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CIRCULAR ECONOMY IN FINNISH COMPANIES: OPPORTUNITIES AND CHALLENGES

Master's Thesis in
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TIIVISTELMÄ
Ympäristöasioiden merkitys on kasvanut liiketoiminnassa. Kiertotalous on konsepti, joka pyrkii sekä taloudelliseen että ympäristön kannalta suotuisaan hyvinvointiin, mutta sen sosiaalinen ulottuvuus on kiistanalainen. Kiertotalouden tarkoituksena on pitää materiaalit ja raaka-aineet käytössä niin pitkään kuin mahdollista ja näin vähentää jätteiden määrää ja luoda pitkäkestoisempaa arvoa. Kiertotalous on lupaava konsepti, joka tuo monia mahdollisuuksia yrityksille, ympäristölle ja yhteiskunnalle, mutta se sisältää myös haasteita, jotka voivat vaikeuttaa sen käyttöä. Tämä pro gradu -tutkielma tarkastelee niitä mahdollisuuksia ja haasteita, joita suomalaiset kiertotaloutta käyttävät yritykset kohtaavat.

Tärkeimmät aihealueet teoriassa ovat kiertotalous, kiertotalouden liiketoimintamallit ja kiertotalous kansainvälisessä liiketoiminnassa. Kiertotalouden liiketoimintamalleja tutkitaan menetelminä, joiden avulla kiertotaloutta voidaan käytännössä toteuttaa. Kaikkia teoreettisia aihealueita tutkitaan niiden mahdollisuuksien ja haasteiden näkökulmasta, jotta teoriaa voidaan verrata empiirisiin tutkimustuloksiin. Tutkielma on laadullinen tutkimus ja aineisto kerättiin viidestä haastattelusta, joissa haastateltiin kuutta kiertotalouteen perehtynyttä toimihenkilöä. Haastatellut toimihenkilöt ovat suomalaisista kansainvälisistä yrityksistä eri toimialoilta kuten metsä- ja energiateollisuudesta. Aineisto analysoitiin sisällönanalyysia käyttäen.

Empiirisen tutkimuksen tuloksena voidaan päätellä, että tärkeimmät mahdollisuudet kiertotaloudesta yrityksille ovat resurssitehokkuus, kustannusten säästö ja ympäristö- ja imagohyödyt. Muita mahdollisuuksia ovat esimerkiksi edellytykset tuotteiden erilaistamiseen, kiertotalouden sosiaalinen hyväksyttävyys ja voittojen leviäminen suuremmalle joukolle. Sen sijaan suurimmat haasteet kiertotaloudesta ovat korkeammat kustannukset tietyissä toimissa, lainsäädäntö ja kiertotaloustoiminnan kommunikointi asiakkaille. Muita haasteita ovat esimerkiksi kiinnostavien kiertotaloustuotteiden löytäminen kuluttajille ja tietämyksen puute tietyillä alueilla kuten kierrätysmateriaalien hankinnassa. Empiirisen tutkimuksen löydökset ovat varsin johdonmukaisia kiertotalouden ja sen liiketoimintamallien teorioiden kanssa. Vastaavasti teoria liittyen kiertotalouteen kansainvälisessä liiketoiminnassa tarjoaa vähiten samoja näkökulmia empirian kanssa.

Kiertotalouden yleisessä teoriassa tutkijat olivat erimielisiä siitä, onko konseptilla sosiaalinen ulottuvuus. Tulokset haastatteluista koskien kiertotalouden sosiaalista puolta ovat selvät: kaikki haastatellut henkilöt näkivät kiertotalouden ulottuvan myös sosiaaliseen hyvinvointiin esimerkiksi työpaikkojen luomisen, puhtaamman ympäristön ja vuokrauspalveluiden kautta. Kiertotalous nousevana trendinä tarjoaa paljon tutkimusmahdollisuuksia. Tutkimustuloksissa yllättävin oli haaste kommunikoida yrityksen kiertotaloustoiminta asiakkaille ja jatkotutkimusehdotukseksi esitetäänkin muun muassa tutkimusta siitä, millaiset viestit koskien kiertotaloutta tavoittavat asiakkaat parhaiten.

AVAINSANAT: Kiertotalous, kiertotalouden liiketoimintamallit

1. INTRODUCTION

The topic of this master's thesis is circular economy and its opportunities and challenges for Finnish companies using it. The aim is to examine the factors pushing companies to use circular economy and the opportunities the concept brings, as well as the challenges associated with it. Circular economy is a rising phenomenon which has got substantial attention from academia, but there is a lack of research on its practical implementations in companies. Thus, the focus of this study is to shed light to the practical side of the concept. This chapter discusses the background and justification for the study. In addition, the research question and objectives are more carefully defined, and delimitations and the structure of the thesis explained.

1.1 Background of the study

In today's economy, it is no surprise that the phone you are using is probably less than two years old. In China, a new mobile phone is bought on average every 8-12 months and in the United States the time span is 18 months. In addition, only a very few of the phones sold in China end up in recycling centers since the recycling rate in the country is only 9-10 percent of the global recycling average. Also, because of the low value of used phones in reselling, most consumers just get rid of the old phones by tossing them into the household trash. Cellphones among other mobile devices contain many toxic substances such as lead, cadmium and toxic mercury which can make a lot of damage to the environment by contaminating water supplies and the soil when thrown into a landfill. (United Press International 2015.)

That is an example of consumer behaviour which is unbearable for the environment. The sustainability challenges faced today include for example over-use of natural resources, pollution, the threat of higher global warming, and a shortage of focus on social justice (Murray, Skene & Haynes 2017). Ritzén & Sandström (2017) discuss the requirement of sustainable development which is decreasing the resource usage of products and services, which should be done in a way that allows companies still to gain profit from their goods in the market. They discuss that a concept of the Circular Economy (CE), which is

nowadays a trending topic, could be a possibility in moving to a more sustainable economic system. Circular economy uses the logic of closing material loops within the product lifecycle, thus it aims to keep materials in circulation in the economy rather than disposing them. This then leads to the desired goal of reducing resource usage and energy demand. (Ritzén & Sandström 2017.)

Circular economy is a concept that aims for the both wellbeing of the environment as well as for businesses to see new market opportunities. The concept can be seen as a solution for different challenges ranging from environmental issues to economic matters. For environmental concerns, circular economy deals with such issues as waste generation and resource scarcity and for the economic side, maintaining economic benefits. (Lieder & Rashid 2016.)

Ghisellini, Cialani & Ulgiati (2016) see that circular economy is a very promising framework for both increased efficiency of resource use and increased wellbeing. In addition, current business models are improved to become more preventive and regenerative. Recovering natural resources is said to make a difference to wellbeing in societies. Circular economy has potential to put new methods into action in order for societies to be more sustainable and increase the wellbeing of their citizens. (Ghisellini et al. 2016.) Other possibilities include for example new business and market opportunities and better brand image for companies, reducing demand of natural resources and preserving nature for environment and economic growth, job creation and innovation for society.

However, there are also challenges for circular economy concerning companies, environment and society. For companies, consumers' attitudes towards remanufactured products can cause problems when those products are not as appealing as new ones (Hazen, Mollenkopf & Wang 2017). Circular economy is still in its infancy when it comes to implementation in practice (Murray et al. 2017 & Ghisellini et al. 2016), thus it is not clear for companies how to make the concept work in everyday business life. Also, environmental legislation and taxation bring their own issues for business (Korhonen, Honkasalo & Seppälä 2018). Even though circular economy is promoted as beneficial for the environment, it is not always that simple. Unintended consequences and over-

simplistic goals are challenges the concept may create for the environment (Murray et al. 2017).

Circular economy has been accused for forgetting the social dimension which is present in sustainability. Geissdoerfer, Savaget, Bocken & Hultink (2017) discuss that the social side is mainly seen in job creation possibilities leaving the overall understanding of the social benefits unclear. Although most authors writing about the concept have limited focus on the social aspect (Geissdoerfer et al. 2017), there are also opinions supporting CE in social wellbeing.

Circular economy has many different aspects to consider and most of them are intertwined, thus companies must consider all the aspects of the triple-bottom line. Circular business models are also discussed to observe the challenges and opportunities in more detail since choosing a business model is something every company must do, and different business models have different opportunities and challenges. In addition, the role of circular economy in international business is discussed.

1.2 Justification for the study

Why it is important to study circular economy? Overall, environmental issues are more and more at the center of the attention from policy makers, business life and academia. EU is promoting circular economy in building a greener and more competitive Europe. The European Commission has launched a Circular Economy Action Plan which focuses on advocating circular economy processes, examining entire life cycles of products (e.g. design, recyclability), advancing sustainable consumption, and targeting resources being kept in the EU economy for as long as possible. The Action Plan was first published in 2015, and it includes both legislative and non-legislative measures which are directed to areas where EU level actions deliver real added value. (European Commission 2020.)

In Finland, Finnish road map to a circular economy 2016-2025 was published in 2016 and lead by Sitra (The Finnish Innovation Fund). It is the world's first national road map aiming for circular economy in national level. The road map was created together with government ministries along with almost 50 other representatives from the public, private

and third sectors. The objective of the road map is to combine different views on the essential changes and actions required for the transition to a circular economy by the key operators. The challenges that need to be tackled are climate change, the depletion of natural resources and urbanization, and the road map presents the most efficient circular economy solutions for those issues proposed by Finland. (Sitra 2016.)

There is a clear research gap in the practical implementation of circular economy and therefore there is a room for a new study. The context of this study is Finnish companies with international activities because it is an area that has not been studied much regarding implementation of circular economy. There are also practical reasons, for example accessing data by interviewing only Finnish companies is simpler than conducting an international study. In addition, focusing solely on one country gives deeper understanding on how circular economy is implemented in that specific context.

In Finland, some studies of circular economy have been conducted. Husgafvel, Linkosalmi, Hughes, Kanerva & Dahl (2018) discuss circular economy in forest sector in Finland. The paper consists of two case studies among both large and small forest sector companies and the purpose is to address two different components of circular economy development in forest sector. The findings in the first case study conclude that when developing circular economy and bioeconomy, material and energy efficiency are important. Also, EU and national level public steering and sustainability considerations should be taken into account and life cycle thinking deserves more focus. In the second case study, the conclusion is that "without inducements, legislative obligations or demand from the construction sector or other customers, the potential for the wide-scale cascading of solid wood in Finland is very limited". (Husgafvel et al. 2018.)

Also Näyhä (2019) examines circular economy, bioeconomy and sustainability in Finnish forest-based sector. The objective of the article is to find out how forest-based sector firms perceive the concepts of bioeconomy and circular economy and their relationship to sustainability when transforming their businesses. The findings conclude that different companies have different understandings of the concepts and they are greatly intertwined. Many of the companies perceived themselves as forerunners in the industry due to having sustainability as their core value and highlighting Finnish knowledge in the sector. (Näyhä 2019.)

In a study by Husgafvel, Linkosalmi & Dahl (2018), companies and public authorities in seafaring sector and Kainuu region were examined. The focus is on the development of circular economy and its key elements. The conclusions are that more attention should be given for advancing more proactive approaches of circular economy development by spreading awareness and building capacity. Some important aspects include material and energy efficiency, development of both international and sectoral guidelines and best practices, life cycle thinking and assessment, recycling/reuse, whole supply chains, waste minimization and utilization of by-products and side flows. In addition, supportive public steering plays an important role. The responding companies have also positive views on future development of CE. (Husgafvel et al. 2018.) Levänen, Lyytinen & Gatica (2018) investigated two battery recycling companies in Finland and in Chile to understand how institutional circumstances affect circular business models in those firms. The developed framework emphasizes that the business models and context-specific institutions are reliant on each other, and there are differences between countries in the promotion of circular economy.

The previous studies concerning circular economy in Finland have been more focused on specific industries, and for that reason this thesis gives broader understanding on the overall implementation of CE in Finnish firms. Also, the fact that Finnish government is advocating circular economy is interesting in the sense of if that motivates companies in the transition to more sustainable business practices.

1.3 Research question

The purpose of this thesis is to examine the opportunities and challenges of circular economy in Finnish companies. This means first defining what circular economy is and examining circular business models.

