most important assets that are required for the business model to work.	<ul style="list-style-type: none"> • What key resources do the value propositions, distribution channels, customer relationships and revenue streams require?
	Key activities	The most important things the company must do to make its business model work.	<ul style="list-style-type: none"> • What key activities do the value propositions, distribution channels, customer relationships and revenue streams require?
	Key partnerships	The network of suppliers and partners the make the business model work.	<ul style="list-style-type: none"> • Who are the key partners and key suppliers? • Which key resources are acquired from partners and which key activities are performed by partners?

Figure 6: The elements of a business model canvas (Osterwalder 2004; Osterwalder and Pigneur 2010).

2.3.Sustainable business models

According to Boons, Montalvo, Quist and Wagner (2012), sustainability in business is often viewed from a broad, societal level or from a firm-specific perspective. There is a lot of information on what it takes to create sustainable innovation on firm level. According to Boons et al. (2012) it is nonetheless the concept of a business model that can provide a useful link between an individual firm and the larger production and consumption system where the firm operates. Recent research has shed light on how sustainable innovations can be brought to life and on what kind of possibilities these innovations create for the global economic system. Boons et al. (2012) underline that because of the society-piercing systemness, and the radicalness of sustainability, firms meet considerable barriers for realizing sustainable innovation. This is why business models are now seen as crucial tools for looking at firm operations from a sustainability point of view: a defined business model connects a firm into the bigger environment it is a part of.

The OECD (2012) sees the importance of business models from the viewpoint of being able to leverage eco-innovation. In order to capture eco-innovation into a commercial success and spread best practices, the OECD sees business models as a central tool for that, and is putting the concept to the center of their green transformation research. “The focus (of the research) on business models allows for a better understanding on how environmental value is captured, turned into profitable products and services, and delivers convenience and satisfaction to users”, the OECD (2012, 5) claims. By analyzing different cases of eco-innovation, the OECD hopes to see how widely environmental values are reflected in the different features of a business model.

According to the OECD (2012), typical business models rarely put environmental sustainability in the center of their value proposition. Nevertheless, specific sustainability enhancing business models exist, and they have been studied recently.

2.3.1. Defining a sustainable business model

FORA (2010) introduces the notion of green business models, and defines them as “business models, which support the development of products and services (systems) with environmental benefits, reduce resource use/waste and which are economically viable. These business models have a lower environmental impact than traditional business models”. According to FORA (2010), companies that make use of green business models move the attention from a product to using the product, which makes it more valuable for the company

to design a durable product. Usually this can indeed be seen as moving from a product- to a service-oriented thinking.

Stubbs and Cocklin (2008) again conceptualize a “sustainability business model” (SBM), by which they mean a firm’s business model that is driven by sustainability. Through a case study, they reveal that organizations that turn to an SBM need to develop structural and cultural capabilities in order to achieve company-level sustainability. In addition, collaboration with key stakeholders is needed in order to achieve a system-wide level of sustainability – the company does not operate in a void.

2.3.2. Features of a sustainable business model

Stubbs and Cocklin (2008) also identify the characteristics of an SBM (See Appendix 1). They have mapped both structural and cultural attributes to cross with the triple bottom line characteristics: the economic, environmental and social characteristics. In addition, there is a *multidimensional or holistic characteristics* column. According to Stubbs and Cocklin, sustainability should be about getting all the three bottom line pillars into balance.

In comparison, Boons and Leudeke-Freund (2013) propose a set of normative requirements on top of the more familiar elements of a business model for it to be successful in the marketing of sustainable innovations:

- 1) The value proposition must provide measurable ecological and/or social value together with economic value.
- 2) The supply chain should only involve suppliers who are responsible towards their own and the focal company’s stakeholders.
- 3) The customer interface asks customers to take responsibility for their consumption, and makes sure the focal company does not shift the socio-ecological burdens to its customers.
- 4) The financial model should distribute economic costs and benefits appropriately among involved actors and account for the company’s ecological and social impacts (Maas and Boons 2010).

Boons and Lüdeke-Freund (2013) underline that these are generically defined requirements, which do not explain how specific innovations can be commercialized, nor do they specify a sustainable business model. Those questions, they claim, can only be answered according to the specific firms and their specified contexts.

2.3.3. Types of sustainable business models

FORA (2010) found five different existing green business model types:

- 1) Functional sales: Customers pay for the utility the product offers instead of buying the whole product.
- 2) Energy Saving Companies (ESCOs): Optimize energy use and get paid by the achieved savings.
- 3) Chemical Management Services (CMS): A CMS company makes a long-term contract in order to supply and manage a client's chemicals.
- 4) Design, Build, Finance and Operate (DBFO): A business model for the construction industry in which the construction, maintenance and operation phase (around 20-30 years) give incentives for improving the quality of the construction project in order to lower life-cycle costs.
- 5) Sharing: Sharing the product between multiple users.

To continue from that, Tukker (2004) presents eight different product-service systems (PSS) types on the base of previous classifications (see e.g. Brezet, Bijma, Ehrenfeld and Silvester 2001 and Zaring 2001). This shows how PSS brings value from products into the services they provide. The eight types are categorized under product oriented, use oriented and result oriented systems.

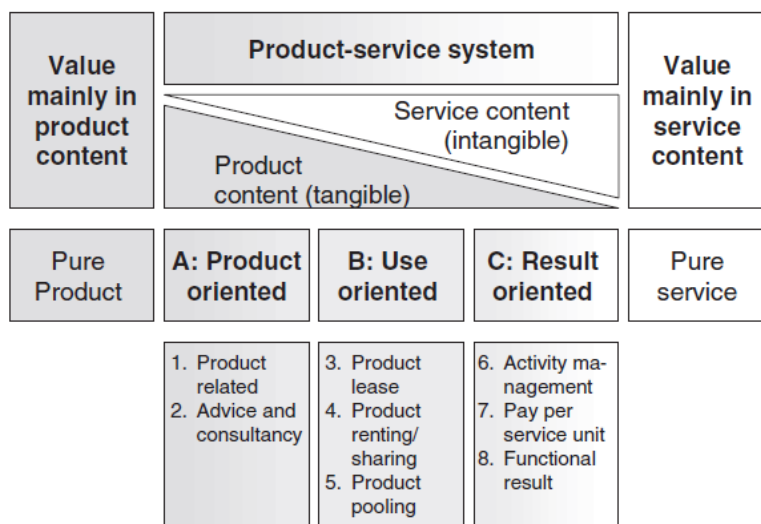


Figure 1. Main and subcategories of PSS

Figure 7: The eight types of product-service systems (Tukker 2004).

A *product-related service* is one in which the provider offers services that are needed whilst using the product, in addition to using the product. According to Tukker (2004) this can mean

a maintenance contract, financing scheme, or a take-back agreement at the end of the product's life.

Advice and consultancy is also a product oriented mode, but the provider of the sold product gives advice as to the most efficient use of the product. Tukker (2004) gives the example of optimizing the logistics in a factory where the product is a production unit.

Product lease means that the provider has the ownership of the product and is usually also responsible for maintenance, repair and control over the product. The lessee has regular fees for the use of the product, for which they usually have unlimited and personal access to the leased product. (Tukker 2004).

In *product renting or sharing* the provider of the product usually owns the product, and is responsible for its maintenance, repair and control. According to Tukker (2004), the main difference to leasing is that the user does not have unlimited and personal access to the product; others can use the same product at other times – sequentially.

Product pooling means the simultaneous use of a product, and resembles renting or sharing to a large extent (Tukker 2004).

Activity management/outsourcing means a PSS type where a part of a company activity is outsourced to a third party. An example is the outsourcing of catering or office cleaning. (Tukker 2004).

Pay per service unit is a product that the user does not buy – they only buy the output according to the level of use. A known example is the pay-per-print formula, where the copier producer takes over all activities to keep a copying function running. (Tukker 2004).

Functional result means that a provider makes a contract with a client about the delivery of a result, which is functional in what Tukker (2004) calls abstract terms. The provider is usually free to decide how it delivers the result. An example by Tukker (249) is a company that promises “farmers a maximum harvest loss rather than selling pesticides”.

Tukker and Tischner (2006) nevertheless note that there is a bias in the research community for under-addressing issues that hinder the PSS from becoming more common: consumer acceptance and business sense are often not taken into account when defining PSS.

Interestingly, Tukker (2004) also evaluated the environmental impacts of each of these product service system types. It seems the most radical reductions can be made by providing

functional results. Also renting, sharing, pooling and paying per use can amount to considerable impact reduction compared to buying the product (Tukker 2004).

PSS type	Impacts compared to reference situation (product)				
	Worse	Equal	Incremental reduction (<20%)	Considerable reduction (<50%)	Radical reduction (<90%)
1. Product-related service		←-----→			
2. Advice and consultancy		←-----→			
3. Product lease	←-----→				
4. Product renting and sharing		←-----→			
5. Product pooling		←-----→			
6. Activity management		←-----→			
7. Pay per unit use		←-----→			
8. Functional result		←-----→			

Figure 8: The environmental impacts of product service system types (Tukker 2004).

It is noteworthy that the environmental benefits of certain business models depend on the way the products are used by customers. For example sharing might increase the use of a product for a customer if they would not use the product without the sharing scheme (OECD 2012).

2.4. Business models for product life extension

The previous business model specifications have been wide in scope. The notion of a business model can be applied to all companies, whereas sustainable business models are trickier to find and define. The final level of business models that I study in this thesis, and that form the specific theoretical background for the empirical part of the thesis are the business models that promote product longevity – business models for product life extension.

These business models have so far not attracted much research interest. The Delft University of Technology in the Netherlands has started a research program on the subject in 2012, ongoing until 2015. The objective of the study is to explore the critical success factors of business models that promote longer lasting products in B2B and B2C contexts (Products that last 2013).

Nevertheless, as there is no available research on the exact subject to date, I will next present what Heiskanen (1996) named as the four business strategies for product life extension, as well as the nine modes of product life extension identified by Linton and Jayaraman (2005). Finally, I will present the two specific product service systems that work for product life extension according to Cooper (2005).

2.4.1. Four business strategies for product longevity

According to Heiskanen (1996), there are at least four known types of business strategies that companies can apply in order to enhance product longevity. Firstly, a *high-quality strategy* can be adopted. As durability is seen as a component of product quality, companies can gain through raising prices for higher quality products (Heiskanen 1996). According to Heiskanen (1996), durability can be promoted through warranties and maintenance arrangements, but brand image and word-of-mouth seem to be the most important information channels for consumers. This high-quality strategy has been realized partially by Artek 2nd Cycle's, Patagonia's and Victorinox' business models, which will be discussed in the empirical part (chapters 4 and 5) of this thesis. Nevertheless, as mentioned earlier, consumers rarely consider durability as a key buying motive (Guiltinan 2009) and do not see durability as a critical attribute of a product (Cooper 2004).

The second type of strategy that Heiskanen (1996) introduces is the *service strategy*. The conjunction to product life extension comes from the point that renting motivates producers to design for optimal durability, which the selling of products does not. In a service strategy, producers "turn into 'fleet managers', taking total responsibility for the physical product over all life cycle stages" (Heiskanen 1996, 32). This way the service providers produce or order products that are durable, and keep them in good shape. This is part of 3Step IT's and Lindström's operating logic, which will be introduced in chapters 4 and 5.

A third strategy type is the *explicitly environmental strategy*, which means that a company's products are marketed with an environmentally-friendly edge. According to Heiskanen (1996), environmental quality is a quality characteristic in its own right. As an environmental strategy, product life extension also benefits consumers. Heiskanen (1996) says durability is nevertheless rarely mentioned as an environmental marketing claim, but is mostly applied to products that replace disposable products, such as baby diapers.

The final product life extending strategy is that of *upgradable products*. This is connected to the service strategy, but can, according to Heiskanen (1996) be applied to sold products. Examples range from modular bookshelves and furniture, which can be altered. Heiskanen (1996, 33) estimates that "modularity, interchangeability, multifunctionality and upgradeability could probably be technically applied to a large number of -- consumer products". This could enable also low-income consumers to build up their product-

composition matching their financial resources. Artek has skillfully used modularity in its furniture design in order to enable the part-by-part buying of products.

2.4.2. Nine modes of product life extension

Linton and Jayaraman (2005) have identified nine modes for product life extension that share similarities, but that also have several differences. The viewpoint of their study is to assess the managerial capabilities and abilities needed to move from one mode to another, and in such way to find new modes that offer potential for high profits.

The nine modes of product life extension, their definitions and the effect they have on products are presented in the next table.

Mode of product life extension	Definition	Focus of the mode	Sample application
Recall	A request for the return of a product (esp. one suspected of being faulty or dangerous), issued by a manufacturer to all purchasers concerned (Oxford 2013).	Safety and extend life	Telecommunications
Repair	To restore (a damaged, worn, or faulty object or structure) to good or proper condition by replacing or fixing parts; to mend, fix (Oxford 2013).	Life extension	Electronic products
Preventative maintenance	Routine maintenance of a vehicle or other machine, intended to prevent problems from arising (Oxford 2013).	Continuous use	Transportation equipment
Predictive maintenance	A condition-driven preventative maintenance program. Uses direct monitoring of the mechanical condition, system efficiency, and other indicators to determine the actual mean time to failure or loss of efficiency for each machine–train system (Mobley 1990 in Linton and Jayaraman 2005)	Life extension	Industrial equipment
Upgrade	To raise (something, esp. equipment or facilities) from one grade to another; to improve or enhance physically (Oxford 2013).	Reduce cost and extend life	Telecommunications
Direct product reuse	To use for a second or further time; to make use of again (Oxford 2013). Reuse includes leasing of product and sale of a product to a new owner by the current owner (Linton and Jayaraman 2005)	Life extension	User goods

Remanufacture	To put (a manufactured material or product) through a process of manufacture again; to manufacture from recycled material or parts. Also: to manufacture (a type of product) again (Oxford 2013).	Life extension	Industrial products
Part reuse	See Direct product reuse. Using different parts of a product again.	Reduction of materials and processing inputs	Automotive parts
Recycle	To reuse (material) in an industrial process; to return (material) to a previous stage of a cyclic process (Oxford 2013).	Reduce material and energy inputs	Paper and metals

Figure 9: Information table on the modes of product life extension (Linton and Jayaraman 2005).

2.4.3. Product service systems for product life extension

According to Cooper (2005), two types of product-service systems are relevant when looking at product durability.

The first one is where some form of value is added to the life cycle of a product, through for example improved aftersales services. The previous modes for product life extension by Linton and Jayaraman (2005) provide many possibilities for these. Consumers International (1998 in Cooper 2005) implies that there have been policy suggestions for designing products with easier repair, longer guarantees and for improving the availability and pricing of spare parts.

Cooper (2005) describes the second type of a product-service system for product durability as a “platform” for consumers, which enables the receiving of a service without buying the product. Examples range from car sharing to using a launderette. This makes it possible to use products more intensively, and reduce the number of products in use. It also eliminates the producer’s need to shorten life spans, because the product is still basically owned by the producer. (Cooper 2005).

So as it seems, many of the business models or product service system types mentioned earlier also suit the enhancement of product longevity. The next chapter will describe how I have conducted this research: how I aim to define the differences in existing business models for product longevity compared to the ones that do not seem to pay attention to product life extension.

3. Multiple case study as a research strategy for business models

This chapter describes how I chose my research material and conducted the research and why, as well as assesses the reliability of the research.

3.1. Research method

This subchapter explains the justifications behind why I chose a multiple case study as a research strategy, business models as the unit of analysis, how I chose and collected my sample data as well as how I managed, analyzed and interpreted the data.

3.1.1. Multiple case study as a research strategy

This thesis studies different types of business models that extend product lifetimes. The main research question is: how do business models that are able to extend product lifetimes differ from business models that do not pay attention to product lifetime extension? The question asked requires a qualitative answer, which makes it clear that I will use a qualitative research method.

Out of different qualitative research approaches used in business research, such as ethnographic, focus group or narrative research, I chose the case study research strategy because it makes it easier to present complex business issues “in an accessible, vivid, personal, and down-to-earth format” (Eriksson and Kovalainen 2008, 116). According to Yin (1989), a case study is the preferred research strategy when “how” questions are being posed, when the study is explanatory in style, and deals with issues that need to be connected and traced over time. It is also a preferred strategy when the studied phenomenon is contemporary rather than historic, and within a real-life context. In addition, a case study is advantageous when the researcher has little or no control over the events or phenomena under study. (Yin 1989). These characteristics describe the focus of my research well.

I have chosen to use an extensive rather than an intensive case study as my research strategy, as my research focuses on mapping features of businesses according to the business model feature framework that I have chosen so as to develop deeper knowledge on business models for product lifetime extension. This kind of research does not yet really exist. According to Eriksson and Kovalainen (2008), the extensive case study research strategy sees cases as instruments that help in exploring specific business-related phenomena and in the development of theoretical propositions that could be tested and generalized to other business

contexts. This is what I aim at by trying to identify the differentiating factors in the product life extending business model features of my case study companies.

3.1.2. Business model as the unit of analysis and sampling decisions

I have chosen a business model as the unit of analysis for this thesis, because it describes a company in a way that combines the company's internal qualities to the external environment it works in. The building blocks of business models have a connection to some external stakeholders, which is why they help in analyzing a societal phenomenon like the shortening of product lifespans on a wider scale – not by just blaming it on certain companies or industries. According to Zott, Amit and Massa (2011), business models have become a new unit of analysis for research and business operations very recently, and they are able to offer a systemic perspective on business. In connection to having the case study as my research strategy, business models offer this research approach the needed data that can put the 'case' (i.e. here the specific business model) in relation to historical, economic, technological, social, and cultural context, which is the main purpose of a case study (Eriksson and Kovalainen 2008).

Zott et al. (2011) conducted a study on the concept of a business model, concluding that there is no single definition for it, and that the research has been dispersed into different silos. One of these silos has been the research on business model innovation, which has been seen as a key to firm performance (Zott et al. 2011). Indeed, the perspective also in this thesis is that product longevity can be advanced through certain business model characteristics, and the case companies have found a certain balanced mix of business model feature characteristics that help them to perform on a high level, with long-lasting products. These companies can be seen as highly innovative examples, and if other companies wish to move to a more sustainable direction with their products, they may want to consider business model innovation in one of the areas I study here.

The business models are analyzed with the help of a classification of business model features by Osterwalder (2004) and Osterwalder and Pigneur (2010). The choices related to each business model feature are explained in detail in subchapter 3.1.5: analysis and interpretation.

I have chosen a set of five business models from different industries as the samples for this thesis. The examples were chosen from different industries partially because there seem to be too few examples in a single industry, and partially also because the solutions found in these

different industries can help in understanding what the range of possibilities is for product life extending business model features. According to Slade (2006), the most problematic industry waste-wise is electronics, where small components have become so cheap that it is often easier and cheaper to buy new instead of repairing the old. Not surprisingly, the electronics industry seemed to have very few examples of business models that would prolong the life of electronic products, so I decided not to focus on that industry. Looking at different industries may also bring a part of the solution for electronics, as business model features are not as product-centered as for example specific corporate strategies: business model features are more transferable and more scalable across businesses and industries, which is also why I found them suitable for this research purpose.

I found the five sample business models through discussions with the faculty of the Aalto University School of Business' Department of Management and International Business. Many of faculty members have extensive knowledge of the sustainability field, and could luckily provide me with many company names to consider. From a list of companies I then chose 3 Step IT, Artek 2nd Cycle, Lindström, Patagonia and Victorinox after careful considerations. All of the companies had to have an element in their business model that enabled the enhancement of product lifespans. It is also evident that they present different types of business models in regard to how they prolong the products' lifespans. There are both business-to-business and business-to-consumer business models included, and the companies largely differ in size. As will be further explained in part 3.2, there are still limitations as to how appropriate the business models are for examining product life extending business model features, and how generalizable the results can be.

Company	Justification for choosing this company
3 Step IT	Operates on a debated industry when it comes to product life extension, but is able to verify that the IT hardware doubles its using age thanks to the company's service.
Artek 2nd Cycle	The store concept proves that Artek products are extremely durable, as they are sold back to the company after years or decades of use. Ageless design brings customers.
Lindström	Professional service diminishes the environmental footprint of the textiles the clients use, and the change from selling products to a service makes the company want to make the most out of the textiles used.
Patagonia	School book example of a company that takes its sustainability values to the core of the business, so much so that it does not require high profit margins on the sake of the environment. Products can be recycled and repaired through Patagonia.
Victorinox	Traditional family-owned business that sees high product quality, durability and functionality as an issue of integrity for the company.

Figure 10: Reasoning behind case choices.

3.1.3. Data collection

According to Laine, Bamberg and Jokinen (2007), a case study is typically comprised of multiple research methods, which is why a case study can be seen rather as a research strategy than as a method. My main data source for the case studies has been the companies' web pages and interviews conducted on company representatives. In addition, there are sources like a BBC radio show clip, a Harvard business case, and newspaper articles that were also found through web search. The sources of data for each case can be found from Appendix 2.

According to Eriksson and Kovalainen (2008), company web pages can serve a good amount of useful information: they can provide data on the company's mission and vision, key people and customers. Press releases can also bring up interesting pieces of information, as they serve as a primary source of official company claims and arguments (Eriksson and Kovalainen 2008). As I looked for information on the company business models, I needed to go through the company web pages very thoroughly. The information that I read is also biased as the companies naturally want to present the best possible image of their selves. This needs to be seen as a limitation, and the companies' own web pages need to be analyzed with extra objectivity.

I conducted two interviews on two out of the five case companies in order to gain more information on the business models. In this thesis, interviews provide a source of in-depth information, but do not act as the main source of data. Because I have tried to form an objective view of the company business models, I had to look at the data acquired also from the interviews with a special lens. As Hirsjärvi, Remes and Sajavaara (2009) note, the reliability of an interview may be weakened by the interviewee's need to give socially acceptable answers. In addition, the interviewee may give information on themes that the researcher never asked about. As Hirsjärvi et al. (2009) remark, the interviewer must know how to interpret the interviewee's answers in light of given cultures and intentional meanings.

I conducted the interviews in a semi-structured style, as a thematic interview. Some central questions were planned in advance, and the interviews flowed forward in themes: I asked about the ways in which the companies operate, about their clients and about the financial aspects of their business, as well as about what they consider as their key value proposition. This helped me in diving deeper into the business model features in each case, as I had to specify the differentiating characteristics of the features, in comparison to more conventional companies.