Thus, the main research question is:

1. **What are the opportunities and challenges Finnish companies face when using circular economy?**

In addition, I have determined two objectives to help answering the research question:

1. *Examine circular business models in order to understand their specific opportunities and challenges and therefore analyze the different aspects of CE in companies more carefully.*
2. *Examine the role of circular economy in international business.*

1.4 Delimitations and scope of the study

This thesis is focused solely on Finnish companies which have international activities such as international trade, manufacturing and subsidiaries. The study has not been limited to a specific industry since that would narrow the research too much, and because the aim is to explore circular economy in different industries, not just in specific one. The thesis examines circular economy from a company perspective and studies opportunities and challenges of the concept.

The purpose of the thesis is not to get a generalizable view of circular economy in companies but to gain understanding on how firms see and deal with the different aspects of the concept. This can then form new areas for further research on the topic. From the interviews, the perceptions of the participants are subjective and therefore give solely initial ideas about the different sides of circular economy in companies.

1.5 Structure of the thesis

Here the structure of the thesis is introduced. Firstly, the chapter 1. Introduction presents background and justification for the study as well as research question and delimitations. Following introduction, literature review has been divided into two chapters: 2. Circular economy and 3. Business models. In these two chapters the relevant theories for the study are explained. In the chapter 4. Methodology, research philosophy, approach and design are presented with the execution of the study. In addition, validity and reliability of the study are discussed. The chapter 5. Findings reveals the main empirical results from the interview data, and chapter 6. Discussion and conclusions discuss the findings in relation

with the literature review. Lastly, conclusions are presented with possible avenues for further research.

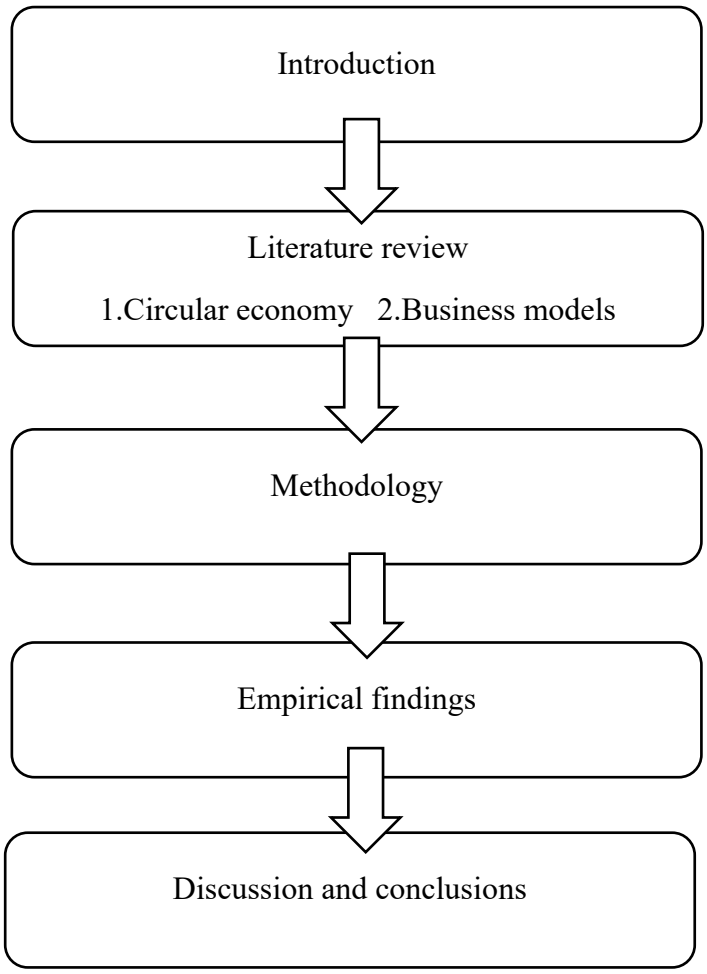

Figure 1. The structure of the thesis

2. THE CIRCULAR ECONOMY

The industrial revolution started the mass production of products with high availability and low costs by new manufacturing methods. This led to the birth of new consumer societies and staggering growth in industrial activity. Therefore, the environment has suffered greatly: emissions, solid waste generation and landfill have become a huge burden for the ecosystem. And there is no end to be seen for the rising demand for resources, including natural resources. This is due to a growing and more rich world population, especially strong middle-class growth has its effects on environment. (Lieder & Rashid 2016.)

2.1 The concept of circular economy

Integrating economic activity and environmental wellbeing is a challenging task. Circular economy displays the most recent attempt to combine those two elements in a sustainable way. There are many variations of definitions for circular economy. Circular economy can be conceptualized as an economic model in which designing and managing different parts of product lifecycle are used to maximize ecosystem function and human wellbeing. Those parts include planning, resourcing, procurement, production and reprocessing and the practice involves both process and output. (Murray et al. 2017.)

Korhonen et al. (2018) describe circular economy as "an economy constructed from societal production-consumption systems that maximizes the service produced from linear nature-society-nature material and energy throughput flow". Cyclical material flows, renewable energy sources and cascading-type energy flows are means to achieve it (Korhonen et al. 2018). Geissdoerfer et al. (2017) define the concept as a system that utilizes the means of slowing, closing and narrowing material and energy loops to minimize emission, waste, resource input and energy leakage. The methods include long-lasting design, repair, recycling, maintenance, reuse, remanufacturing and refurbishing (Geissdoerfer et al. 2017).

‘Restorative’ is a word that is important in describing circular economy since it is not only a preventative approach which reduces pollution but also has the objective to repair previous damage. This damage control is carried out within the whole industries designing better systems themselves. There are three Rs which are essential for circular economy: Reduce, Reuse and Recycle. (Murray et al. 2017.) Hu, Xiao, Zhou, Deng, Wang & Ma (2011) have a slightly different view: they add one more R to the group. Hence, the four Rs are Reduce, Reuse, Recycle and Recover.

Since its establishment in 2010, the Ellen MacArthur Foundation has been supporting the organizations who aim to move their business towards circular economy. The charity defines circular economy as a development cycle which mission is to keep value and utilization rate of products, materials and components as high as possible. Natural capital is being cared for and conserved for both today’s and future’s people. The concept aims to optimize the use and production of resources, also it will benefit in “minimizing system risks by managing finite stocks and renewable flows”. Every part of circular economy work together effectively. “A circular economy is restorative and regenerative by design”. (The Ellen MacArthur Foundation 2017.)

Figure 2. The concept of circular economy (European Parliament 2015)

In the Figure 2, the concept of circular economy is shown in a picture. Even though circular economy aims for zero waste, there is also residual waste coming from the process. This is because not all resources can be used again or recycled due to their condition. However, the amount of waste in circular economy is much less than in the traditional linear economy.

Circular economy is the opposite to linear economy which generates waste from natural resources through production. That is harmful to the environment since its natural capital is decreased and loses value because of pollution from waste. However, the term linear economy has become popular by the researchers writing about circular economy and concepts related to it. Thus, it has been used to advocate the term circular economy and without it may not have become known by the public. (Murray et al. 2017.)

The concept of circular economy is very popular in China since the principle guides the country's economic development (Murray et al. 2017). For China, circular economy is a political objective which is implemented top-down (Ghisellini, Cialani & Ulgiati 2016). It aims to reduce the burden, which comes from pollution, of ecosystem, and reduce the lack of resources (Guo, Geng, Ren, Zhu, Liu & Sterr 2017). Environmental crisis is a very severe fact for the country since China is the largest user of natural resources and is becoming the world's largest economy (Welfens, Bleischwitz & Geng 2017). To show how important environmental wellbeing is for China, it has included circular economy for five-year plans which guide the country's development (Zhijun & Nailing 2007).

Circular economy is also expanding to Western countries and NGOs (Murray et al. 2017). According to Korhonen et al. (2018), circular economy is gaining a foothold in Europe since the concept is promoted by the EU and by some national governments such as the Netherlands, France, Sweden, UK and Finland. Outside Europe, countries including Japan and Canada have also adopted the concept. In addition, several businesses around the world are supporting circular economy. (Korhonen et al. 2018.) Ghisellini et al. (2016) point out that on the contrary to the Chinese way of transiting towards circular economy (top-down), in Europe the concept is mainly treated as a bottom up approach promoted by civil society, NGOs and environmental organizations, for example.

A large part forming circular economy is legislation, rather than the work of academics. Legislation is important at least in Chinese context, since the country's economic

development is based on the concept. This may be the reason why circular economy has not yet been an academic field with its own faculties, a journal and editorial board. (Murray et al. 2017.) Korhonen et al. (2018) argue also that practitioners, the business community and policy-makers have been the greatest influencers to the concept of circular economy. Prieto-Sandoval et al. (2018) discuss that regulation and policy determinants have an important role in CE implementation by influencing and motivating consumers' and suppliers' environmental practices.

2.2 Circular economy and sustainability

Circular economy and sustainability are two terms which are attracting a lot of attention from academia, industry and policymakers. However, the similarities and differences between both terms continue to be unclear since literature has not made a clear distinction between them. After a broad literature review, eight different relationship types were classified and thus the most obvious differences and similarities between the concepts could be clarified. In conclusion, circular economy can be defined as a system that utilizes the means of slowing, closing and narrowing material and energy loops to minimize emission, waste, resource input and energy leakage. The methods include long-lasting design, repair, recycling, maintenance, reuse, remanufacturing and refurbishing. Sustainability, on the other hand, can be described as an integration that aims for the benefit for both current and future generations. Its parts include economic performance, social inclusiveness and environmental resilience. (Geissdoerfer et al. 2017.)

Murray et al. (2017) point out a view that circular economy forgets about the social dimension which is one of three pillars of sustainability. Circular economy is focused on developing more environmentally friendly manufacturing and service systems in order to benefit the biosphere. Therefore, it is still unclear how the concept is going to make a difference to social equity which includes equality of social opportunity, financial equality, and diversity of gender and races, to name a few. (Murray et al. 2017.) Also Geissdoerfer et al. (2017) and Homrich, Galvão, Abadia & Carvalho (2018) mention that circular economy has a limited focus on social aspects but the economic and environmental sides are emphasized.

However, Korhonen et al. (2018) argue that the successful circular economy takes into account all the three dimensions of sustainable development, including the social aspect. They highlight the sharing economy as a social objective. The sharing economy means that cars, office spaces, vacation apartments et cetera are used by many different people to keep the utilization rate high which then saves materials and energy from producing since everyone does not need to own their own car, for example. Cooperation and community using, participative democratic decision-making and increased employment are parts of the sharing economy. (Korhonen et al. 2018.)

Thus, there are different opinions about the relationship between circular economy and sustainability. The main controversy relates to the social aspect which some researchers see missing. In their opinion environmental and economic factors are in focus leaving the social side to less consideration. However, counter arguments are presented that the concept does consider social issues for example in a form of sharing economy.

2.3 Opportunities and challenges of circular economy

Since the topic of the thesis is the opportunities and challenges of circular economy, next the concept is discussed from both perspectives.

2.3.1 Opportunities of circular economy

Circular economy presents many opportunities for companies, society and environment. Korhonen et al. (2018) discuss that for circular economy to be successful for companies, it is important to discuss about the economic objective of the concept. The economic aspect is important also for society. Circular economy aims to reduce raw material and energy costs as well as waste management and emissions control costs which come from the traditional linear way of production. There is business sense to circular economy since it allows an economic value to be used many times and as long as possible. Here the economic value refers to products or services which have been produced using raw materials. Thus, companies are interested in circular economy because they can benefit

from it by saving resources which are expensive in many cases. (Korhonen et al. 2018.) Also, The Ellen MacArthur Foundation (2012) discusses Economic growth and Substantial net material cost savings which are two of the four economic opportunities from circular economy. Resource saving and increased profits are the main factors behind economic growth. Companies could make more revenues using emerging circular technics and save resources by more efficient utilization of inputs. Material costs could be lowered by the means of detailed product-level modelling. (The Ellen MacArthur Foundation 2012.)

There are also other benefits from the value reuse: creation of new business, market and employment opportunities. For business, adapting circular economy can also improve the image of companies and they can use green marketing tactics in their advertising, which can be appealing to customers. (Korhonen et al. 2018.) The Ellen MacArthur Foundation discusses also Job creation potential and Innovation as other two economic opportunities in addition to economic growth and substantial net material cost savings discussed earlier. Employment opportunities within circular economy are seen wide, ranging from higher skilled jobs in remanufacturing to increased vacancies in service sector. Innovation is an important part of circular economy and can affect many sides of the economy in a positive way. It encourages technological development and energy efficiency, creates more business opportunities for companies, and enhances materials and labor. (The Ellen MacArthur Foundation 2012.)

According to Ritzén & Sandström (2017), industrial companies may find circular economy appealing since it combines business development with sustainability issues and approaches the integration critically. The criticality comes from the general fact that the overuse of natural resources is unbearable for the environment.

2.3.2 Challenges of circular economy

Circular economy is not a perfect concept but has also challenges. Korhonen et al. (2018) point out a question concerning the usage of the saved resources and money generated by circular economy. The ideal situation would be that they would be used for sustainable consumption practices to benefit the whole globe. However, this requires a change in the

current consumption culture which is not easily done. (Korhonen et al. 2018.) Hazen et al. (2017) discuss that there must be change in consumers' attitudes towards remanufactured products for circular economy to be plausible. Consumers tend to avoid remanufactured products and rely on ordinary goods. Thus, consumers' attitudes and behaviors play an important role in developing circular economy and must be considered. (Hazen et al. 2017.)

Lieder & Rashid (2016) argue that even though circular economy is a hot topic for researchers, the focus has been in the environmental side of the concept, in such matters as waste generation and resource use, for example. Thus, business and economic perspectives have not gained as much attention and the advantages of circular economy for business are still not clear. This then can affect to the implementation of circular economy in a negative way. (Lieder & Rashid 2016.) Also, environmental legislation and taxation can pose risks which should be lowered (Korhonen et al. 2018).

Korhonen et al. (2018) & Ritzén & Sandström (2017) state that circular economy is competent in proposing beneficial ideas but their implementation in practice remains still rare and a problem to be solved. Ritzén & Sandström (2017) add also that even though the literature has identified essential barriers of implementation of the concept, they are usually not tested in practice.

Murray et al. (2017) criticize circular economy also for having 'unintended consequences and over-simplistic goals'. Fitzherbert, Struebig, Morel, Danielsen, Brühl, Donald & Phalan (2008) give an example of an environmentally negative consequence which is the one that follows planting of oil palm to increase green fuel. To plant oil palm, forests in Indonesia have been cut down and many species living there have suffered greatly by losing their habitat (Fitzherbert et al. 2008). For over-simplistic goals, long-lasting products are usually thought as a good way to decrease waste, but they are not always efficient ecologically. Manufacturing long-lasting products can increase the amount of useful energy spent and release more entropy than counterparts which have a shorter life but more natural outcome. For instance, comparing a bamboo chopstick and an innovative plastic fork, a chopstick would be a better option because it is easily recycled and would be back to the biosphere faster since it is made only from natural materials. (Murray et al. 2017.)

Table 1. Opportunities and challenges of circular economy

	Opportunities	Challenges
Companies	-Reduce raw material and energy costs -New business and market opportunities -Better brand image -Innovation	-Consumers' attitudes towards remanufactured products -Implementation in practice -Environmental legislation and taxation
Environment	-Reduce demand of natural resources -Preserve nature	-Unintended consequences: oil palm planting for green fuel has destroyed the habitat of many species -Over-simplistic goals: long-lasting products can be less efficient ecologically than products from natural materials which do not last as long
Society	-Economic growth -Job creation -Innovation	-Lack of focus on social issues: how to improve the wellbeing of citizens

Opportunities and challenges of circular economy are summarized in the Table 1. Both aspects are outlined from the point of view of companies, environment and society. After knowing the opportunities and challenges of the concept, the implementation of circular economy in practice is discussed in the next chapter of business models.

2.4 International business aspect of circular economy

Circular economy is a raising concept globally, and therefore CE in international business context is discussed from the perspective of multinational companies (MNC).

2.4.1 Implementation of CE

Circular economy is a promising concept which attracts a lot of attention from both academia and business, but can it really work in an international business context? For example, the supply chains of multinational companies are long and hard to manage which can pose problems for implementing circular economy through the whole company. Perez-Aleman & Sandilands (2008) discuss problems in supply chains and how can them be avoided. Companies have many standards for environmental and social wellbeing, but the challenge is to have on agreement which makes companies and suppliers willing to actually adopt the standards. Often standard setting fails in including all the groups, in many cases the groups most affected by the proposed standards are forgotten in the planning. Also, suppliers, especially those in poor developing countries, should be supported by creating infrastructure which would enable them to make the required changes to improve their social and environmental procedures. But this can be a real challenge for MNCs. To help in implementing norms, supply chain standards should be crafted in cooperation between global goals and knowledge on local circumstances varying depending on location. This means then that the standards are built from a lower to higher position. (Perez-Aleman & Sandilands 2008.)

Focusing on environmental and social standards in supply chains can weaken the position of small-scale and poorer suppliers. Usually, companies and NGOs' response is to terminate cooperation with suppliers who do not reach the new requirements. This procedure makes it hard for poorer suppliers to stay in MNC's supply chain because they cannot respond quickly enough to the certification requirements asked for. The requirements can include skills, infrastructure and mandatory investments in new techniques. Also, high requirements concerning quality and environmental and social norms can lead to unintentional consequences. Thus, small businesses and poorer producers may be left out from high-standard supply chains while those chains are dominated by multinationals and developing country elites. (Perez-Aleman & Sandilands 2008.)

Thus, when implementing circular economy, among other environmental standards, MNCs should also consider those suppliers in the bottom of the pyramid and try to include them to the progress. The danger with the concept is that it becomes an approach mainly

used in developed countries which already have relatively good environmental conditions and those developing countries which would need circular economy the most, will not have resources to use it.

Also, Korhonen et al. (2018) mention that global CE-type projects are still not happening in the near future, but local and regional programs can take place. This is because circular economy does not have a global administration to guide its progress even though sustainable development is a common goal for nations around the world.

2.4.2 Power of MNCs

It can be discussed that because circular economy demands a lot of efforts, such as recycling, reusing and remanufacturing, those can be hard to achieve in an international business context. In many cases MNCs have their manufacturing in one place and then products are distributed to all around the world. Hence, for closing the loops, recycled products should be used again in making new products. That could mean transferring them to another location which would take time, effort and would not be environmentally friendly. Also, many MNCs such as H&M are focused on producing goods that are sold in huge numbers and the quality of those goods is left to lesser consideration. It would be difficult for H&M to change its business model for a circular one and it is probably not happening any time soon.

One aspect to consider when talking about MNCs and the implementation of circular economy in international business context is the power of MNCs in the world. According to Foreign Policy (2016), Apple's financial capital is bigger than the GDPs of two-thirds of the world's countries. In addition, in 2016 Apple was only the fourth biggest company in the world, ahead of Apple were Walmart, ExxonMobil and Royal Dutch Shell. Also, the number of Walmart's employees were 2.2 million which is more than in many small countries. (Foreign Policy 2016.) As can be seen from those examples, MNCs have grown into huge entities and it in that light it is not surprising that they are very powerful.

Figure 3 by Chen (2018) shows MNC's spheres of influence which starts from business partners and expands to local community and society. Although, nowadays MNCs'

actions are spread much wider than to just local communities and societies, for example MNCs from US are present in communities and societies all around the world.

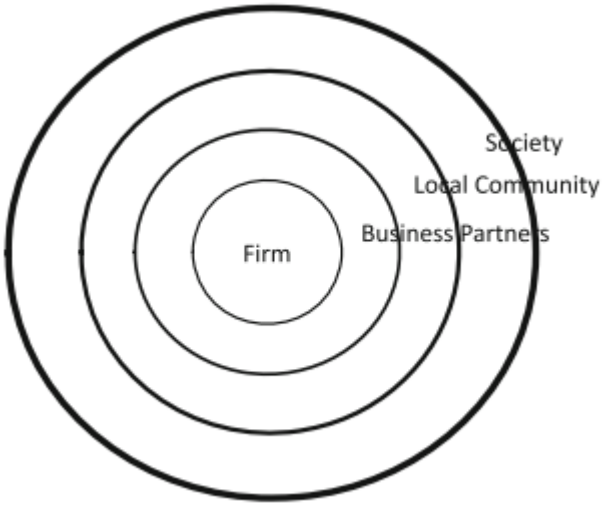

Figure 3. MNC's spheres of influence (Chen 2018)

Detomasi (2007) discusses that due to globalization, the power that MNCs hold is considerable. Also, Kicsi & Ailenei (2016) imply that globalization has altered the international environment in a way that is preferential to MNCs and that has led MNCs to possess real power which can be used to shape the balance of power in international level. Nowadays MNCs are important factors in international business in many ways. They can look for new markets and opportunities or cheaper production locations, for instance. (Kicsi & Ailenei 2016.)

Because of their power, MNCs can be seen as threats to small businesses and local communities. Even national states can feel threatened to lose their sovereignty and power. (Kicsi & Ailenei 2016.) Growing structural power of companies compared to countries is because MNCs can decide to leave the country and move on to the next one (Holden & Lee 2009). Usually countries do not want MNCs to leave since it could be harmful for the economy and thus countries are willing to act to some extent how MNCs want. Detomasi (2007) discusses another issue occurring from the status MNCs hold. The problem is that MNCs are accountable to no one because MNCs have grown considerably and their stock ownership is dispersed (Detomasi 2007).

Earlier, Korhonen et al. (2018) mentioned a question concerning the use of the saved resources and money achieved by circular economy. The ideal situation would be that they would be used for sustainable consumption practices to benefit the whole globe. However, the focus of MNCs is to make profit for their shareholders and their willingness to share the profits to benefit others and the environment can be questioned. And because of the power MNCs hold, they can hamper the implementation of circular economy greatly if they wish to. There is no international authority to govern MNCs and their actions. According to Lieder & Rashid (2016), environmental benefits of circular economy are easy to see but companies might struggle in imagining the economic benefits the concept could bring them. That can create reluctance from companies when it comes to the implementation of circular economy (Lieder & Rashid 2016).

Thus, for circular economy to be applicable in international business context, there are many aspects to consider. MNCs must not forget the suppliers in the bottom of the pyramid but try to include them as well to the progress of implementing circular economy to all the activities of the company. MNCs are very powerful today, so to make circular economy successful globally, MNCs should be made to see the benefits of the concept and alter their business models and especially supply chains. However, that is a challenge since modifying huge supply chains is a great and demanding task and MNCs will not do it unless they see bigger revenues generated from it. Which leads to the fundamental problem which is that MNCs' purpose is to make money for their shareholders, not to save the planet and that may show in their actions.

Table 2. Motivations for CE and reasons to avoid CE for MNCs

MNC	Motivations for CE	Reasons to avoid CE
The CE context	- Reduce raw material and energy costs -New business and market opportunities -Better brand image -Innovation -Higher user satisfaction	-Consumers' attitudes towards remanufactured products -Implementation in practice -Environmental legislation and taxation -Higher costs -Business risks -Lack of experience

The IB context	- Can help in drafting new environmental standards which are required from companies (can also improve brand image)	-Difficult to modify the supply chains -Standard setting for poorer suppliers can fail -Hard to change current business model for a circular one -Profits should be shared also outside the company

In the Table 2, motivations for circular economy and reasons to avoid it are considered from the perspective of MNCs in both circular economy literature and in international business context. In the CE context, there are many motivations to use CE and reasons to avoid the concept. In the IB context, MNCs' motivations for CE are fewer than reasons to not to adopt the concept. Thus, it seems that the literature on circular economy is more positive about the possibilities for MNCs than the literature in international business context. This can mean that circular economy can be less achievable in a global context than in a smaller one, for example in a one country or continent.