The interviewees were identified through the initial contact with the case company. At 3 Step IT, I sent an open contact request on the company web page, and the company internally looked for the qualified interviewee. At 3 Step IT it was the Chief Remarketing Officer (CRO), who knows most about the after-leasing possibilities at the company. I visited the company's headquarters in Vantaa and conducted the interview at one of their meeting rooms.

I tried to contact Artek 2nd Cycle through the same method, but when I got no reply, I decided to go and see the store for myself, and ask for an interview at the same time. As the store had no clients at the time of visit, I was able to conduct the interview right away. A store salesman explained he is one of the three employees at the store, and was therefore able to answer my questions with sound knowledge.

3.1.4. Data management

In order to manage the data and to be able to collect the needed information, I had already gotten to know the business model literature somewhat. On the base of different classifications of business model features, I had managed to restrict the number of features that I would focus on into 3: the value proposition, the customer interface, and the revenue model. These were picked and combined partially out of Osterwalder and Pigneur's (2010) Business model canvas and partially out of Osterwalder's dissertation from 2004. Restricting the business model features under these headlines helped in managing the data but also in finding the central differentiating factors that made these cases special from a product life extension point of view.

The interviews were recorded, and I also wrote down notes during the interviews. Because the interviews were not the main source of information and the tone in which the interviewees answered was not important, I chose not to literate the interviews. The questions were fact-based in nature, so the way in which the answers were given was not of great interest for the present research purpose.

3.1.5. Analysis and interpretation

The collected data was analyzed with the help of selected business model features.

Business model feature	Definition
Value proposition	Osterwalder (2004, 43) defines a value proposition as “an overall view of a company's bundle of products and services that are of value to the customer”, and later in the Business model canvas as the mix of products and services, which creates value for specific customer segments (Osterwalder and Pigneur 2010).
Revenue model	The linkage between revenue streams and cost structure: what is the logic behind the company’s financing; how does the company create profitable business?
Customer interface	The customer interface is comprised of the elements that relate to the relationship between the company and its customers. According to Osterwalder (2004), these elements are the target customers, the distribution channels and the relationship type between the company and the customer.

Figure 11: Definitions of selected business model features.

I found these business model features most useful for analyzing and interpreting the data on the chosen business models for product life extension, as they cover the biggest operational areas of a business that have to do with the society and especially customers. The choices were made after plotting the case example companies into the Business model canvas (Osterwalder and Pigneur 2010). The plotting was done with product life extending characteristics in mind, and showed that most of the differences appear on the right hand side of the canvas, which has also been named as the value-creating side, whereas the left side includes more of the features that make the business work efficiently (Osterwalder and Pigneur 2010).

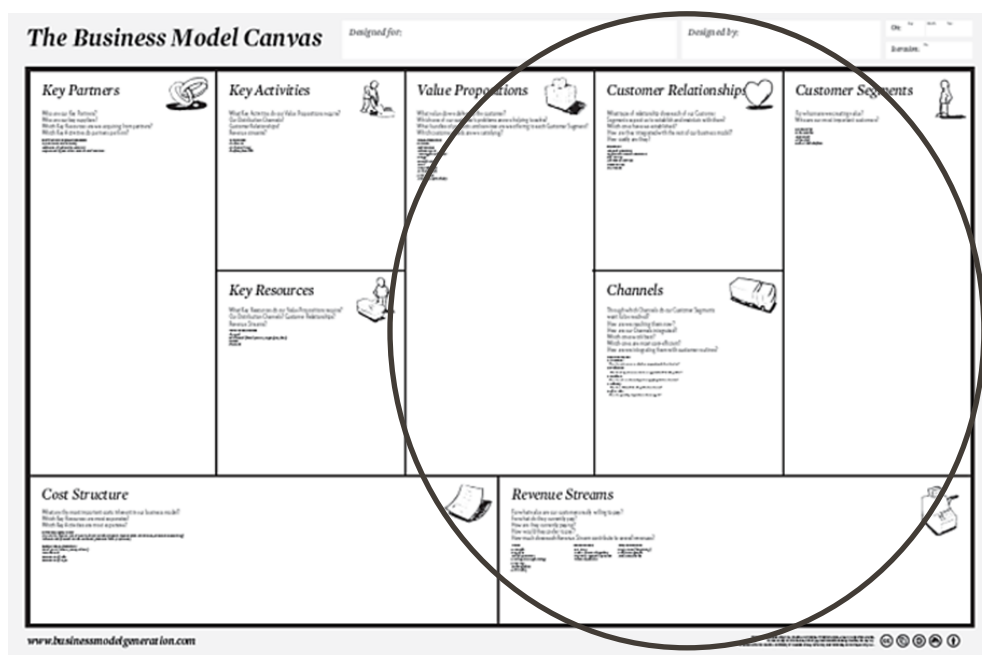


Figure 12: The right side of the Business model canvas.

This seems logical, as the product lives have been shortened partially in order to reach efficiency advantages in manufacturing; using cheaper and easily breaking materials and parts. Therefore, if companies are to make products longer-lasting, it is doubtful if it can be managed by making the operations even more efficient. The right side of the canvas; the value-creating side, seems like a natural choice for companies that want to create value by enabling the longer using life of products. The business model features from Osterwalder's canvas that were left out of the analysis are the "Key Partners", "Key Activities" and "Key Resources", which comprise the left hand side of the canvas with "Cost Structure". They have also been headlined as the "infrastructure management pillar" (Osterwalder 2004). Nevertheless, it was impossible to present the cases without touching upon some topics that had to do with the "infrastructure management" of the company.

Reasoning behind each selected business model feature

The value proposition is the essential part of a business model: it can be seen as the reason for the existence of the company. In this thesis, the point of view I emphasize in value propositions is: what makes a company's product or the product the company is using in its services longer-lasting? What makes the company's value proposition different in comparison to companies that do not invest in the prolonging of their products' lifespans? In some of the case companies, the difference is especially seen in the value proposition, which makes it possible for the company to compete on the markets. In other cases, the value proposition might be very similar to competitors, but the differentiator is found in some other business model feature.

The revenue model is the most interesting business model feature in traditional business' sense: how can businesses remain profitable even when their products are longer-lasting (which usually means they are also more expensive to produce) than those of competitors? What kind of business logic is behind such a company? The revenue model feature sheds light on where the case companies get their revenue streams, as well as if there is a certain element in the cost structure that makes the businesses earn more profit. It is highly important for the purpose of this research to know, what makes a business that supposedly puts more money into its products to financially survive among its competitors.

The customer interface feature is an important one, as the discussion on shared use, performance economy and product-service systems have increased. This element tells if the customers are businesses or private customers, how the transactions are performed and what

makes the customers want to choose the case company as their supplier. The feature includes also information on the case company's choice of target market: especially with specialty products it might be difficult to try and reach all possible segments. A longer lifespan of a product might not even be in everyone's interests, and that is when a company must know who to target, if the customer base is not large enough yet.

After analyzing these three business model features for each case company, I have analyzed the differences that can be seen in them in comparison with companies that could be named as "conventional", or as companies that seek for the efficiency benefits from cheaper materials and parts and do not incorporate a life cycle management -way of thinking into their business models. The "conventional" business models can also be seen as ones that try to reach economies-of-scale and sell as much as possible with lowest possible costs. Each case business model is compared to the biggest corresponding competitors' business models, which might differ in what comes to the sold product-service mix. For example, in Lindström's case there is no equivalent competitor in at least the Finnish market to compare to, which is why the business model features are compared to both laundry services and textiles sellers.

3.2.Evaluation of the study

This subchapter assesses the reliability, generalizability and limitations of the research process.

3.2.1. Validation of the study

The validity of a study has many definitions in qualitative research. According to Golafshani (2003), some researchers believe it is a modifier that cannot be given to qualitative studies because of the lack of an unambiguous test, which would reveal just how valid a qualitative study is. He continues that researchers have developed their own definitions of validity, and turned into other terms, like quality, rigor or trustworthiness.

According to Eriksson and Kovalainen (2008), case studies can be evaluated pretty much the same way as other types of research. A good case study needs to be significant in some way, and the studied issues should be interesting and relevant. In addition, the cases of a case study must be defined explicitly, and all relevant evidence must be investigated. A case study should become complete only after reaching convincing results. Case studies also need to be depicted from multiple perspectives, and evidence that challenges the research design the

most must be looked at. Both supporting and challenging evidence should be presented. (Eriksson and Kovalainen 2008).

I believe this thesis and case study is significant in a way that there is no previous research exactly on this issue. The issues under study are relevant for today's world, where natural resources are insufficient to fill the planet's population's needs, and consumption is growing every day. Environmental degradation is ruining people's livelihoods and the possibilities of future generations to enjoy the nature. Studying business models that can help protect the planet is also personally interesting and motivating to me.

The case studies are also depicted from multiple perspectives, and an array of sources is used. An example of challenging evidence that I encountered is the dominating market position abuse charges against Lindström.

3.2.2. Limitations of the study

According to Eriksson and Kovalainen (2008), case study research has been criticized for having anecdotal descriptions with a lack of scientific rigour. This case study faces limitations especially in what comes to the transferability and generalizability of the teachings of the cases, as a business model has been defined to succeed when it is differentiated enough and difficult to duplicate (Teece 2010). This confirms that the conclusions made on the basis of the case studies must be considered also with an industry-specific mindset: while a different way of doing things might have worked for one company, it might not work for others, and especially not for other industries.

Another limitation of this thesis is that I interpret the evidence on the case business models through my own experiences, and might be biased to present the companies in a better/worse light based on those experiences. Even when aiming to be as unbiased as possible, the fact that I personally believe this study can "make the world a better place" can have an effect on the way I present the results and that has to be taken into account.

Setting boundaries to the study proved to be a difficult task as well, as there seemed to be a very limited amount of possible cases to study. As I explained before, I was not able to find enough cases from the electronics industry to only limit my study around that industry, so it was necessary to widen the research field. This, nevertheless, has provided a much more diverse set of business model feature characteristics to look at, and has probably heightened the quality of this research.

As for language and cultural barriers, three out of the five case example companies were Finnish, which can be a limitation for the results. The other two, Patagonia and Victorinox, are from the US and Switzerland respectively. The interviews were conducted in Finnish, and the information on the Finnish company web pages were also read partially in Finnish. Nevertheless, the research design does not seem to face limitations because of language or cultural barriers, unless possibly if trying to directly transfer or generalize the conclusions to businesses outside Western countries.

4. Existing business models for longevity

Business models depict the structuring of a company's operations, which is why they are a good unit for looking at how some companies have been able to succeed with longer lasting products as opposed to conventional type of production and selling of products. Rather than looking at only the product itself, it is important to understand how companies derive value through the business logic that surrounds the product – according to OECD (2012, 7), “business models innovation is relevant for all firms and organizations as it is about staying in the game or being at the forefront of competition while assuring economic viability or sustainability of their operations”. A business model is therefore a good depiction of the general possibilities for survival of the whole company.

The chosen case examples come from a wide array of industries. It is this extensiveness that I can help in bringing a broad understanding of the possibilities companies have in changing their business models towards the promotion of longer product lifespans.