3. BUSINESS MODELS

In this chapter, the characteristics of a business model are discussed accompanied by definitions of linear and circular business models with examples. In addition, the opportunities and challenges of circular business models are examined to have a better understanding of different aspects of circular economy in companies.

3.1 Business model

Teece (2010) characterizes a business model as "defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit". Profitability, the satisfaction of needs and service guarantee are the purpose of a business model which aims for the long-term competitive advantage (Wirtz, Pistoia, Ullrich & Göttel 2016). A business model can be defined as the logic of the firm: it deals with the operations of the company and with the means of value creation for the firm's stakeholders (Casadesus-Masanell & Ricart 2010). Wirtz et al. (2016) discuss that value creation and guaranteeing profitability are essential parts of a business model framework.

Casadesus-Masanell & Ricart (2010) present that a business model can be seen consisting of two different sets of elements: choices and consequences. The choices refer to the actions on concrete issues made by management about how the organization must operate. The consequences are then what happens because of those choices. Location of facilities, compensation practices, and sales and marketing initiatives are examples of choices. Consequences can be rise or fall of sales volumes because of a pricing policies (choice), for example. Thus, it can be argued that every organization has a business model since every organization makes some choices which lead to some consequences. (Casadesus-Masanell & Ricart 2010.)

Bashir & Verma (2017) discuss that competitive advantage is no longer gained through innovative products and services but trough unique business models. Even though companies still rely heavily on developing new products and services for gaining

competitive advantage, it is harder to get good profits from them because of copied products and substitutes from other companies, especially from those coming from cost-effective countries such as India and China. It is much more difficult to imitate a business model than a product or service and thus a business model is a more sustainable competitive advantage than products or services. (Bashir & Verma 2017.) Also Zott, Amit & Massa (2011) share the view that "the business model can be a source of competitive advantage".

Strategy is closely linked to business models since choosing a business model is part of strategy. A business model then shows the methods how the company can compete in the marketplace. (Casadesus-Masanell & Ricart 2010.) Dahan, Doh, Oetzel & Yaziji (2010) describe a strategy as the plan of the progress to a desired future state. In this view a business model is a 'description of a state'.

Even though the concept of business models has been gaining great attention as late as in the last decade, it is not a new theory (Casadesus-Masanell & Ricart 2010). What makes the concept so popular today is the rise of the Internet from the mid-1990s (Zott et al. 2011). Casadesus-Masanell & Ricart (2010) and Bashir & Verma (2017) mention that drivers for innovating new business models and improving the old ones include globalization, deregulation, technological change, and market shifts, for instance.

3.2 Business models for linear economy

A linear business model (LBM) is the way most manufacturing industries operate today (Linder & Williander 2017). Lieder & Rashid (2016) mention the term 'planned obsolesce' which means producing disposable products which are meant to last only for a short period of time and are then thrown away. This mindset of fast consumption and discarding products is known as linear consumption behavior.

Figure 4. Linear economy

Figure 4 shows the concept of the linear economy which is taking natural resources, making them into products and in the end of their lifetime, disposing them. Supply chains used by companies are the factor that mainly characterizes business models in the linear economy. The supply chains are straight and follow the principle of the linear economy presented in Figure 1: take, make and dispose. Linear economy hinders the use of recycled materials and does not support remanufacturing of spare parts (Linder & Williander 2017). Global supply chains and manufacturing networks are typical for the business environment in which multinational companies (MNC) operate today. International supply chains are becoming more important as economic activity rises in international context. Supply chains can vary from simple import and export chains to subsidiaries outside the company's home country. (Er & MacCarthy 2006.) According to Caniato, Caridi, Crippa & Moretto (2012), small companies have advantage over MNCs when it comes to adjusting supply chains and that is mainly because of scale. Small companies can modify supply chains thoroughly for both import and export activities but MNCs are more likely to change either the inbound or outbound part of the supply chain but that change then may be radical. Because altering the supply chains can be difficult for MNCs, they are more focused on improving products and processes. (Caniato et al. 2012.) Because of those difficulties in altering supply chains, MNCs are likely to hold on to the traditional linear business models.

Since most of MNCs use the traditional linear business models, the supply chains are straight the customer being in the end of the process which means discarding the products after use. That is detrimental for the environment and against the principles of circular economy. Because supply chains play an important role in the companies' transition to circular economy, Genovese, Acquaye, Figueroa & Koh (2017) imply that developing sustainable supply chain strategies is essential for the concept to work in practice and make a difference to the wellbeing of the environment.

3.3 Business models for circular economy

Urbinati, Chiaroni & Chiesa (2017) examine that for adapting circular economy, like for any new industrial paradigm, a company has two choices: it can either adjust its business model or develop a new one. Despite of which of the two actions the company chooses, there are four main modifications required from both of them according to the principles of circular economy. Firstly, supply chains must be altered to better fit to the new concept: cooperation among the actors of supply chains is increased and reverse supply chain activities are implemented. Secondly, customers are highlighted and they are offered a new value proposition which requires companies to recognize new ways to execute the buying process. Also, companies and customers must have more collaboration with each other and between themselves. (Urbinati et al. 2017.)

Linder & Williander (2017) define a circular business model (CBM) as "a business model in which the conceptual logic for value creation is based on utilizing economic value retained in products after use in the production of new offerings". Thus, after consumers have used products, they come back to producers although there can be middlemen between producers and users. This leads to that fact that the term circular business model is very similar to the concept of closed-loop supply chains, and always has distinctive parts which involve recycling, remanufacturing, reuse or one of the closely related activities such as refurbishment or renovation. (Linder & Williander 2017.)

According to Lewandowski (2016), business models to suit circular economy can be grouped different ways. The ReSOLVE framework by the Ellen MacArthur Foundation collects together most of the different business model types (Lewandowski 2016). ReSOLVE comes from words Regenerate, Share, Optimize, Loop, Virtualize and Exchange, which are different business actions. Regenerate means moving towards renewable energy and materials and it includes minimizing waste of biological resources, in other words returning those resources back to the ecosystem. When it comes to Share, it is closely linked to sharing economy in which consumers do not own the product, but they have a right to use it. Reusing and extending product lifetime through maintenance and repair are also included in the aspect of Share. (Ellen MacArthur Foundation 2015.)

Optimize is about increased efficiency of products and can be seen in production and in supply chain activities, for example automation and waste removal in manufacturing. One core principle of circular economy is closing material loops and thus Loop means keeping materials and components in circulation rather than going to waste. Virtualize is getting more and more popular and it involves "delivering utility virtually", for instance online shopping, e-books and music. The last one, Exchange, deals with new technologies and replacing old materials. 3D printing is one emerging new technology. (Ellen MacArthur Foundation 2015.)

In the Table 3 below, examples of business models suitable for circular economy are presented. Each model is defined and given an example of a company or business practice.

Table 3. Examples of business models in circular economy

Model	Definition	Example
Remanufacturing	Repairing a product or its components to a state in which the product is as good as new	Caterpillar: Remanufacturing program
Share: Collaborative Consumption & Sharing Platforms	Sharing access or ownership	Airbnb: online marketplace for renting your home & Uber: transport services by unlicensed drivers
Product-Service System	A profitable mix of products and services	Car pooling, catering services, maintenance and insurance contracts for products
Virtual platforms	Delivering utility virtually	E-books, Spotify, online shopping

3.3.1 Remanufacturing

Lewandowski (2016) has used the ReSOLVE framework to group business models under the words described earlier. There are many different business models and here are presented only few. Remanufacturing is a business model under classification criteria of Loop. Remanufacturing can be described as repairing a product or its components to a state in which the product is as good as new. (Lewandowski 2016.) Bakker, Wang, Huisman & Den Hollander (2014) discuss that creating (reverse) supply chains is important also in the context of remanufacturing. Gehin, Zwolinski & Brissaud (2008) imply that remanufacturing encourages innovation since remanufactured components can be combined with creative new parts which can make the remanufactured product even better and more appealing than the original one. Caterpillar is an example of a company using remanufacturing in its business. The company has a remanufacturing program in which customers return used parts and components and in exchange they get remanufactured products. (Caterpillar 2017.)

3.3.2 Share

Under criteria of Share, business models mentioned include Collaborative Consumption and Sharing Platforms which have the same idea of having multiple users of the same product or service by sharing access or ownership. The users can be members of the public or products can be shared also between businesses. (Lewandowski 2016.)

This sharing economy offers many possibilities for both consumers and providers and intermediaries. For consumers, it makes life easier because they can use a certain product, whether physical or immaterial, for a specific purpose without having to buy a generic product. It is also economically reasonable since it requires lower capital investments through using instead of buying. The sharing economy involves an ecological side which aims for reducing waste by not having the need to produce so much goods and services. When it comes to consumers, a social aspect is also mentioned. Enjoyment and reputation are seen as factors which play a role in consumers' social ambitions. (Puschmann & Alt 2016.)

For providers and intermediaries, new business models can open doors for new possibilities in business. Platform models are one way to run business in sharing economy and it means providing consumers with a platform where they can share goods and services. Using these new models can also have a positive effect on brand image. (Puschmann & Alt 2016.) Malhotra & Van Alstyne (2014) discuss also the benefits of platforms. Platform models can provide safety to the service by community policing and self-regulation. This involves background checks for providers in sharing service and platform models can be quick in helping members in conflict situations. (Malhotra & Van Alstyne 2014.) Probably to most well-known businesses in the sharing economy are Airbnb and Uber.

3.3.3 Product-Service Systems

One concept emerging in the sustainability field is Product-Service Systems. According to Tukker & Tischner (2006), a Product-Service System (PSS) can be conceptualized as "consists of a mix of tangible products and intangible services designed and combined so that they jointly are capable of fulfilling final customer needs". Annarelli, Battistella & Nonino (2016) define PSS as a business model which aims also to fulfill customer's needs and is a profitable mix of products and services. They add that PSS considers the three aspects of sustainability: economic, social and environmental. Tukker (2015) discusses the benefits of PSS which include possibilities to reduce material flows in the economy and at the same time increase service productivity or user satisfaction. This can happen because companies have inducement to make lifespan of products longer in order to make most use of them, including cost- and material-efficiency and re-usage of parts in the end of products' lifetime (Tukker 2015).

Product-service systems are usually divided to three categories which are product-oriented services, use-oriented services and result-oriented services. Product-orientated services mean that the product is still the core but some additional services, which are needed during the use period, are included. In use-orientated services, the product is owned by the provider which is also often responsible for maintenance and repair. The customer has the right to use the product in exchange for a regular fee. Result-orientated

services do not include a product but a result. The customer and the provider agree on a result delivered. (Tukker 2004.)

In practice these three categories mean different kinds of mix of products and services. Under product-orientated services, maintenance and insurance contracts as well as supply of consumables for the core product are common. In use-orientated services, an example is car pooling in which various users use the car simultaneously. Of these three categories, result-orientated services are the best fit for circular economy since the profit is gained through delivering a service rather than selling products. Examples of result-orientated businesses are catering services, copying business (payment per copy) and copier provider for offices (takes care of e.g. maintenance and paper and toner supply). (Tukker 2004 & 2015.) Also Lewandowski (2016) mentions PSS in the ReSOLVE framework mentioned earlier. He discusses different PSS types and business models such as Product lease, Availability based, and Performance based which are all under classification criteria of Share. Product lease means that a customer can use the product without owning it. Availability based concerns time, a customer has access to the product or service for a specific period. Performance based PSS is a more complicated one, in this case "the revenue is generated according to delivered solution, effect or demand-fulfilment". (Lewandowski 2016.) Thus, PSS is very similar to the sharing economy and can be seen as one type of business model under the sharing economy.

Table 4. Opportunities of circular business models

Possibility	Consumers	Manufacturers	Providers	Environment
Using instead of buying	X			
Lower investment	X			
Better brand image		X	X	
New business possibilities		X	X	
Innovation		X	X	

Less waste				✕
Higher user satisfaction	✕	✕	✕	

Table 4 summarizes the main possibilities of the concept for consumers, manufacturers, providers and the environment. As can be seen from the table, manufacturers and providers have the most possibilities from circular business models. Also, customers and the environment can benefit from the new innovations as well. Next, the following subchapter focuses on challenges of the circular business models.