Business	Industry	Product	Customer relationship	Revenue	Employees
3Step IT	IT-leasing	IT-hardware	B2B	444 M € (2012)	250 (2013)
Artek 2nd cycle	Furniture	Used furniture	B2C	n.a.	3 (2013)
Lindström	Textile services	Work wear, carpets, industry textiles, hygiene textiles	B2B	288 M € (2012)	2 750 (2013)
Patagonia	Retail	Outdoor apparel	B2C	400 M \$ (2011)	1 500 (2012)
Victorinox	Knives	Swiss army knives, cutlery, watches, travel equipment, apparel	B2C	485 M CHF (2008)	1 700 (2009)

Figure 13: Information table on case companies (information from company homepages and interviews, see Appendix 2).

Next, I will present the case example companies and the selected features of their business models.

4.1. 3 Step IT

3 Step IT is an IT leasing company that was founded in 1997 and is headquartered in Vantaa, Finland. The company offers a service helping businesses and other organizations with high-

volume IT needs to manage the financing, use and replacement of IT equipment. With approximately 250 employees and over 3 300 customers internationally, the company is also the biggest reseller of refurbished computers and mobile devices in the Nordics (3 Step IT 2013). According to the company's Chief Remarketing Office (CRO), 3 Step IT refurbishes and resells 95 % of the equipment that is returned to them after the first phase leasing.

The competitive advantage of the company builds on transparency, cost-effectiveness and sustainability. The "3 steps" that the company is named after depict the services that 1st phase customers are able to get from the company: step 1) *leasing* IT hardware to the clients, step 2) *asset management* – knowledge on the used equipment and their condition and step 3) *replacement* – replacing with new and erasing data from old, used equipment.

The company faces competition from the sellers of IT hardware, but more and more companies are realizing the easiness of leasing as a business solution – it is cheaper in most cases, and there is no worry of getting rid of the hardware or data on the computers later on. On the IT leasing market, 3 Step IT competes with the suppliers of leasing services, like banks, who do not offer other services related to the hardware, or with IT leasing companies, who rarely refurbish or resell the used equipment. According to the CRO, 3 Step IT has changed the market so much so that also the financial institutions that do IT leasing have had to take back the leased products, whereas they previously did not. The company has been successful financially in the recent years, but also in terms of staff satisfaction – 3 Step IT constantly ranks among the "best places to work" in Finland (3 Step IT 2013).

4.1.1. Value proposition

The CRO stresses that one of the key aspects of the company's value proposition is the extent of customer service it provides: customers can start by choosing the IT products they consider best suit their operating environment. 3 Step IT then sets up the financing limit and leasing term contract accordingly. According to the CRO, each brand of IT equipment has their own leasing conditions set by 3 Step IT, and some brands' value may decrease faster than others', which creates differences in the leasing fees. This is an interesting point, as the company actually calculates the rates in which a certain brand will wear down, and price the leasing contract in relation to that, in order to make the refurbishment and reselling of the equipment profitable. If the quality of the product or the "rate of wearing down" would be visible in consumer products that are for sale, the incentive to develop longer lasting products would probably increase.

3 Step IT's clients can rely on the company for all the needs that are related to the use of IT equipment: the financing, transporting the equipment to the client and back, managing the equipment, as well as removing the data when leasing ends. In addition, clients receive 5 % of the original cumulated leasing value back at the point of returning the equipment, which is a lucrative deal for both the client and 3 Step IT: 3 Step IT can be sure of getting the IT equipment back from clients when there is a deposit involved, and then refurbish and resell the equipment. As for clients, 3 Step IT's service can free up resources for core business activities instead of having to tie them down by buying own IT equipment. The comprehensive management and financing model also helps in planning internal finances and future acquisitions, and in saving time. 3 Step IT manages an online asset register where clients can derive reports for information and financial management needs when needed. (3Step IT 2013).

4.1.2. Revenue model

3 Step IT's revenue model is based on both the leasing of IT equipment and the refurbishment and sales of the used equipment. According to the CRO, the business model is similar to no other company, especially because of the refurbishment and reselling of used IT hardware, which the company calls the "remarketing services". According to the CRO the fact that 3 Step IT also manages the asset side of leasing has a big impact on their revenue. The company is able to handle the whole supply chain very cost-efficiently with the help of their own refurbishing center in Vantaa, Finland.

3 Step IT has taken its value depreciation calculation model from the car leasing industry. As explained before, different brands are given different depreciation values, which translate into the leasing fees that the customers pay for their equipment. In addition, the 5 % payback of the cumulative sum of the leasing fees upon the return of the leased equipment helps 3 Step IT plan its own cash flows associated to refurbishment and remarketing, and plan effectively ahead. It also makes the financing package attractive and competitive to banks.

4.1.3. Customer interface

The first phase of use of the IT equipment happens in organizations, mostly in middle-to-large-sized companies, through leasing. 3 Step IT brings the chosen brand's hardware to the client, and manages the equipment throughout the leasing contract. The client is able to run

reports with 3 Step IT's online asset management tool, with which tracking leased assets, cost monitoring and budgeting is possible. (3 Step IT 2013).

According to the CRO, when the leasing agreement of the equipment ends, the hardware is refurbished, and its use continues through two channels: the trading/broker channel and the reseller/distributor channel. The first channel works through a website, where 3 Step IT updates the current stock of used hardware: which types of computers there are in the storage, and how many. The brokers, which 3 Step IT has a contract with, are able to order the products they want from the storage. The main market areas are Southern and Eastern Europe, and North Africa. The products that are refurbished also meet CE-certificate demands. The brokers sell the hardware onwards to private consumers.

The distributor channel (direct) sales are directed to the Nordic countries, and have been a success in especially Sweden, where people, according to the CRO, seem to be more open to having used computers than in Finland. Especially private Swedish schools, which often have to compete for students, buy used computers to attract more students. The CRO mentions though, that Android software is starting to enable the use of such cheap new hardware, that it is hard to compete with the prices even with the refurbished equipment.

The life cycles of the hardware that 3 Step IT has resold are not followed after the purchase by second hand users.

4.2. Artek 2nd Cycle

Artek is a design furniture manufacturing company founded in 1935 by the famous designers Alvar and Aino Aalto, Maire Gullichsen and Nils-Gustav Hahl. The company builds on functionality and timeless aesthetics and its products usually last for generations. Artek's products are found in public spaces as well as homes, museums, schools, hotels and offices. (Artek 2013). Artek 2nd Cycle is a retail store for Artek's recycled products. It was founded in November 2011 and is run by 3 employees. According to a store salesman, the customers of the 2nd Cycle store are somewhat younger than those of the original store, but nevertheless pretty good income earners, as the furniture are not from the cheapest end.

Artek's competitors are the rest of the furniture industry, and especially design furniture. The products are seen as investments, as customers believe that they are long-lasting and even prestigious pieces of furniture. Whereas IKEA represents affordable, everyday furniture that

needs to be self-assembled, Artek's products are from the upper end of the price-scale, and a customer may typically see the items as carefully chosen pieces of décor, which are functional, of good quality and beautiful at the same time. Another similar business model is that of Martela, whose Martela Outlet sells the company's own used products – used office furniture. Martela Outlets are located in six different Finnish cities (Martela Outlet 2013). Also IKEA's used furniture can be sold, traded or bought at the imaginatively named website www.aeki.fi and a Northern-American version www.aeki.us. The websites are separate entities from IKEA. (Aeki 2013).

Nevertheless, Artek 2nd Cycle would seem to compete more with the mother company Artek's products, or other design and/or second hand furniture that can be seen even as pieces of art – as lifetime investments. In addition, according to the store salesman, the store has more of a promotional value to the mother company, and its revenues are not big enough to compare with Artek.

A typical piece of furniture sold at the 2nd Cycle store is the three-legged “Stool 60” by Alvar Aalto. According to the store salesman, a 20-years-old “Stool 60” can be 50 % cheaper at the Artek 2nd Cycle store than when bought new. Nevertheless, the rarer and older the stool, the more expensive they get – a “Stool 60” from the 1950s costs more than a new one, as it is considered to be a collector's item.

4.2.1. Value proposition

Artek is considered to represent ageless, functional, Nordic design, which lasts for decades. The value proposition of the 2nd Cycle store comes from the fact that the furniture is still very much functional, and according to the store salesman, most of the wooden products have formed patina (“a gloss or sheen; specifically that on wooden furniture produced by age and polishing” (Oxford 2013)), and become even more valuable as design objects. The store also seems to lure in somewhat younger customers than the original Artek store, which might be because of the partially cheaper prices as well as the environmental value of recycled furniture, which younger adults may appreciate.

Artek claims to still represent one of the most innovative modern design companies. The Artek furniture system is based on standard- and systems thinking, which enables the customization of the furniture according to personalized needs. (Artek 2013).

4.2.2. Revenue model

Artek 2nd Cycle store buys used furniture from people who offer them to the store, refurbishes them if needed, and sells them forward again, or keeps them as part of the collection. The furniture has already once been sold by Artek, so this round is exactly what the name of the store promises: the 2nd cycle, also finance-wise. According to the store salesman, the store does not create a lot of revenue, but has more of a PR and marketing edge for Artek.

The idea of the Artek 2nd cycle store is also to promote the non-famous Finnish designers under the Artek brand, which have not gained popularity for some reason. The store salesman explains that the store also hosts the biggest Artek collection globally.

Artek products are in the luxury end of furniture brands, which seems to not have been hit by the latest recession. According to the Guardian (2013), Ben Perkins, a research director from Deloitte, claims that the core customers of luxury goods companies have hardly been hurt by recession, whereas middle class is the one that suffers. Luxury goods companies may thus lose luxury shoppers that buy products very rarely, but kept the ones that buy more often. In Artek's case, the modularity of the products has been of help on difficult times. According to Helsingin Sanomat (2009), Artek presented a combinable furniture system at the Milano furniture fair at a critical time, where both sustainability and recession are defining nominators of the present.

4.2.3. Customer interface

The Artek 2nd Cycle store is located in Kaartinkaupunki, near Helsinki center. Part of the selection is displayed also on the store webpage, and a monthly photo collection is uploaded on the store's Facebook site. According to the store salesman, most customers call and ask after a certain product. The store also has the largest collection of Artek products in the world – the rarest ones will probably never be sold but instead be put up for exhibition. The store has its own upholsterers, which refurbish the furniture with fabrics on them. Some customers may bring their old furniture even multiple times there just for upholstery.

People who want to sell their old Aalto design furniture usually call the store and send pictures to find out how much they could sell them for. The store also works as a marketing platform for new Aalto products, and as said before, has perhaps greater PR than monetary value for the company as a whole. The store salesman sees the basement level store attracting

somewhat younger people than the original Artek store around the block. The store gets orders also from e.g. Japan and Central Europe, as well as the United States, but no products have been sold to the US so far. Some customers also want to buy the products to be able to use recycled products and diminish their environmental footprint. Many want to get their parents' or grandparents' old Artek furniture, as they last "from father to son".

4.3.Lindström

Lindström is a Finnish textile service company, which offers a range of services from interior design to work wear rental and personal protective equipment solutions. The company is one of the oldest ones in Finland, founded in 1848, and used to operate as a dyeing and laundry service. In the 1990s the company, nevertheless, decided to focus on textile rental services. Today it has work wear services in 21 countries and mat services in 13 throughout Europe and Asia, and altogether about 2750 employees. It is the market leader in textile services in Finland, and one of the leading companies in the industry in Europe and Asia. (Lindström 2013).

According to the Finnish Competition Office (Kilpailuvirasto 2004), smaller competitors of Lindström had complained that Lindström is abusing its dominating market position in the mat service industry in Finland. A 2004 ruling, nevertheless, concluded that even with a market share of over 50 % nationally, Lindström has not intentionally lowered its prices to gain more market share, but has been able to make its service in the mat service industry so efficient, that it is able to offer lower prices than competitors. (Kilpailuvirasto 2004).

The ruling also presented the biggest competition Lindström faces (or faced in the turn of the millennium): on hand hygiene markets, where Lindström offers washable fabric towel rolls, there are the disposable paper towel producers Metsä Tissue and Georgia Pacific, whereas with mat services the central competitors in Finland are member firms of the national Puhdaspalvelu Fi as well as local mat service firms. (Kilpailuvirasto 2004). This shows that in the textile service industry, optimizing costs from logistics and washing as well as the scale in which the company works are essential in determining the lowest possible price points which still are profitable for the company.

Lindström has lately been able to rapidly expand its operations outside Finland, and the share of its international operations from turnover is almost 40 percent. The company has expanded especially in Europe and Asia. (Lindström 2013). Growth has been very strong in India,

where it faces no direct competition in its work wear rental service thanks to its distinct business model – the repairing, washing and maintenance service centers for the rented work wear ensure a controlled supply chain (The Hindu Business Line 2013).

4.3.1. Value proposition

The company's motto is "Cares for your image", which wants to say that their service can provide everything there is to a client's external image from carpets in the office and work wear to hygiene textiles. The renting of work wear is advertised as a cost-efficient, professional-looking, safe and easy way to handle how the employees are arrayed. In addition, Lindström promotes the environmental friendliness of its services: all work wear fabrics have the EU eco flower and all towels are made of ÖkoTex 100 cotton. (Lindström 2013)

According to the company, about 80 % of the environmental effects of the product are borne during the maintenance and service process, to which they put special care: e.g. the same water used in the washing of towels from offices is used again in the washing of industrial textiles. The work wear materials have been chosen keeping in mind the way they are used and maintained, as well as the life-cycle expectations. For example the uniQcare collection, which is designed for the caring industry, is made out of cotton-polyester, which is made of recycled plastic bottles. (Lindström 2013)

Nevertheless, Lindström does not brand itself only as the sustainable choice among its competitors, but rather as a business partner with a long experience, who can make the clients' everyday easier with forerunning product and service solutions.

4.3.2. Revenue model

The work wear rental service is a quite new service type on B2B markets. According to the Hindu Business Line (2012), the design, procurement, maintaining and renting out the work-wear makes a simple business model, and the highly mechanized service and logistics make the company work very efficiently and with a relatively low staff number.

As noted earlier in the company description, Lindström is able to compete with the prices of all other mat service providers in Finland because of its efficiency. The costs related to washing, maintaining and logistics have been carefully calculated, and with the coverage Lindström has in Finland, the company is able to optimize the costs well.

The renting business model seems to work well for Lindström, as it is renting the textiles to other businesses. As Stahel (2010) notes, this kind of a performance-based business model is more common when the object that is used is seen as a tool, rather than a toy. Work wear and other textiles used at e.g. industrial space are there to serve a function, which is why especially a renting business model can succeed in providing the needed performance.

4.3.3. Customer interface

Lindström's work wear rental takes care of many aspects of the clients' textile needs. The clothes are made according to employees' measurements and designed in a way that compliments the company image. The rental clothes are washed and maintained by Lindström, and each piece has its own microchip so that they are easily returned to the right employee after washing. (Lindström 2013).

The company conducts customer satisfaction surveys yearly, and according to a survey in late 2012, the clients are especially happy with the friendly and service-oriented Lindström staff. The company is seen as a trustworthy and professional service-provider. Points of development that come out from the survey were the anticipation of customers' needs, the improvement of product knowledge, as well as the quality of communication and listening to the customer. (Lindström 2013).

4.4. Patagonia

Patagonia is an American outdoor apparel selling company founded in 1973. With over 1200 employees the company is known for its responsible ways of operating and is considered as the apparel industry example of responsible business. Patagonia encourages its customers to even reduce the amount of clothes and equipment they buy, and does not follow seasonal fashion in its designs. All of Patagonia's products have manufacturing and supply chain information on the company website and the company also e.g. supports its employees in doing work for environmental NGOs. The products are sold globally. (Patagonia 2013).

Patagonia's biggest competitors are other outdoor apparel brands, such as The North Face, Marmot Mountain and Columbia Sportswear, as well as some fashion-oriented apparel companies, like Tommy Hilfiger and Ralph Lauren, which have expanded into sports apparel (Harvard business school 2004). None of the competitors have, however, so strongly differentiated themselves as the green choice in outdoor apparel. The numerous choices Patagonia has made in order to pose less pressure to the environment have also made the

company a better choice in the eyes of environmentalists and those who prefer environmentally-friendly products.

Patagonia advertises its products with the help of stories. The Patagonia Ambassadors are athletes that use Patagonia products and help the company's design department in testing, refining and validating the products in very difficult locations around the world. (Patagonia 2013). The stories of these ambassadors are then used in the company's marketing material. According to Harvard business school (2004), the company also largely trusts in the influence of word-of-mouth marketing.

4.4.1. Value proposition

Patagonia's mission statement reads: "Build the best product, cause no unnecessary harm, use business to inspire and implement solutions to the environmental crisis" (Patagonia 2013). The company has grown from making clothes and equipment for climbing into manufacturing also other outdoor sports apparel. In the core is the spirit that presents a connection between people and the nature, and this is also what the company aims to show in its value proposition: Patagonia wants to convey a truthful image of a company the cares about the environment and the planet's future. The company puts it simply: "our values reflect those of a business started by a band of climbers and surfers, and the minimalist style they promoted. The approach we take towards product design demonstrates a bias for simplicity and utility" (Patagonia 2013).

Patagonia offers long lasting and good quality outdoor apparel that is made from durable and ecological materials. They have for long now used only organic cotton, and more and more of their fabrics have been made out of recyclable materials, like plastic bottles. The customers share the company's values, and trust that when buying from Patagonia, they get premium quality, which also does not hurt the environment – unlike in many other brand's cases. Many of the company's customers also want to buy products from a company that promotes sustainability actively through philanthropy and different kinds of initiatives that are not directly linked to the items that are for sale.

4.4.2. Revenue model

Patagonia's revenue model is not very different from other apparel manufacturers, but it is notable that as a family-owned business, the company does not face high sales growth objectives. The owner couple, Yvon Chouinard and Malinda Pennoyer, does not require high

profits from the company, and e.g. does not encourage new sales stores to be opened as frequently as would be possible demand-wise (Harvard Business School 2004).

In addition, the company is happy to put a large extent of its earnings to different environmental initiatives, and a percent of profits is donated to environmental non-governmental organizations yearly. As mentioned before, most of the materials of the products the company manufactures are made of premium or recycled materials, which also raises the manufacturing costs. (Patagonia 2013). This also shows in the prices of the products, which are on the higher end of outdoor apparel and equipment pricing (Harvard Business School 2004).

4.4.3. Customer interface

Patagonia's customers buy the products from retailers or online. According to Harvard business school (2004), the target market of Patagonia has been and still is "surf bums" – outdoors and extreme sports loving people, who need good quality materials for their hobbies. The customers are well taken care of, as the company offers a repair service for their products, for a reasonable consideration. A recycling service for used products is also available.

One of Patagonia's most known advertising campaigns was one where they actually told people *not* to buy their products, unless they needed them. As a company of its word, the company does pretty much anything to truly be environmentally friendly, and so far so that it has admitted what actually puts the worst pressure on the environment – consuming too much in itself.

4.5. Victorinox

Victorinox is a Swiss knife manufacturing company that was founded in 1884. With over 1700 employees, the company produces the durable, multipurpose Swiss army knives that have a life-long guarantee. The knives come in different sizes, and with different amounts of functionalities, but the classic model has 6 functions: a nail file with nail cleaner, a key ring, a toothpick, tweezers, a blade and scissors. The knives are repaired by Victorinox if needed, for free, and the quality is said to be unchangeable through years. All of the company's products are manufactured in Switzerland but sold worldwide. (Victorinox 2013). In addition to Swiss army knives, the company produces knives, watches, luggage and fragrances, which fit the brand values: quality, innovation, functionality and iconic design (Swiss Style 2013).

Victorinox faced a big challenge when the 9/11 tragedy happened: Swiss army knives were no more allowed as carry-ons on planes, and the reputation of the knives got a big hit. The company had, nevertheless, decided not to sack people even as the sales numbers especially in the big market of the US sank, but cut working hours and rented the employees to other Swiss companies nearby the factory instead. (BBC 2012).

Victorinox is presently the only qualified producer of Swiss army knives, as it acquired another army knife manufacturer Wenger in 2005, and integrated the operations in 2013 so that also the Wenger factory produces knives under Victorinox' name (Victorinox 2013).

Stahel (2010) looks at product functionality through dividing products into tools and toys: tools are used for earning money and toys for having fun. Stahel (2010) claims, that beauty and ownership are less important than functionality for tools. Stahel (2010) also sees that performance-based business models are usual around tools; leasing for example provides the needed functionality, whereas ownership is not that important.

As for Victorinox, the knives can be seen as both tools and toys. The classic knife model is described as something that “will accompany you through your working life and in your leisure time” (Victorinox 2013). A customer with pseudonym “Nomen est omen” has written a comment on the company website on December 9, 2012 on the classic Swiss army knife model saying they have carried the knife around for 20 years and that the quality has not altered during the years.

4.5.1. Value proposition

Victorinox is proud about the long tradition and high quality of the Swiss army knives and the company. The company claims to give quality and functionality the top priority in product design, and that their quality management system ensures that. Being Swiss is also very important to Victorinox, which has been managed by the same family in three generations now. (Victorinox 2013). The attributes relatable to the army knives are often related also to other Swiss products – such as Swiss watches, which are also seen as being of very high quality.

Next to the quality aspect the knives provide high functionality, which can be seen as the range of functions that an army knife can have: the classic model has six whereas there are knives with tens of functions. (Victorinox 2013).

4.5.2. Revenue model

The revenue model is a basic retail model: Victorinox products are sold through country representatives and dealers. Nevertheless, the company claims to never have sacked an employee for economic reasons: the finances are managed so that money is put aside during good times, and then used during recession in order to be able to keep the employees in the house (BBC 2012). In addition, the products are claimed to be made using top materials, which also shows in the price of manufacturing. As Victorinox is the only patented Swiss army knife manufacturer, it has a monopoly on the market for these special products.

4.5.3. Customer interface

The products are sold in specialty stores, for example outdoor equipment stores, to private consumers. The lifelong guarantee ensures repair or replacement in case there are defects in the materials of the knives or in the workmanship of the products. Nevertheless, the electronic components of the knives only have a 2 year guarantee. The Swiss army knives are famous around the world, and the company proudly shares stories from customers telling how they used the knife in a memorable situation. (Victorinox 2013).

5. Special features of business models for longevity

The previous chapter focused on describing the business model examples that were chosen for this thesis. Based on them, I will now look at the different features of a business model: the value propositions, revenue models and customer interfaces, and compare those of the sample case business models, to what can be seen as the typical or more conventional case on each industry. That is, I will look for the things that make these business model features special in the sense that the companies are able to extend product lifetimes in comparison to their competitors. The defining differences are summarized in a table in Appendix 3.