3.4 Challenges of circular business models

Linder & Williander (2017) identify many challenges and limitations regarding circular business models. Remanufacturing is one type of a circular business model which requires a lot of technological expertise since disassembly, remanufacturing and upgradability of products need to be considered in their design. This can make fixed costs slightly higher for a CBM than for a linear business model. Also, it can be difficult to make remanufactured products as appealing and up-to-date as new ones (so called fashion vulnerability). After all, especially in consumer markets, the look of the product is a very important quality in selling. (Linder & Williander 2017.)

For the most important limitation of CBM, Linder & Williander (2017) point out that CBM has a higher business risk than an equivalent linear model. This is due to the fact that when validating a CBM, the time horizon is longer because CBM must consider customer demand for both initial sales and sales after consumers recycle the product and it will be used again in a form or another. Linear business models have advantage over circular business models because it is easier to design and evaluate hypotheses for a shorter run than for a more distant future. This is because costs and revenues are based on underlying factors that can change when time passes. (Linder & Williander 2017.)

Korhonen et al. (2018) examine challenges regarding circular economy type innovations. They state that for those innovations it will be hard to gain market share because the market is dominated by existing infrastructures and their associates which include

networks, stakeholder discourses and areas with high financial investments. Typically, those investments are technological solutions with a slow payback time which makes owners and investors reluctant to change course to other concepts such as circular economy. An example of a high financial investment is energy production. (Korhonen et al. 2018.)

The sharing economy has also downsides. Geissdoerfer et al. (2017) discuss that the Sharing Economy can have harmful effects on social wellbeing. Malhotra & Van Alstyne (2014) explain this by two societal dimensions, employment decline and increased housing costs. Secure employment has decreased because of the sharing economy favors freelance work which pays only for one task at the time and does not cover more than the marginal costs. It hampers workers' future since it is harder to develop new skills and take care of healthcare and retirement. Increased housing costs are common in many cities and tourist destinations because short-term rentals generate more money than renting apartment for a long period. The removal of affordable housing causes problems for people living in those destinations permanently and looking for a flat. (Malhotra & Van Alstyne 2014.)

Malhotra & Van Alstyne (2014) describe taxi services in the sharing economy. Taxi services carried out by private citizens cause problems for licensed drivers because competition becomes unfair for the licensed drivers. They are burdened with greater costs from taking licensing exams and commercial insurance which are missing from the private drivers. It can be argued that ride sharing expands by taking advantages of loopholes to avoid costs and regulations. (Malhotra & Van Alstyne 2014.) In 2015, Germany banned Uber since the company was viewed to violate transport laws and both European and national laws. In a case of an accident, Uber would be in trouble since they do not have sufficient insurances for drivers and passengers. The decision to ban Uber was also an act of support to professional taxi drivers in competition with unlicensed drivers. (BBC 2015.)

Also, Product-Service Systems have faced criticism. In many cases, PSS include additional costs which are not familiar to manufacturers. PSS are usually brought together by more than just one company which results in higher transaction costs because of more complicated contracting and revenue-sharing arrangements. Normal product sales models

have advantages over PSS in reducing costs risks which can be significant. This is because PSS producers may have a pre-agreed price in which they are supposed to deliver the service. And if the service includes cost factors which are unknown and locked to the pre-agreed price, it can lead to a cost risk. There are also investment and capital needs in PSS production which must be considered. For example, in a car leasing business, a PSS producer has to pay the capital costs of the car him/herself and is paid back in installments. However, establishing a PSS business struggles often due to the fact that many companies only have experience from traditional product or service business. This means that companies have two choices: they can either develop or buy new proficiencies and capabilities needed in their new business model. Additionally, the PSS business may require changing parts of the old model, including delivery and supply channels and production procedures in order to the PSS to be able to compete with the existing product sales business. Even though these changes are needed, they can lead to deflation of capital and goodwill. (Tukker 2015.)

Risks concerning the circular business models are gathered in the Table 5. Consumers, manufacturers, providers and employees have different kinds of risks from the circular business models. The table shows that manufacturers have the most risks and providers almost as many. However, manufacturers and providers had also the most possibilities from the circular business models and thus it can be argued that the circular business models can be a risky business but if done right, success is achievable.

Table 5. Risks of circular business models.

Risk	Consumers	Manufacturers	Providers	Employees
Technological expertise required		X		
Higher costs		X	X	* X
Fashion vulnerability	X	X		
Business risks		X	X	
Problems in entering market		X	X	

Decrease of social wellbeing				✖
Lack of experience		✖	✖	

*For example, licensed taxi drivers vs. Uber drivers. Licensed drivers have higher costs which makes it difficult to compete with unlicensed drivers

Planing (2014) discusses consumer behaviour as an important part in the movement towards circular economy and consumers can be a reason why it takes time to implement a new approach. An example is that customers are more likely to focus on purchase price of product than on the net present value of a durable but more expensive product which in the long run would be more economical (Planing 2014).

4. METHODOLOGY

In this chapter, the main methodological decisions of the thesis are discussed. Methodology is the theory behind the different procedures of the research, hence methodology addresses the underlying theoretical and philosophical assumptions of the research and determines how research should be conducted (Saunders, Lewis & Thornhill 2007: 602; Hirsjärvi, Remes & Sajavaara 2005: 172). Firstly, research philosophy and approach are discussed following research design, purpose and execution of the study. Lastly, validity and reliability of the thesis are considered.

4.1 Research philosophy and research approach

Research philosophy can be understood as "the development of knowledge and nature of that knowledge". It includes the assumptions about how the researcher views the world, and these assumptions then support the chosen research strategy and the methods attached to it. (Saunders et al. 2007: 101.) Research philosophy in this thesis is positivism. Positivism is said to be the most popular philosophical position of management studies. It can be described as "knowledge of the world is obtained through applying the scientific methods to experiences and to empirical world". To put simpler, positivism is interested in facts, value free and prioritizes observation. Even though positivism by its nature is used mainly in quantitative research, it has room also in qualitative studies. (Eriksson & Kovalainen 2008: 18.)

For this thesis positivism is chosen because the researcher is interested in practical use of circular economy and its effects in companies. The results from the interviews are treated as facts on the matter and the researcher's focus is on observing and examining the facts objectively. The aim is to make conclusions without adding personal judgments or values to the process. For a master's student writing their thesis, thus conducting their first research, positivism is a convenient research philosophy because it does not require further interpretation, this is because the data is a direct link to the findings which are then examined as facts.

Research approach refers to the relationship between theory and data, meaning is the researcher testing hypothesis based on a theory (deductive) or first collecting data and developing theory based on the data analysis (inductive). In this study, the latter is applied. Induction can be defined as building theory and its purpose is to understand better the nature of the question. What will formulate the theory is the analyzed data. (Saunders et al. 2007: 118.) When it comes to executing this study, first a literature review was carried out to get an understanding of the phenomenon and to define valid interview questions. Second, the interviews were conducted. Lastly, the interview data was analyzed, and suitable theories were drawn from it.

Using induction was useful in this case because it enables the finding of possible alternative theories which a stricter deductive approach may not identify as effectively (Saunders et al. 2007: 119.) The existing literature of circular economy is extensive, however implementation of circular economy in practice has not been studied as much and therefore having highly structured hypotheses could narrow the study too much.

4.2 Research design and research purpose

Research design is the general plan of how the research questions will be answered (Saunders et al. 2007: 133). Thus, it includes both data collecting and analyzing techniques. The research design in this thesis is qualitative because it is best suitable for this particular study. In its nature, a qualitative approach is all-encompassing and favors people as the instrument of data gathering. The sample is chosen appropriately rather than using a random sample. A qualitative research design prefers qualitative methods in data collection such as semi-structured interviews in this thesis. The purpose of qualitative approach is to reveal unexpected matters and gain in-depth understanding of a certain topic. (Hirsjärvi et al. 2005: 155.)

Simply, research purpose is the aim of the research. This thesis' purpose is exploratory which means that the aim is to shed new light for the phenomenon and give new insights to a topic that has not been studied much (Saunders et al. 2007: 133). As said before, circular economy as a concept has gain a lot of attention from academia as well as from business world, but previous studies in Finland have been focused on specific industries

and the overall picture of opportunities and challenges of CE in Finnish companies is still unclear. Thus, exploratory research purpose is suitable to asses CE in this specific context and find out what is happening inside companies.

4.3 Execution of the study

For executing this study, the data was collected by interviews in different Finnish companies using circular economy. The interviews' goal was to get answers to the research question "What are the opportunities and challenges Finnish companies face when using circular economy?". There were five interviews in total with six experts. In this chapter, the data collection and analyzing methods are discussed.

4.3.1 Data collection

The data collection started by contacting eleven Finnish companies of which five agreed for an interview. The requirements for the companies were that they use CE actively in their business and they have at least some international activities, for example selling products also outside Finland. The contacted companies were chosen by examining their websites for sustainability and circular economy related matters. The selected companies had clearly stated that they use circular economy in their business and therefore they were the target group. In addition, news articles about circular economy activities in Finnish companies were observed. The study was not limited to a specific industry but companies from different branches were contacted. The companies were contacted via email to sustainability professionals or by filling a contact form in company's website. One interviewee was approached by first meeting a company representative in a career fair and getting her contact details, which led her contacting the expert first and then giving the expert's email address to the researcher. Most of the contacted companies replied either agreeing to an interview or declining the request.

There were six interviewed experts from five companies, thus one company had two experts present in the interview. The participants have different positions and titles, but they can all be considered experts in the field of circular economy in their companies.

Interviewees, their companies and positions are summarized in Table 6. The interviewed persons are referred as Experts to keep them anonymous since the aim of the study is to examine notions of managers in the field of circular economy but not opinions of specific individuals. The companies and positions are still present to give the study context and enhance its reliability.

Table 6. Interviewees of the study

Pseudonym	**Company**	**Position**
Experts 1 & 2	Fortum	Manager, Research and Development & Head of Business Development and Product Sales
Expert 3	Neste	Senior Advisor of Sustainability
Expert 4	UPM	Director, Strategic Partnerships
Expert 5	Kesko	Vice President Corporate Responsibility
Expert 6	Biolan	Director, R&D and Business Development

The interviewed companies were Fortum, Neste, UPM, Kesko and Biolan. Fortum is an energy company which develops and offers solutions regarding electricity, heat, cooling and improving resource efficiency. The company has main business operations in ten countries and 8 000 employees in total. About Neste, it is the world's largest producer of renewable diesel and renewable jet fuel. The company offers also oil products and develops renewable solutions for the plastics and chemicals sectors. Neste has production in four countries: Singapore, the Netherlands, Finland and Bahrain. UPM is a forest-industry company that has production in 12 countries and sales network in six continents. Its products include pulp, timber, biofuels, label materials and papers, as well as plywood and different types of bio products such as biochemicals.

Kesko's business areas include grocery trade, the building and technical trade and the car trade. The company has circa 1,800 stores engaged in chain operations in Finland, Sweden, Norway, Baltic countries, Poland and Belarus. Biolan is a family business

specialized in products for houseplant and ecological gardening and living. The company has production plants in Finland, Estonia and China.

Table 7. The companies of the study

Year 2019	Fortum	Neste	UPM	Kesko	Biolan (Group)
Industry	Energy: electricity, heat, cooling, improving resource efficiency	Oil & diesel, renewable solutions for plastics & chemicals sectors	Forest, e.g. pulp, timber, biofuels, label materials & papers	Grocery, building, technical and car trade	Ecological gardening and living, houseplant
Number of employees	8 000	5 474	18 700	25 000	138 (2018)
Turnover	5.4 billion	15.8 billion	10.2 billion	10.7 billion	36 million (2018)
Internationality	Main business operations in Finland, Sweden, Norway, Russia, Poland, Baltic countries, India & Denmark	Production in Singapore, the Netherlands, Finland and Bahrain, products sold around the world	Production in 12 countries and sales network in six continents	1,800 stores in Finland, Sweden, Norway, Baltic countries, Poland and Belarus	Production plants in Finland, Estonia and China, products sold around the world

The data collection method was interviewing and more specifically semi-structured interviews. Semi-structured interviews consist of list of themes and questions to be covered. When conducting a semi-structured interview, the situation is always lightly different to one another because it is dependable on the flow of the conversation, this means that the order of questions can vary and there can be extra questions or some are left out (Saunders et al. 2007: 312). For example, one interviewed company is a smaller family business and that was discussed as an extra aspect for the topic. The advantages of semi-structured interviews include that the interview situation is fairly conversational and informal since interviewees are encouraged to talk about the topics freely without strict boundaries. In addition, the materials are systematic and comprehensive to a certain extent. (Eriksson & Kovalainen 2008: 82.)