5.1.Value proposition -based differences

As noted earlier, value proposition is the mix of products and services that creates value for the specific customer segments that a company is trying to reach. It answers to questions like which needs is the company satisfying or which problems is the company helping to solve (Osterwalder and Pigneur 2010).

3 Step IT's value proposition differs from its competitors especially in the sense that the company collects the IT hardware back from the leasing clients, and refurbish and sell them further. The customers are easier off with the company's service, and depending on the size of the customer's organization, leasing may come cheaper than buying new equipment. 3 Step IT prolongs the hardware's life –according to the CRO, refurbishment and resale prolong the hardware's using age to 8-9 years instead of the usual 3-4 years that the hardware is used in a single leasing contract. According to the CRO approximately 95 percent of the equipment that 3 Step IT leases are reused.

As the CRO explained, most other IT leasers do not collect the equipment back and do generally not care about the rest of the hardware's lifespans after the leasing contract. The option for a typical customer would be to either buy the equipment to themselves, where the using age would stay at approximately 3-4 years, after which the computers would end up at employees' homes or summer cabins, or hopefully even in recycling; or the customer could lease the equipment through banks' leasing services, and not be sure that the computers would be taken back or recycled at the end of the contract.

As for second hand buyers, they can be sure that the computers have been refurbished and tested in an orderly manner. 3 Step IT promises transparency and certifies the computers that are up for resale. In addition, some computers that have been leased may not have been used

much at all, in which case continuing their use through resale is a lucrative possibility for all stakeholders.

When products do not become a possession of the client but instead stay with the original service provider, also the provider has an incentive to make sure the equipment is used in a sustainable manner, and in 3 Step IT's case to still earn money with the products. As mentioned earlier, the problem of designing durable products is that customers are the ones who benefit from them, not the producers; so there is no incentive (Stahel 2010). What 3 Step IT shows is that a service business model combined with the aftersales makes taking care of and prolonging the IT equipment's life-span a priority for the company as well.

Artek 2nd Cycle's value proposition differs from other furniture sales stores in that the furniture are already once used, but still continue to be functional, of high quality, and with ageless design. The value of the product may even be higher than that of a new one, as some items become rarities. For a customer, the knowledge of the history of a sustainable, value-retaining piece of furniture can bring a sense of prestige and pride, and Heiskanen (1996) would name this as a high-quality strategy for product life extension.

Compared to other 2nd hand furniture sellers, Artek's products are clearly meant to be left from one generation to another. Even when being functional, the items are above all aesthetic. Even though design was created to sell more products, it can be used to design better products as well. Artek has amazingly been able to build especially on the fact that the products are durable yet always in fashion. Whereas 2nd hand furniture is most of the times bought in order to save money and also maybe to be ecological, in Artek's case customers may also enjoy the fact that they get a famous piece of Nordic design from the 60s. In one way, the customers do not have to choose between aesthetics, durability, ecology and price.

Lindström has been a pioneer in the textile service industry, and its sustainable values are recognized amongst customers and key partners. Outsourcing textile services to a professional who knows how fabrics should be treated and who has the appropriate machinery for it brings savings in both monetary and ecological terms. Renting instead of buying has obvious gains in the amount of textile materials needed for each individual company.

All Lindström textiles that are no longer used go to either energy or other utility use: some are being cut as rags and sold to clients to be used where recyclable towels cannot be used. Some are sent to utilization through subcontractors: some are made into recycled thread or carpet

rag. The utilization rate of the textiles for now is 73 percent, and the company aims to improve it. They are also looking for new ways of utilizing the old textiles. (Lindström 2013).

In addition, the Finnish Association for Nature Conservation (2013) has calculated the differences between drying one's hands with either a paper towel, dryer or a roll towel (which Lindström supplies), and a roll towel is clearly the most environmentally efficient in what comes to used materials and power. Looking at Lindström's competitors, one can say that the hygiene services of the company are a better choice than buying paper towels or dryers.

Patagonia has truly been able to brand itself as the green outdoor apparel company. The difference between buying from Patagonia and other companies in the industry can be seen in e.g. the source of materials and the limiting of yearly collections so as to not encourage wasteful consumption from customers.

When looking at Patagonia's competitors, e.g. North Face, they have not built their identities on "being green", like Patagonia, but are offering similar kinds of services to their customers, such as recycling. However, none have taken steps to diminish the amount of products sold. Patagonia's advertising campaign that said "do not buy this jacket" had nevertheless adverse effects from what the message was. Being true to the sustainable image that Patagonia has given in public has certainly earned the company a loyal fan base, and the products' reputation as the durable and environmentally-friendly choice is world-known. The strategy Patagonia has chosen seems to come close to the high-quality strategy, but also to the explicitly environmental strategy that Heiskanen (1996) proposes for product life extension.

Victorinox promises an infallible quality for its Swiss army knives, with a lifelong guarantee. Compared to other companies' "lifelong guarantee" promises, Victorinox seems to provide a wide customer service network for repairs. In addition, the products are claimed to be fully recyclable.

The company is the only qualified producer of Swiss army knives, so it does not face direct competition in this product category. What can be seen as close competitors are other tool and especially knife producers, as Victorinox also produces high quality cutlery. Also the cutlery is admitted lifelong guarantee, as the company claims that the steel they use is always first class, ensured by their quality management system (Victorinox 2013).

5.2. Revenue model -based differences

As mentioned earlier, the revenue model block of a business model depicts the monetary aspect of the company operations; the business logic of the company. In this chapter the meaning is to point out the economical differences that make extending product lifetimes possible for the case examples. It is, after all, probably the biggest hindrance for all economic actors to not think about extended product lifetimes – a company must make profit in order to live, and the easy way is to just produce and sell more, and for cheaper, with cheaper (and often also poorer) quality materials.

3 Step IT has closely studied the revenue model of car leasing companies: they provide a full service for their customers from the financing to the management and recalling of the hardware. This differs from some of the competitors in the market, as banks, who offer leasing services do not have such expertise with the logistics and supply chain management of the used equipment. This, and the fact that they are specialized only in IT equipment, gives 3 Step IT a clear advantage in optimizing the costs of all operations. Then again the other IT leasers or hardware sellers, who usually do not take the leased or sold products back, and sell them further, miss on the profits on that end. According to the CRO (2013), the refurbishment and reselling of the equipment is, after all, an integral part of their business model. If compared to the traditional type of selling IT equipment, 3 Step IT also manages to create a steady cash flow, which is easier to predict on a longer term, whereas lump sales are always more unpredictable.

In addition, the leased products are valued according to their estimated lifespans, and the customers' leasing fees depend on those. The less durable the brand, the smaller the resale price can be – but customers make the call on which brand they want to use. Informing about the estimated lifespans of different brands would help also consumers in picking out products that would last longer, but as far as there is no information on it, consumers put the responsibility on manufacturers' hands (Niva and Timonen 2001).

Artek 2nd Cycle's revenue model is interesting in that the company is able to resell what has already once been sold, and so keep on prolonging the lifespans of their products even more. They are able to profit twice from the same item – although the second time around they pay the supplier, who may once have been a customer. Depending on the rarity of the product, the amount of purchase price differs. The products are luxury items, which may even accumulate

more value through time. In that sense, Artek products could in a way even be seen as new antique.

Compared to such competitors that also sell used furniture, Artek 2nd Cycle's revenue model is special also in the sense that it is not expected to raise considerable profits, but it works more as a promotional platform for the mother company. Compared to others, the prices of the furniture are higher, which implies the high usability the products still have. The revenue model would probably not exist if the products were less durable – at least with decades-long cycles.

Lindström's revenue model's specialty is that the company has increasingly focused on renting instead of selling the textiles, and made services its core business. Offering the utility that the textiles provide helps Lindström focus on what the clients actually need. The service model also enables the same fabric to be used for a longer time – it can be reused or recycled when the initial customer does not need it anymore or wants to renew the collection in use. Renting e.g. work wear has only become popular in the past couple of decades, and Lindström is growing fast especially in the Asian markets.

Few competitors have adopted Lindström's business model in the Nordic market. As explained in the previous chapter, there were nevertheless some disputes between smaller players in the Finnish mat service market. Thanks to Lindström's economy of scale it has been able to offer lower prices than its competitors. Few companies also offer such a wide variety of textile services, but are more likely to specialize in selling textiles and/or selling laundry service. Lindström enables companies to deliberately define the type of textiles they need and for which use, and uses its expertise to maximize the using of each fabric. Lindström has skillfully built its brand for over a hundred years, and knows what works. Whereas the textile industry has not moved to a service-based business yet, like IT leasing, Lindström may very well change the way the industry works.

Patagonia's revenue model is a basic retail model, but as a difference to perhaps most other apparel manufacturers, the owners do not require high sales growth. Instead, the company's success is built on sustainability and e.g. a percent of the profits is donated to environmental NGOs. The higher quality materials, different sustainability projects that the company endorses, and extensive employee benefits seem boost sales as the customers of the company value these actions, but it is questionable if this kind of a strategy would be possible for a publicly listed company, who is responsible for the assets of multiple shareholders.

Patagonia is also a part of the Benefit Corporation (B Corp) movement, founded in the US. The idea of the movement is to redefine business success as both benefiting the shareholders and the community where the corporation operates. According to the B Corporation website (2013), the companies that join the movement voluntarily meet higher standards of transparency, accountability, and performance. The movement believes that as business is the most powerful man-made force on the planet, also business and not government and nonprofits alone must create common value. So far over 760 businesses in 27 countries have joined the movement. The companies that join the movement must pass certain performance requirements. 20 US states have also made the Benefit Corporation a legal status that is administered by the state, and another 11 states are considering the possibility of joining. (B Corporation 2013).

Victorinox' business logic does not differ largely from that of a basic tool or knife manufacturer. Nevertheless, the company puts great effort into not having to sack any employees due to economic reasons. In a BBC interview (2012) the son of the company founder, Carl Elsener Jr. explains that they find ways of overcoming the normal economic cycles (recessions) by putting money aside during good times. They invest against these cycles and are then able to keep the employees.

Compared to its competitors, Victorinox puts perhaps more effort into the quality and integrity of its operations. This may cost the company more, but as a family-owned business, the company is also honestly worried about its reputation than making highest possible returns.

5.3. Customer interface -based differences

The customer interface –feature explains the defining differences in the case examples' customer relationships, as well as in the target markets. Is it beneficial to target a wide or a carefully selected market in order to succeed with more durable products? And how are the customers involved in the business making? The case examples have quite different types of relationships with their customers.

At **3 Step IT** the customer interface is twofold: the customers who lease the IT equipment seem to value the fact that the whole service from financing to managing and collecting the equipment back is available through the company. A long term relationship with the clients makes 3 Step IT a trustworthy partner, and data erasure is also easy to be trusted in the

company's hands. After refurbishment, the second phase customers can be sure that the equipment still fills quality certificates and that it works well even after having been used. Keeping the supply chain well-running is a benefit for both 3 Step IT and its customers and enables the extension of the hardware's lifetime at large.

The biggest difference compared to the company's competitors is naturally the mere fact that there is a 2nd phase of use for the hardware – unlike in basically all other competitors' case. In addition, the customers receive the whole package related to IT hardware usage from the same company; whereas competitors would simply either just sell the equipment or lease but not take care of the end-of-lease phase. 3 Step IT can be seen as the full-service house, and it also advertises its service with the environmentally-friendly edge of longer lifespans for the used hardware.