Four of the five interviews were done via Skype and one was a face-to-face interview. This was because the locations of the companies were distant, and it was more convenient

for the managers to arrange a Skype meeting. Even though face-to-face interviews are considered better in building trust between interviewer and interviewee, the Skype meetings were necessary for abovesaid practical reasons. For enhancing trust, the interviewees were given the topic and information about the thesis project beforehand (who is interviewing for what purpose, how will the results be presented). These matters were discussed also in the beginning of each interview and interviewees were encouraged to ask questions when needed. The interviews lasted between 30-90 minutes and were held in Finnish. Four of the five interviews were recorded with permission of the participant and notes were taken in all interviews. The recorded interviews were transcribed.

4.3.2 Analyzing the data

The recorded interviews were transcribed by listening the recordings and writing them out word by word. By transcribing the recordings, the researcher was able to analyze the data more effortlessly. The analysis method for the interview data was content analysis. Content analysis is "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use". It is useful in providing new insights and building a deeper understanding of particular phenomena as well as presenting practical steps (Krippendorff 2004: 18.)

In practice, content analysis uses themes in dividing the data into separate pieces. The sections that concern a similar theme are categorized under different topics. There can be many different themes, but they should be combined into 3-7 main themes to avoid the analysis becoming too broad. The main themes are then labelled and described as concepts. The results of the analysis are the identified concepts or themes. (Koivunen 2015: 52). In this study, the original themes in the interviews were for example the opportunities and challenges of CE, the role of CE in international business, collaborations within CE, social dimension of CE and practical examples. The themes from the analysis remained quite the same but were combined into three main themes: opportunities of CE, challenges of CE, and the role of CE in international business.

The purpose of this study is not to create generalizable data since the data consists of only five interviews. However, the interviews give evidence for presenting the characteristics of circular economy activities of Finnish companies from different sectors. In addition, the data was compared with theory during the whole analysis to make legitimate conclusions.

4.4 Validity and reliability

When conducting a high-quality research, it is important to assess the validity and reliability of the study. Validity is described as "the extent to which data collection methods accurately measure what they were intended to measure" (Saunders et al. 2007: 614). For taking the results of scientific research seriously, validation leads to accepting them as true by providing compelling reasons for a measuring instrument to be valid (Klippendorff 2004: 313). For improving validity, the interview questions were carefully planned based on the literature review and the interview structure was similar in all situations. The participants were given the theme of the interview beforehand for them to prepare for the discussion. In the beginning of each interview, the term circular economy was clarified for both parties to have the same view on what the concept means. In addition to data gathering, validity in literature review was strengthened by focusing on peer-reviewed articles in field of circular economy and sustainability in top journals such as Journal of Cleaner Production and Ecological Economics.

Reliability means the repeatability of the results using same data collecting techniques, in other words the extent to which the techniques will give consistent findings (Hirsjärvi et al. 2005: 216; Saunders et al. 2007: 609). For instance, reliability could be tested by having two or more interviewers and checking if they get similar answers. For this thesis that was not possible, but reliability of the study was developed by explaining the research process thoroughly, transcribing the recorded interviews, and adding direct quotations from the interviewees. One company did not want to have direct quotations in the thesis from them, however their opinions are present in the overall discussion. In addition, relating reliability, different biases can be discussed. Here interviewer bias is considered. Interviewer bias means a situation where "the comments, tone or non-verbal behavior of

the interviewer creates bias in the way that interviewees respond to the questions being asked" (Saunders et al. 2007: 318). The researcher acted as neutral as possible when interviewing and gave the participants space to tell their views without being led to a certain direction. The purpose of the study was to get in-depth knowledge of the topic and thus the questions were semi-structured which means that the question structure is similar in all interviews but has space for additional questions and points from the interviewees.

5. FINDINGS

This chapter is focused on the results from the interviews. As the research question was "What are the opportunities and challenges Finnish companies face when using circular economy?", the main findings are divided to those areas as well as to the role of circular economy in international business.

5.1 Opportunities of circular economy

As was evident from the literature review, there are many different opportunities from circular economy depending on the company's business model and industry. Even though the interviewed persons work in different sectors, they identified many same advantages from circular economy. As noted by one of the participants: *"I would say that resource efficiency, cost savings, and what comes as very important the environmental aspects."* (Expert 4) That summarizes well the main areas of opportunities that are mutual to the interviewees, in addition to image benefits, keeping up with the changing business climate, and other aspects for a specific company.

5.1.1 Resource efficiency, costs savings and collaboration

Resource efficiency was identified as an opportunity by all interviewees, and in many cases cost savings are associated with it. The importance of resource efficiency varied between the participants, for some it was seen as one of the most important factors of CE and for few it become evident more between the lines.

> "*The principles of circular economy have been in use for a long time also under the term eco-design which means designing the processes as resource and energy efficiently as possible already in the beginning and thinking about the product's or material's possible use or recyclability beforehand."* Expert 4

> "*Earlier we had to buy the suitable raw materials but now we don't need to as much. By engaging in different projects and collaborations in the field of circular*

> *economy, we have built a network that enables us to get access to materials that are very good to us but problematic for other industries (e.g. forest sector). By this we have been able to reduce some raw material costs and as a result our competitiveness is also better in that sense."* Expert 6
>
> *"Circular economy is seen in many areas and it's a policy that comes strongly from seeking resource efficiency which of course brings savings in itself."* Expert 4

Resource efficiency means that energy, natural resources and materials are used as efficiently as possible. Resource efficiency is an important issue for all the companies because it reduces costs, saves natural resources and can help meet clients' expectations. Important part of resource efficiency is using waste of other companies as material as was said by one of the experts. This minimizes waste and at the same time reduces costs by not having to buy raw materials. Thus, resource efficiency is inside the overall business logic of reducing costs to improve competitiveness.

All the interviewed companies have some kind of collaboration in the field of CE. Companies have collaboration with other companies, research centers and universities. In addition, other partners mentioned were for instance Ministry of the Environment, Business Finland and LUKE (Natural Resources Institute Finland). Usually the cooperating companies have a part in the company's value chain, they are for instance raw material suppliers or customers. Collaboration is seen as an essential part in developing new materials and practices, and it is beneficial to have partners from different industries.

A participant told that for the past year customers and large suppliers have been in contact more and wanted to discuss and hear about the circular economy matters of the company. Furthermore, the company had organized an event where the most important raw material suppliers were invited to discuss how they could help the company to reach its circular economy goals and vice versa. Thus, the way of thinking has extended by seeking new ideas together with stakeholders.

In almost all interviewed companies circular economy can be thought as a continuum for practices that are similar to CE and have been used for years before the term circular economy became popular. In Finland, CE has been used long for example in paper and

bottle recycling. Few interviewees defined timeline from which the term has been prominent, and it was from circa 2015.

5.1.2 Environmental benefits

Environmental benefits are the in the core of circular economy and they are important for the participants as well. Climate change is a megatrend that demands actions from all parties, and companies have their own role in it.

> *"We have been able to reduce the use of virgin materials."* Expert 6
>
> *"We make renewable products to advance the work for a better climate."* Expert 3
>
> *"This kind of environment-society responsibility goes hand in hand with the economic responsibility, thus here the goals meet."* Expert 4
>
> *"Circular economy in a sense that when environment is being better cared for, it of course affects all our lives."* Expert 5
>
> *"Forests have of course value to other things than just for wood or biomass production."* Expert 4

As was said about resource efficiency, reducing the use of virgin materials is important also when talking about environmental benefits. Since the demand of natural resources is growing, it is crucial to find new recycled materials to be used in production. The aim is also to prevent waste from generating in the first place, and it can be achieved by collaborating with industrial customers and helping them to develop better processes in their sites. Thus, the goal is to locally find the solutions that generate the least amount of waste. Furthermore, one important aspect is that no such material is returned to circulation that does not belong there, also the harmful substances are processed.

In addition to concrete actions to prevent waste and reduce the use of virgin materials, some interviewees discussed the value of nature in conceptual level. Caring for the environment is important also in social sense, meaning that clean surroundings are vital for people and for overall ecosystems.

5.1.3 Image benefits & social dimension

Nowadays people appreciate environmental values, and they are important also when collaborating with other companies. For a small company it is very beneficial to be referenced in a larger company's sustainability reports as an example firm in sustainability. Thus, also here the different projects and cooperation can be valuable.

> "*These kinds of circular economy stories are valuable in image sense, but image benefits are still a secondary issue. … When we look at sustainability, it has three aspects: social, environmental and economic, it doesn't matter in which order they are but they must be balanced and that's the number one and we can get there with circular economy and by that we can improve our profitability, but in many cases we are also able to create new business opportunities and jobs. And of course all these bring also good PR."* Expert 4

> *"Circular economy has helped as commercially even without having to separately raise it as a brand factor. But of course it brings image benefits."* Expert 6

The interviewees recognized image benefits as an opportunity from circular economy, but they are viewed as a result rather than a goal. The focus of CE is in the core business factors such as resource efficiency and cost savings, and image benefits are seen as a secondary issue as said by one of the participants. What should be noticed is that image benefits are not just for the company itself but also for its customers, and that is essential when the customers are other manufacturing companies since they are thinking about what their customers appreciate. Companies can get image benefits from different activities varying from environmental actions to job creation. The environmental benefits discussed in the last sub-chapter are also important as image benefits. All interviewees recognized that CE has all the three sides of sustainability: environment, economic and social, and the social aspect was also discussed further.

The matters mentioned within social dimension include business and job creation, cleaner environment, renting services, and that nature has a value in itself. When circular economy improves environment and economy, it has direct social effects. Society demands companies to manage their activities better, thus developing circular economy answers the requirements set by society. Taking care of waste and designing responsible production processes affects the environment and employs people, to name a few.

Recycling is workforce intensive, produces jobs and generates taxes. Thus, in a larger picture a company is funding public services. Circular economy aims for reducing waste and it results in cleaner environment, and renting services enable more people to get access to a particular device, it being for instance a car or a tool. Circular economy makes processes more invisible and consumers are able to see from where the materials are coming from and where they are going, and it brings security and responsibility in a sense that the invisibility might prevent environmental damages. One interviewee pointed out that social dimension is not dependable whether there is circular economy or common economy, it is more about firm's way of acting and what customers demand. Few participants mentioned that their companies have also projects in the field of social sustainability. Taken from the interviews, the social dimension is very much aligned with the environmental dimension.

5.1.4 Innovativeness

Since in theory innovativeness was raised as an opportunity for companies, it was discussed also with some of the participants. An interviewee saw that CE naturally enhances innovativeness since the daily work is about finding new and innovative solutions on how to refine waste materials back to use. However, the thought can also be turned around: innovativeness increases circular economy. Everything can be recycled but it must be reasonable economically, technically and environmentally. It is ongoing innovation process where sometimes the developed solutions turn out to be techno-economically unprofitable but can later become profitable by some new technical innovation or by legislative guidance or incentive. An example from Finland is the ban of organic waste to landfills which steered many materials elsewhere.

Also another Expert pondered which comes first, innovativeness or circular economy? Circular economy and resource efficiency have effect on innovativeness and development projects can be done in collaboration with different parties, for example cities, customers, research centers and universities. An interviewee contemplated that in many cases talking about innovativeness is political verbiage, meaning that almost anything that is brought to political decision-making increases employment, innovativeness and companies'

willingness to invest in Europe. For some extent those are true but if circular economy as such was a goldmine in which with low effort and lightly innovating solutions would be found then they would all be already used. Nevertheless, being innovative and open-minded is important but one has to keep in mind that the solutions developed have to be also economically justifiable.

5.1.5 Other opportunities

After discussing the main common opportunities identified by the experts, a few more possibilities are presented.

> *"We have been able to differentiate our products."* Expert 6

Products can be differentiated by decreasing the use of virgin materials when the competitors are heavily leaning on them. In addition, by investing in recycled materials, a company can prepare itself for the situation where we are now when the use of virgin materials is discussed, and recycled materials are becoming the must. The differentiation has brought commercial benefits also in the form of private label products. Nowadays it is common for a company to offer both brand and private label products, and it requires particular competitiveness which can be gained by differentiation, for instance.

> "*It is easy to get a social approval for circular economy activities. … Added value flows upwards the chain and brings wealth to places where it has not been before."* Expert 3

The social approval means that customers are happy to see that the products they buy are not taking resources away from other functions such as food production. Societies more and more recognize the need for climate actions and at least promote them if they do not yet have support mechanisms. However, many societies want to do their part in climate work by having supporting structures in legislation, for example. In addition, raw material producers, thus the procurement end, gets value to inferior products that did not have use before and as normally, when demand increases the price rises. Thus, circular economy is beneficial in spreading wealth to a larger group than before.

"I would say that if we don't get engaged to it, that would make great harm to us."
Expert 5

Climate change is a megatrend that alters the business climate in many, if not in all, industries and it is crucial to keep up with the change. Those companies that are not willing to explore new ways of doing business will eventually drop out. The structure of commerce will change and will go to a direction of circular economy, for example renting services are seen to be the alternative for ownership of many products, such as cars and tools.

"Sustainability has risen to an extremely important topic." Expert 4

Overall, sustainability issues will become more and more important in the future. For example, when presenting and discussing about a company's products in events abroad, before there might be only few questions from the investment side about sustainability issues and the company had a sustainability director answering. There has been a change. Nowadays the expectation, or a must, is that senior management understands and can answer to these questions and is committed to sustainability values. Also B2B-customers expect that raw materials come from well maintained and certified forests and plantations, and harmful chemicals are not used. The overall trend in manufacturing is that customers are very conscious and demanding on environmental issues. Thus, for an environmentally responsible company the rise in importance of these topics is advantageous.

5.2 Main challenges of circular economy to a company

Circular economy is balancing between innovating new materials and processes, but still keeping them economically justifiable. Innovation and open-mindedness are needed but they should not create new problems in form of difficulties in transportation of new materials, for instance. In this chapter, the main challenges of circular economy identified by the interviewees are discussed.

5.2.1 Higher costs

Earlier, resource efficiency and cost savings were discussed as an opportunity from circular economy, but in contrast CE can also result in higher costs in certain activities.

> *"Cost levels are a huge challenge."* Expert 4

> *"The fact that we have to take samples from every batch we get is expensive, but we have decided that because of image risks we need to do that."* Expert 6

Cost levels are a challenge for example in different processes, on a higher level it may seem that some nutrients could be extracted from waste streams and used again, but in practice those processes would be extremely expensive and the nutrients would not have the quality they need to be used as a fertilizer, for example. It was brought up that everything can be recycled, the issue here is just that recycling the last few percent is so greatly expensive that no one is willing to pay for it or the following raw material. Thus, in some cases it can be techno-economically and even environmentally more reasonable to utilize certain waste stream as energy and produce something new. This is because for certain materials the recycling process can consume so much energy, water and other resources before the material is cleaned and recycled that it would not make sense even environmentally. Here the term techno-economic refers to recycling that is sensible technically, economically and environmentally.

There can be risks associated with different waste streams and therefore it is important to choose right partners and materials. One waste stream may seem decent in the beginning but demands from markets can change rapidly and that can cause problems. A company must be awake to assess different kinds of materials since they can vary also with same distributor. Furthermore, pesticides are used considerably around the world. When it comes to food, there are limits for the amounts of pesticides but for animal excrement, for instance, there are no pesticide limits set. However, in law there are certain boundaries, but they are very vague. What this means is that a company making fertilizers from animal excrement can see testing the amounts of pesticides necessary even though it is not mandatory by the law. Taking the samples and testing them is expensive, but the image risks of producing products with high amounts of pesticides could turn out even more expensive. From here it can also be discussed that not all side streams are as

valuable, and a company must weigh the outcomes and different costs associated with the specific stream.

5.2.2 Legislation and regulation

What was evident from the interviews was that legislation and regulation pose challenges for the companies in Finland and abroad. However, it is important to acknowledge that legislation and regulation were still seen more positive than negative and can also bring business opportunities.

> *"At the moment regulation still brings quite a lot of challenges."* Expert 4
>
> *"It can be said that there are conflicting elements in society, at one hand society talks about how it promotes circular economy and on other hand prevents circular economy with old and very stiff waste regulations."* Expert 3
>
> *"These issues go over many different fields of governance. It can be that if there are certain instructions in environment or waste legislation on how to handle things, the wall comes in what related directives say. It would be nice to see more paths from legislation where the different fields of governance wouldn't just look at their own perspectives."* Expert 6
>
> *"Because national legislations have not recognized this kind of product, many markets have been close for years because regulations have not been up to date."* Expert 3

The laws are important, but they are quite complex both in Finland and especially in EU-level. There are many areas that can be difficult to handle in waste laws, for instance at what moment does a waste become a product, what can be transported to where and what cannot, how is that transporting regulated in EU, to name a few. Legislation could be more supportive because it comes a bit behind the material trade and circular economy, thus it could change and support the business faster. Implementing new directives requires work by mostly changing processes.

In Finland, there are comprehensive environment and waste regulations that have been used for decades. The main aspects of the laws are functioning well but there are areas in

which regulation is not up to date. Here the waste hierarchy can be discussed. It has usually five stages: 1. avoiding generating waste, 2. the material can be recycled as it is, 3. the material can be modified into something else, 4. the material can be recycled as substance and could be dissembled and used for something else, 5. the material is used for energy or disposed. The problem with the waste hierarchy is that bureaucracies are deciding what usage is better than the other and it is a slippery slope. For example, if waste grease is used for a lipstick is it better than use it to make plastic? No-one can define that. The markets for materials are dynamic but regulations are not. What is clear is that if the material gets burned you can only get heat from it, but the other comparisons are difficult to make. Thus, there are very stiff and old waste regulations which do not promote circular economy in the right way. They were developed in a time when it was not even thought that waste could be used for something else, there were only two options which were to put waste into landfills or burn it. However, principally societies strive to follow rational operations and as they see the benefits from circular economy, e.g. decreasing the usage of different resources, the main decisions they make are in the right direction. Also in the positive side, the lack of recognition for circular products by national legislations is yielding which enables companies to sell their products in wider markets.

Even though legislation brings challenges, all the companies saw the role of legislation and regulation more positive than negative, and it can also bring business opportunities. Legislation supports business development and legislative guidance is important. The stricter and more demanding legislation is for recycling, it is benefit for a company. When a company is a forerunner in building environmentally friendly processes, the stricter legislation gets the stronger the company is since it already has the needed procedures in place. Thus, tightening environmental legislation is more supporting and per se improves business opportunities. In Europe, environmental legislation is very similar in many countries but when you go further to developing countries, the legislation is also developing and hence in the future establishment of environmental legislation creates new markets and possibilities. In the field of recycling, new markets will open precisely because of evolving legislation and other requirements in developing countries. For having the conditions to do business in recycling or other environmental field in developing countries, it usually requires that those laws demand certain actions, before

that it is difficult to make it work. Thus, there is potential for international growth since circular economy goes forward in all continents.

What companies can also do is to support law-making in its developmental phase and by that be part in building new legislation. One participant mentioned that legislation does not have that much effect, but it was motivating to see circular economy as one of the government's priority projects.

5.2.3 Communicating CE to customers

Perhaps a more surprising issue regarding challenges was communicating circular economy activities to customers. The theme was mentioned by three interviewees and they raised interesting views on the matter.

> *"Communicating responsibility and sustainability issues for consumers is extremely difficult, to get the message through you must focus on only few things and highlight them sufficiently big and repeat them. And still it doesn't go through not even close to everyone."* Expert 5

> *"Nowadays some things are seen as self-evident and it can be a bad thing for a firm to rely on that something is self-explanatory, it should think about what are the things that should be communicated and in what way."* Expert 6

> *"We are quite conservative company in terms of communicating these things and there are many things people don't know about, we should talk about these issues more."* Expert 4

It was pointed out that communicating sustainability and circular economy topics to consumers is more challenging than for business customers. If you go to a grocery store and there is a sign about sustainable products, for example, perhaps you do not even notice it or are not bothered to read it. If a consumer spends ten seconds choosing a yoghurt, it is likely that they will not spend time searching if the yoghurt has a circular economy or other sustainability sign. Thus, in general it is difficult to get attention and interest from consumers, but at the same time there are the ones who are very much into these issues. The customer base is polarized, some do not care about environmental issues at all and some are very focused on them. It is difficult to design marketing campaigns since

consumers appreciate many different things, for some price is the most determing factor and for others environmental issues are in the core.

As was expressed by one participant, some topics can be viewed as if they are self-evident, for instance of course companies act responsibly and have quality systems et cetera. However, the same things might not be as self-exploratory to all customers and other stakeholders, and thus it is beneficial to evaluate which are the matters a company wants it stakeholders to know about and what are the best ways to communicate those aspects. For instance, one interviewee mentioned that the company has its own windmill and solar power and even though they are not necessarily profitable, they are part of the company's values and should be communicated to customers.

It is challenging to communicate that a company is on the right path for reaching its goal when the end result is not there yet. In addition, people get plenty of information from everywhere and have different perspectives for the same messages. Nowadays many consumers are skilled in finding pitfalls that have been left unsaid. It is important to listen to all kinds of customer feedback since they are the signals on what customers think. Because if a customer makes the effort to ring and express their opinions and worries, it is usually just the tip of the iceberg. It could be concluded that if some issue comes totally from nowhere, then a company has not been paying attention to the signals it has received.

5.2.4 Other challenges

Even though companies recognized many the same abovesaid challenges, in this sub-chapter few other difficulties are discussed.

> *"It's challenging to find circular products that customers would be interested in."* Expert 5

> *"At the moment, many virgin materials are so cheap and that is a barrier and a challenge for circular materials because they are quite expensive. After all, price is so determining factor."* Expert 4

Finding attracting circular products was identified as a challenge only by one participant because of the company's industry: selling food and consumer goods. As was said in the

previous sub-chapter about communicating CE to customers, also here the polarization of customer base is in the center. There are many diverse emphasizes which differ also inside one consumer group, for example the ones that are into sustainable products can still have different points of view on what are good recycled products. And then there are consumers who are not amenable at all for circular products. Nevertheless, the interviewee that found that as a problem said that there are also success stories in sustainable products for consumers, it is just difficult to know which product will be lucrative.

Other participants' companies sell plenty of their products to industrial customers and according to them, customers are more demanding on sustainable products than against them, only the price can be a hindering factor. What industrial customers primarily want is that the product or material made from recycled goods is equal to a fossil product. The basic qualities must be at least as good as in virgin material. Because industrial customers are selling their products forward, their interest is usually related to the question on what consumers want. Thus, industrial customers are making decisions where they consider consumers' choices. Using renewable materials can give them head start. Concerning this, the higher price may not be an issue if the recycled material is good quality and consumers appreciate sustainable products. In this situation customers can be willing to pay more than for the fossil product.

> *"The challenge was that earlier we didn't have proper knowledge on the procurement side of the waste we now use in our processes. … Now we have quite good procedures and we do more research all the time."* Expert 3

There is plenty of investigating to do in the area of raw materials for circular processes. The details of the processes include where to find the suitable materials, testing if they fit to the processes and if they do, what kinds of environmental permits are needed, for example. It is important to always find new raw materials that are preferably cheap and going to as minor use as possible in order to have the gap between present and future value as high as possible. Thus, companies need to have versatile knowledge of different states of procurement processes.