Artek 2nd Cycle's customers work as the focal point of the whole business: they are the providers of the used furniture, as well as the buyers of the used furniture. The importance of product quality, design and brand stands out in this case, as people are willing to stay in a relationship with the company even after owning its products for decades. One of the reasons for this may lie in the aesthetics of the products: according to Cooper (2005), people can become attached to the shape and feel of a product, and especially wood ages well (van Hinte 1997 in Cooper 2005).

In comparison to competitors, Artek is especially known for its durable products, which is also one of the reasons customers come back to it. The products are highly wanted, but not all can afford them. Compared to e.g. IKEA products, whose customers are able to shop there practically whichever their income class, Artek is a luxury brand. Nevertheless, the sense of prestige may also not be there so much so that customers would like to have decades-old IKEA furniture. The higher prices and smaller availability of Artek products are also things that make customers want them, as with all luxury goods. The higher price, nevertheless, in this case also probably means longer product life.

Lindström's customers are in a continuous relationship with the company, as the service agreement of e.g. work wear includes the maintenance and washing of the clothes. The clothes are equipped with a microchip that helps in following each employees own work clothes. The customers seem pleased with the rental service, and as a B2B company it is easy to see why the customers are more eager to let go of owning their own work clothes –

especially work-related products (tools according to Stahel 2010) are not so emotionally important, and are more seen through the function they provide, as with 3 Step IT's case.

What can be seen as Lindström's strength compared to its competitors is the comprehensive relationship it has with its clients. Clients can be sure to get the functionality they need, and that the textiles are made for the use that they need it for. This makes the company's textiles seem like they are used to the maximum, and as Lindström takes care of the washing and maintaining of the fabrics, it is in Lindström's best interest to make them last as long and in as good shape as possible. According to Cooper (2005), involving customers into the production process can make them appreciate the products more, which probably is true in Lindström's case: people who wear their work clothes every workday want to be involved in designing the work wear that best functions in the task.

The customer segment that **Patagonia** is trying to reach is very small: in the Harvard business case (2004) it was mentioned that the company actually designs its products for surf bums and other outdoorsy, easy living promoting youngsters. This target market, which people might describe "cool", is nevertheless something that a lot of people aspire to, at least mentally. The surf bums naturally prefer long-lasting and durable products, which take up a lot of wear and tear during their intensive free time activities. This is what the company founder first thought of when starting his company. (Patagonia 2013).

Compared to its competitors, Patagonia's target market segment is much smaller. Extreme sports are after all a quite narrow field. Nevertheless, it seems like Patagonia's customers are also more loyal to the company because it is so true to its values. Because the company gives so much back to the community and environment, its customers are willing to invest in Patagonia products, even when they come with a price premium. The brand story has been cleverly built, as the Patagonia Ambassadors; extreme sports athletes show how Patagonia products enable them to manage in world's toughest spots.

Victorinox shares the quality dimension of Artek and Patagonia and wants to make products that last. Customers also create the company's brand story by sharing insights about how they have used their Swiss army knife in some situation in their life – some have been even in a life threat. (Victorinox 2013). The lifelong guarantee makes sure customers rarely need more than that one knife during their lives and that makes the brand stronger. Heiskanen (1996) would describe this as the perfect example of a high-quality strategy, where warranties

promote durability, but brand image and word-of-mouth are the most important information channels on product durability for consumers.

As mentioned earlier, compared to its competitors, Victorinox actually does provide the lifelong guarantee that other brands may only talk about. Even the Victorinox luggage is promised a lifelong guarantee, and according to some internet travel forums' discussions on luggage brands (flyertalk.com, australianfrequentflyer.com, airliners.net), they live up to that promise.

6. Conclusions

This chapter sums up the conclusions made on the base of the literature review and empirical research on business models for product life extension.

6.1. Empirical observations and their assessment

The business models discussed in chapters 4 and 5 shed light on many different aspects of how businesses can extend product lifespans. Even when the business models represented different industries, similarities between them could be found. I will assess the empirical observations by topic.

Ageless and aesthetic design

It seems that putting an effort on what the product looks and feels like can have an effect from a product longevity viewpoint. Mugge et al. (2005) argue that a strong person-product relationship is able to postpone consumers' product replacements. Then again Cooper (2005) noted that making products aesthetically appealing can promote longevity. Furniture as products seem to correlate with these arguments, as people seem to become attached to pieces of furniture as they are a part of everyday life at home, giving a sense of comfort and familiarity. The signs of lived life that furniture has do not seem to bother consumers – Artek products are gladly given from fathers to sons. Artek seems to have successfully combined aesthetics, agelessness and practicality in its products.

The 2nd Cycle store is merely an extension of Artek's marketing strategy, but at the same time it gives an important signal that Artek products can be for everyone. The Artek brand may also promote ageless design that is not dependent on trends. Of course all consumer goods companies are not able to succeed with Artek's recipe: only very few types of products are able to acquire more or even keep the same value while aging.

At Lindström design is also an integral part of operations. The company's clients get to design e.g. the work wear together with Lindström, which according to Cooper (2005) can make the client appreciate the service more. It may also raise the desire to use the same product (and its design) for a longer time.

Efficiency and experience in running a (service) supply chain

The two product-service systems companies presented in this thesis seem to have figured out that it is not enough to offer a service instead of selling a product – the service also needs to be realized in an efficient and customer-oriented way in order to succeed.

3 Step IT offers a completely thought-out service and is able to provide its clients an easier choice for dealing with IT needs. Once the first phase has been dealt with with high efficiency and steady experience, the computers are usually refurbished in the company's own industry spaces, again not relying on any external source and making the supply chain work seamlessly. The website for updating the storage situation of used equipment makes the refurbished hardware easy to sell further.

Lindström gives a similar kind of example to 3 Step IT: both offer their clients a comprehensive service that covers all their needs relating to a certain aspect of their operations. With Lindström, it is the whole external appearance that a client wants to express. Lindström carries out the service with decades of experience so that the logistics and all operations work as efficiently as possible, making even competitors incredulous (Kilpailuvirasto 2004).

Offering a service instead of a product - servitization

According to Stahel (2010), people are more open to not owning a product that they use for work, compared to not owning a product they use for play or during leisure time. In 3 Step IT's case the client companies' employees do not seem to care where their work computers come from, as long as they work properly. Again in Lindström's case, the employees of client companies seem pleased with the easiness of having a clean and undamaged work outfit always ready, as Lindström takes care of the washing and maintenance. The fact that the clients of both 3 Step IT and Lindström do not own the products they lease or rent from the companies has made their lives easier, most probably saved them money and also the handling costs of used products. Moving into a wide selection of textile services has been surprisingly easy for Lindström, and it has been expanding very ambitiously in the recent years.

The problem with electronics is that they are developing so fast that newer equipment is becoming cheaper and cheaper. Businesses or consumers might not choose leasing or renting if buying new is effortless and becomes even cheaper. What 3 Step IT seems to have figured

out is that especially the service aspect needs to be thoroughly thought out in order to lure in customers.

Powerful brand story

When looking at the three product selling examples companies of this thesis, it seems clear that longer lasting products need a strong story behind them in order to become sales hits. Heiskanen (1996) mentioned that consumers are best informed about product durability through brand image and word-of-mouth, which makes sense especially when looking at Patagonia and Victorinox.

Patagonia and Victorinox have managed to create a kind of a heroic brand story behind their products. Both companies' owners are known to be strongly present in the public image of the companies, and strengthen the reliable image of the products. The companies also use heroic stories in their advertising: Patagonia Ambassadors are extreme sports athletes that give fame to the products, whereas Victorinox is happy to collect and share stories about people who have used the Swiss army knife in a tricky situation.

In addition, the founder of Patagonia, Yvon Chouinard, has trained the executives of companies like WalMart to become more environmentally-friendly and has become renowned in the corporate responsibility circles through his energy and commitment for CSR.

Reuse and recycling as profit creating or cost diminishing acts

The end of a product's lifecycle can be turned into a start of another one through reuse or recycling efforts. Recycling products and materials used in the making of products properly can in some cases bring clear cost savings.

Reasons for maximizing the utility of the textiles Lindström uses are clear, but recycling the textiles in the end of their use may also save the company money in the future: the EU is planning a law that forbids taking textile waste to landfill. The company is already using some of its rags as recycling material and energy waste, and plans to increase the recycling amount.

What Artek has creatively come up with is, that products that are so durable that they last until second hand markets do not have to be a competitive risk for the original company, unlike Guiltinan (2009) notes. Artek became the reseller of its own products, which also encourages the company to keep on producing long-lasting products.

In the case of 2nd hand computers, all markets do not, nevertheless, seem as ready for reuse as others. The CRO of 3 Step IT explained that in Finland people do not seem to want to use 2nd hand computers, whereas organizations in Sweden are much more open to it. The company is nevertheless clearly profiting from the reselling (recycling) of the leased equipment, and gets the used equipment sold outside the Finnish market.

Warranty as a quality promise

Even when Cooper (2004) claims that consumers do not seem to consider durability as a critical attribute or a key buying motive (Guiltinan 2009), some consumers do give it attention, at least when it comes to certain products. Victorinox has been able to make a lifelong guarantee into a competitive advantage.

Victorinox, like Patagonia and Artek, promises superior quality and durability for their products. The company's lifelong guarantee promise seems to work well also for other products than the Swiss army knives, with which they have a monopoly. The promise of guarantee works as a strong signal of quality and can increase sales, if advertised correctly. Victorinox seems to have acquired popularity especially through word-of-mouth marketing and a reputation that has been built for decades.

Especially for products that are expected to break down after some years, a lifelong guarantee seems like the ultimate proof of getting value for one's money. All companies that offer longer-than-average lasting products could probably easily and quite effortlessly benefit from providing longer guarantees than their competitors do. Consumers would probably especially want to see this in consumer electronics. The EU has set a minimum of 2 years' guarantee for all consumer products sold in the European Union.

6.2. Main conclusions in relation to earlier research

The literature that I studied had few remarks on what types of businesses there are that produce longer lasting products. In addition, the examples did not present business models as the unit of analysis, but used business strategies (Heiskanen 1996), "modes" (Linton and Jayaraman 2005) and product-service systems (Cooper 2005) instead. The business models that were analyzed in the empirical part could be categorized under these frameworks, and did present all of the business strategies (high-quality, service, explicitly environmental and upgradeable products strategies), as well as the product-service systems and some of the modes.

The connections between the business model cases and the frameworks that used different analyzing units have been summed up in Figure 14. The modes of product life extension were not separately discussed in the empirical part of the thesis, but can be distinguished from the case descriptions considerably easily. Cooper (2005) presented a two-fold framework for product-service systems that suit especially product life extension in business, but the framework can only be applied to the cases of 3 Step IT and Lindström, as those were the only service type of business models.

Framework	3 Step IT	Artek (2nd Cycle)	Lindström	Patagonia	Victorinox
Business strategy for product life extension (Heiskanen 1996)	Service strategy	High-quality strategy; upgradable products	Service strategy	High-quality strategy, explicitly environmental strategy	High-quality strategy
Mode of product life extension (Linton and Jayaraman 2005)	Repair, direct product reuse, remanufacture	Repair, upgrade, direct product reuse, remanufacture	Repair, preventive maintenance, remanufacture, recycle	Repair, recycle	Repair
Product-service system for product life extension (Cooper 2005)	Value added to the life cycle, platform for services	N.a.	Platform for services	N.a.	N.a.

Figure 14: Case companies in relation to the product life extension frameworks of chapter 2.4.

In addition, some of the business models can be placed under the wider roof of green or sustainable business models, defined by FORA (2010): 3 Step IT and Lindström can be defined as “functional sales” business models, where customers pay for the utility rather than the product. Nevertheless, the fact that not all of the case companies can be classified as “green” business models hints to the need for a separate business model framework for business models for product life extension. Boons and Lüdeke-Freund (2013) nevertheless note that a specific sustainable (and product life extending) business model is impossible to be generically defined, as the characteristics that make one depend on specific firms and their contexts. The product life extending possibilities for business models that I presented in the previous subchapter thus serve as a list of characteristics that companies can consider, if they want to prolong product lifespans.

A main insight in relation to earlier research was that the product-service systems, or functional sales business models of 3 Step IT and Lindström seem to work very well, and that they are changing the industries they operate in, which has not been visible in many consumer goods industries. 3 Step IT and Lindström have possibly been able to succeed because they provide services for businesses. One of the only consumer-oriented service businesses that is known for traditionally being a sales business is car sharing. In car sharing, the initial investment is nevertheless very big, so it may be difficult to transform e.g. the use of consumer electronics to rental or leasing contracts.

This seems to provide a more general conclusion on how different it is to create a service-based business in the consumer market compared to a B2B business. As Stahel (2010) notes, toys, which e.g. computers ultimately are for consumers when they are used during leisure time, are seen as objects that people rarely want to share or have as used, whereas tools are seen for the utility they provide. This is why computers, which are used at the workplace, do not carry as much emotional value, and leasing is an easier choice. The same goes for clothes: Lindström is able to succeed in renting work wear as they are seen as tools, whereas Patagonia, even as an extremely green company, has not diverted into a service business, but keeps on selling new products (even if partially made out of recycled materials).

The interesting question that remains is, even with the emergence of new business models that prolong product lifetimes, is it possible to build a sustainable future with a reasonable use of natural resources only by waiting for the businesses to slowly transform? According to Guiltinan (2009), policy makers must take action if planned obsolescence is to be fought effectively.

A number of researchers seem to think that a motion towards alternative economic systems from the consumption-based is necessary in order to bring the natural system into a balance. Stahel (2010) has researched the so-called performance economy, which would decouple resource consumption from economic growth and bring more jobs through a completely service-based society.

Another topic under discussion is the peer economy, which would be base the economic system on sharing and cooperation. In Finland, a couple of service websites challenge the traditional types of product manufacturers and sellers by e.g. allowing people to freely swap services or products between each other (Sharetribe 2013) or share a car ride to make travelling cheaper (Greenriders 2013). These and other small version of the peer economy,

often called “time banks”, have emerged in a number of countries. The idea of time banks is to provide a service or some expertise for a favor in return: you get time according to the time spent on the service you personally provide, and are thus able to purchase someone else’s time with your work. The Finnish tax authority has nevertheless threatened to step in, as there are no taxes paid for these services.

As discussed earlier, the B Corporation movement is driving changes into legislation in the United States. The role of companies in the society has been questioned, and the number of businesses signing up as “B Corps” is slowly growing. Nevertheless, it is uncertain how big of a positive environmental effect these companies are able to create.

Asking how product lives could be extended may seem absurd, as it seems the objective for many companies and even governments at some point in time has been to shorten them. Going back to products that would last even 10 years seems hard. Nevertheless, the natural environment may not be asking nicely for much longer. Environmental degradation and pollution levels are causing serious health problems as well as losses of livelihoods. Businesses, governments and consumers are needed in order to change the way we act in our daily lives – to change the impression that we live so as to consume. Business model innovation towards product life extension is one step to the right direction, and pioneering companies are needed to set the example.

6.3.Suggestions for further research

This thesis has attempted to fill the gap in research on such sustainable business models that promote product lifetime extension. In order to help more companies in becoming sustainable, there are nevertheless many things that this thesis could not cover.

One of the biggest impacts from an environmental point of view would probably happen, if people would stop buying so many products, and instead started to rent, lease or borrow them. The product-service system types of business models in this thesis were concentrated on leasing and renting to other businesses, whereas it would be interesting to see how businesses that target consumers could create longer lasting products by offering services.

Another interesting thing would be to see how some companies are able to create enough reputation around their durable or longer lasting products to turn it into money. Probably many product manufacturers already exist that design durable products, but they have not been able to make it big. Looking at exactly what the ways are to create brand value with

durable products especially in consumer electronics could help giving credit to those who deserve it.

Lastly, more business models for product life extension from a wider geographical area could be studied in order to find out how much consumer cultures and governmental policies affect the success rate and possibilities for creating longer lasting products through business and business model innovation.

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Appendix 1 – Characteristics of a Sustainability Business Model

Characteristics of a Sustainability Business Model				
	<i>Economic Characteristics</i>	<i>Environmental Characteristics</i>	<i>Social Characteristics</i>	<i>Multidimensional or Holistic Characteristics</i>
Structural attributes	External bodies that track performance of companies use a triple bottom line (TBL) approach.	Threefold strategy: offsets (do no harm but make amends if you do), sustainable (do no harm), restorative (leave the world better than you found it).	Stakeholder engagement skills: understanding stakeholders' needs and expectations (being relevant to stakeholders).	Systems approach: <ul style="list-style-type: none"> • cooperative business strategy and planning. • collaborative model including supply chain, competitors, government agencies, communities.
	Lobby industry and government for changes to taxation system and legislation to support sustainability.	Closed-loop systems: responsible for product throughout its lifecycle.	Educate stakeholders; "relentless" communication.	TBL approach to measure organizational performance.
	Keep capital local: local shareholders and investment in local sustainability initiatives.	Implement a services model.	Implement stakeholder consultation program.	Institutionalise sustainability in the business: "relentless" communication, stakeholder education, leadership, champions, and align internal performance measures.
		Industrial ecosystems and stakeholder networks.	Get "buy-in" from internal and external stakeholders.	Demand-driven model, not supply-driven model (driven by what people need, not driven by companies trying to get people to buy more).
Cultural attributes	Profit is a means not an ends. Business makes a profit to do something more. "Higher purpose" to business than making money.	Treat nature as a stakeholder.	Stakeholder approach (managing the organization for the benefit of all stakeholders and not prioritizing shareholders' expectations above other stakeholders).	Medium to long-term focus.
	Shareholders invest for social & environmental impact reasons as well as for financial reasons.		Alignment of stakeholder expectations.	Reduction in consumption.
	Shareholders temper expectations for short-term financial returns.		Sharing of resources (people, profits, and time) among stakeholders to achieve sustainable outcomes. Relationship building (trust, two-way loyalty, honesty, integrity, and fairness, equity).	

Appendix 2 - Research material

Company	Research material
3Step IT	<ul style="list-style-type: none"> Interview on Chief Remarketing Officer, May 16 2013 http://www.3stepit.fi
Artek	<ul style="list-style-type: none"> Interview on store salesman, May 29 2013 http://2ndcycle.artek.fi/ http://www.aeki.fi/ http://www.martelaoutlet.fi/ Helsingin Sanomat 2009. <i>Lama ei katkaise tuolin jalkoja</i>. Accessed online on July 31 2013 at http://www.hs.fi/artikkeli/Lama+ei+katkaise+tuolin+jalkoja/1135245784262. The Guardian 2013. <i>Recession bypasses market for luxury goods</i>. Accessed online July 31 2013 at http://www.theguardian.com/business/2013/feb/15/recession-bypasses-luxury-goods-market
Lindström	<ul style="list-style-type: none"> http://www.lindstrom.fi/ Kilpailuvirasto 2004. <i>Määräävän markkina-aseman väärinkäyttöepäily vuokramattomarkkinoilla</i>. Finnish Competition Office's ruling for Lindström in a suspect case of dominating market position abuse on the rental carpet market in Finland. Accessed online July 29 2013 at http://www.kilpailuvirasto.fi/cgi-bin/suomi.cgi?sivu=ratk/r-2000-61-0160. The Hindu Business Line 2012. <i>Lindstrom – weaving a new outsourcing business</i>. Accessed online July 31 2013 at http://www.thehindubusinessline.com/companies/lindstrom-weaving-a-new-outsourcing-business/article3907800.ece. The Hindu Business Line 2013. <i>Lindstrom eyes growth in workwear services</i>. Accessed online July 29 2013 at http://www.thehindubusinessline.com/companies/lindstrom-eyes-growth-in-workwear-services/article4577459.ece.
Patagonia	<ul style="list-style-type: none"> http://www.patagonia.com/ B Corporation 2013. Accessed online July 27 2013 at http://www.bcorporation.net/ Harvard business school 2004. Patagonia. Harvard business case 9-703-035, revised December 14 2004. Accessed online May 10 2013 at https://business.wfu.edu/download.aspx?id=2509.
Victorinox	<ul style="list-style-type: none"> http://www.victorinox.com/ BBC 2012. <i>Revealed: The Swiss Army knife</i>. BBC Radio 4 Today, April 6 2012. Accessed online June 11 2013 at http://news.bbc.co.uk/today/hi/today/newsid_9711000/9711459.stm Swiss Style 2013. <i>On the cutting edge</i>. Accessed online July 30 2013 at http://www.swissstyle.com/victorinox-cutting-edge.

Appendix 3 – Chart on the special features of business models for product life extension

Company	Value proposition -based difference	Revenue model -based difference	Customer interface -based difference
3Step IT	<ul style="list-style-type: none"> • Efficient, extensive & trustworthy service • Doubled product life thanks to reselling 	<ul style="list-style-type: none"> • Refurbishing and selling used equipment • Depreciation value according to IT brand 	<ul style="list-style-type: none"> • Service makes clients' lives easier • 2nd hand users get lower-priced hardware that works well
Artek 2 nd cycle	<ul style="list-style-type: none"> • Recycled high quality design furniture with lower price than new and ageless design 	<ul style="list-style-type: none"> • Reselling already once sold products • Promotional value of the 2nd Cycle store 	<ul style="list-style-type: none"> • Old customers provide the used furniture • Customers trust the brand quality and like the aesthetics as well as the functionality
Lindström	<ul style="list-style-type: none"> • Taking care of the client's whole textile services needs efficiently 	<ul style="list-style-type: none"> • Renting textiles that are usually sold • Very well managed service supply chain lowers costs 	<ul style="list-style-type: none"> • Easiness of the service • Designing the used products together with the client
Patagonia	<ul style="list-style-type: none"> • High quality materials • Transparent supply chain • Sustainable values throughout the company 	<ul style="list-style-type: none"> • Owners do not require high sales growth • 1 % of profits go to environmental NGOs 	<ul style="list-style-type: none"> • Target market very small but one that people want to identify themselves with • Repair service for customers
Victorinox	<ul style="list-style-type: none"> • High quality, durable products 	<ul style="list-style-type: none"> • Also staff is considered as a long-lived asset: putting money aside for bad years 	<ul style="list-style-type: none"> • Lifelong guarantee against any defects in materials or workmanship