One participant mentioned that because CE things are seen as important, but they are not the core in many companies, the importance of circular economy is very much dependable

on the people in charge of CE related activities and senior management. Do they know how to bring those ideas forward and do their objectives meet? However, the value of CE is nowadays better understood.

5.3 The role of CE in international business

Since environmental issues are important all around the world, the role of circular economy in international business was discussed.

> *"It brings possibilities for growth and by that internationality is a central element."* Expert 3
>
> *"It is strongly a global issue."* Expert 5
>
> *"The state of circular economy depends on the customer, country and industry, and there is quite a lot of variation."* Expert 4

International situations have had impacts on the development of CE across the globe. For example, China banned import of waste and it reflects around the world especially in areas where recycling and circular economy infrastructure are under-developed and rely on sending waste elsewhere. As a consequence, the field takes rapid steps further in recycling materials more and more locally and manufacturing industries invest in new processes. As was mentioned already in the legislation chapter, environmental legislation is developing in many countries and it brings new business opportunities as well. There is plenty of potential for international growth in the field of circular economy.

Internationality is an essential feature and enables growth in circular business. The background is that if certain circular material streams for a single market or actor are not sufficient enough, with international purchasing and gathering materials it can be possible to make it profitable. And profitability comes from efficiency in every level. One participant mentioned that they have fully global purchasing which facilitates flexibility and a company is not dependent on single market or raw material.

Producers, societies and countries must make sure that materials are possible to recycle, that there are systems and processes for it. For example, in Finland plastic recycling is

being developed and it is a system that is missing from many countries. Also, bottle recycling in Finland is advanced and an interviewee pointed out that there are visitors from abroad who want to get to know the system. All these aspects promote Finland as an environmentally friendly country and endorse Finnish companies as well.

One interviewee explained that since the company operates in multiple countries, its obligations do not concern only Finland but the whole company and all its locations. Therefore, business is per se international and it is not necessary to separate domestic and international units either when talking about circular economy activities. Different processes are developed in different places and can then be utilized in different locations. Overall, it is beneficial to think about the broader geographical context already in the development stage of a product, material or a process. Can it be used also elsewhere than just in Finland or nearby areas?

For an example country, China is making progress in environmental knowledge gradually becoming mainstream. China's large population is a huge opportunity but again, consumers have many different preferences. One interviewee said that their business in China has grown considerably during the past two years. Building market in China is a long-term work and commitment, and the company has had a subsidiary there for 11 years. Because the company has been in same business in Finland, it has had time to prepare the market in China and now when the environmental business is taking off there, the company is part of it from the start. The company has been able to invest in new products in China and through that expand also to another Asian country. Furthermore, the company has designed a different business area in China which is environmental education in private schools and kindergartens. For example, there are model gardens in which food waste can be composted and children learn different ways of helping the environment. This business area has been successful and brings also image value.

Countries have different starting points and perspectives of circular economy. In developed countries and especially in Europe the importance of CE is understood quite similarly but there are also nuances between countries. Developing countries are strongly waking up to different problems, for instance plastics in oceans. What should be more taken care of are the roots of problems which are under-developed waste management systems. As long as it is legislatively and culturally acceptable to throw garbage to a

nearby ditch, it is difficult if not impossible to compete with that free pit with waste treatment payments. In those countries the legislation might be in place but the monitoring of it is not sufficient. What was also discussed by a participant was that developing countries might not recognize the opportunities circular economy can bring, and in US the focus in on which is most efficient and cheapest.

An interviewee reflected that circular economy is best fit for countries and companies that have flexible mindset, ideas on what things are worth trying, and sufficient know-how and education. In addition, the American attitude of "think big" can be useful also in circular economy. Thus, if you can scale almost anything upward, the economy of size starts helping. Everything you do should have either not profitable but good beginning which will lead to profitability, or something that works from beginning and can support itself. Larger companies might have advantage because they can have different sectors which can support each other and circular business has time to turn profitable, and in turn it can be the biggest money-maker of a company. As said before, it requires persistence and patience to build something new.

However, interviewees saw many opportunities also for small companies and start-ups. In many cases, small companies have narrow but deep knowledge of certain areas and they can sell their expertise for bigger companies. Thus, networking is very important especially for small companies and start-ups. Circular economy can be a great opportunity for developing and testing new ideas and for example growing renting industry can be one way to start. In addition, using circular processes can make small companies stand out in image sense.

One participant discussed the role of society's support in developing CE ideas. For small companies it might be easier to get financial support from society which is positive since then they can pilot something they otherwise could not. However, there are also pitfalls in society giving funds. If a company starts piloting over a too small idea with society's money, it can happen that as long as there is money, the piloting continues but then it is realized that the idea was not ready to be made into a business. Thus, there can be very good ideas in the field of start-ups and small companies, but if they do not have resources, also money from society can get lost when the idea will not get to the stage where it could become real business which carries itself. Circular economy should not run with benefits,

but it should be real business where in the end there must come something that has added value someone is willing to pay for. Some companies may not understand that the process in developing new products and practices is long. Also, the questions of what the market is, who is the customer, is this technology scalable et cetera may have too little attention in the beginning.

5.4 Summary

The interviewees recognized many same opportunities and challenges from circular economy to a company. The opportunities ranged from improving resource efficiency and saving costs to image benefits and caring for the environment, for example. For the challenges, higher costs, legislation and regulation, and communicating CE activities to customers are examples of difficulties companies may face when applying circular economy.

In addition, collaboration and social dimension were considered. All the participants said their companies have collaboration in the field of circular economy, for example with other companies, universities and research centers. Even though some scholars saw the social dimension missing from circular economy, all the interviewees responded that CE has a social aspect which can be seen in job creation and sharing services, for instance.

For the international aspect of circular economy, the interviewees discussed that CE opens up opportunities for international growth since CE is expanding around the world and the development of environmental legislation, for instance, is one driving force in many countries. It was also noted that CE can be beneficial for both large and small companies and start-ups, and the key is to have an idea that can be develop into a real business case. In the next chapter the findings are discussed in relation with the literature review and conclusions are drawn from them.

6. DISCUSSION AND CONCLUSIONS

The purpose of the study was to find out what are the opportunities and challenges of circular economy from company perspective. The findings from the interviews were quite consistent with the literature review. In the literature review, the opportunities and challenges of circular economy were discussed in the context of circular economy itself, circular business models and international business context.

In summary, circular economy is based on closed production systems in which reuse of resources is the key for keeping materials in usage as long as possible. This then creates more value and not just for the present time but also for the future. (Urbinati et al. 2017.) In circular economy, cooperation and inter-sectorial dynamics are emphasized by transforming by-products of an industry into a resource for a second industry (Korhonen et al. 2017).

To discuss the implementation of circular economy in practice, business models were introduced as the first objective of the thesis. A business model can be characterized as "defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit" (Teece 2010). Wirtz et al. (2016) discuss that value creation and guaranteeing profitability are essential parts of a business model framework. Strategy is closely linked to business models since choosing a business model is part of strategy. A business model then shows the methods how the company can compete in the marketplace. (Casadesus-Masanell & Ricart 2010.) Business models for circular economy include for example Remanufacturing, Collaborative Consumption & Sharing Platforms, Product-Service Systems and Virtual platforms.

The second objective of the thesis was to examine circular economy in international business context from the perspective of multinational corporations. It was found out there are many aspects to consider in that sense. For instance, in implementing environmental standards, MNCs must not forget the poorer suppliers struggling to meet the standards but try to include them as well to the progress. That prevents CE being only used in rich developed countries. Because of the power MNCs hold, it would be hard to make CE work internationally without help from them. For global success for CE, MNCs

should have clear vision on how the concept can benefit them. Thus, MNCs would be open for modifying their business models and especially supply chains to fit to CE.

6.1 Answering the research question

The main purpose of this study was to gain understanding on how companies see and address the positive and negative sides of circular economy, and thus the research question of this paper was:

> *What are the opportunities and challenges Finnish companies face when using circular economy?*

In the Figure 1, the main opportunities and challenges of circular economy for companies, environment and society were summarized. Since the focus is on companies, the main opportunities from theory are reducing raw material and energy costs, new business and market opportunities, better brand image, and innovation. Like for the overall concept of circular economy, circular business models have also both possibilities and challenges. For the possibilities, manufacturers and providers, thus companies, can be more innovative and find new business possibilities which can lead to a better brand image. Higher user satisfaction can be a possibility for them as well.

From the interviews, the main opportunities from circular economy for companies were resource efficiency, cost savings, and environment and image benefits. In addition, collaboration and social dimension were discussed in relation to opportunities. Other opportunities included possibility to product differentiation, social approval of CE activities, larger value spreading, rise of sustainability as an important topic, and CE as a must. The exactly same opportunities in theory and interviews are cost savings and image benefits, meaning the participants mentioned those when asked about the most important opportunities from CE. In addition, some of the other aspects from theory also surfaced during interviews.

In CE theory, new business and market opportunities are discussed as possibilities from circular economy. Even though the interviewees did not highlight those as straight

opportunities, they were mentioned related especially to legislation and regulation. Since environmental legislation is being advanced also in developing countries, it opens new business and market opportunities for companies. Furthermore, product differentiation and private label products can broaden a company's business area. Higher user satisfaction was introduced in circular business models theory. The participants said that customers are more and more demanding of environmentally friendly products and thus higher user satisfaction can be achieved by circular products.

Innovativeness was also discussed with some of the interviewees, but it was not raised as an opportunity by participants themselves. It was seen as a two-way street where circular economy enhances innovativeness but also innovativeness promotes circular economy. One interviewee emphasized that even though innovativeness is important, the developed solutions must be also economically justifiable, and sometimes talking about innovativeness can be political verbiage. Thus, innovativeness was not seen as an important aspect in practice than it was in theory.

In literature review, there were differing opinions whether circular economy has a social dimension. Some scholars (Murray et al. (2017), Geissdoerfer et al. (2017), Homrich et al. (2018)) see the social side missing from circular economy and the focus is on economic and environmental dimensions. However, Korhonen et al. (2018) discussed that CE does have a social dimension and they highlight the sharing economy as a social objective. The answer for this dilemma was very clear in the interviews: all the participants said that circular economy has a social dimension. It can be seen in job creation, cleaner environment, and renting services, to name a few.

In theory, challenges of circular economy include consumers' attitudes towards remanufactured products, implementation in practice, and environmental legislation and taxation. The most risks from circular business models concern manufactures and providers. Higher costs, business risks, lack of experience and problems in entering a market are common for both parties. Requirements of technological expertise and fashion vulnerability are additional challenges for manufacturers. Main challenges identified by the interviewees were higher costs, legislation and regulation, and communicating CE to customers. Other challenges included finding interesting circular products for consumers,

lack of knowledge on procurement side, and circular materials being expensive. Thus, there were many same challenges recognized by academia and business professionals.

To conclude, the interviews, CE theory and circular business models theory share many same opportunities and challenges for a company. Also some of the individual issues for a specific company are presented in the paper to give a broader and more in-depth view to the topic.

IB context theory, on the other hand, considers slightly different aspects. However, there are also interfaces to the interviews. For example, IB theory argues that profits generated from circular economy should be shared also outside the company. Some of the interviewees mentioned that their companies have projects around the world where the firms help build infrastructure to the places where they get their raw materials, for example. Even though these types of projects are part of business, they share wealth also outside a company and thus can fit to the IB context theory.

"Hard to change a current business model for a circular one" from IB theory is an issue which was not raised as a problem by the companies since almost all of them have practiced CE long just without calling it by the term. That is probably more of an issue when a company is selling consumer goods since a firm is then dependable on consumers changing their current consumption practices. In conclusion, IB context theory of CE is the most different one of the theories presented in the literature review and had the least same points of view with the empirical findings.

Table 8. Opportunities and challenges of CE for a company by context

Context	Opportunities of CE for a company	Challenges of CE for a company
Interviews	Resource efficiency, cost savings, environmental & image benefits, possibility to product differentiation, social approval of CE activities, larger wealth spreading, rise of sustainability, CE as a must	Higher costs, legislation & regulation, communicating CE activities to customers, finding interesting circular products for consumers, lack of knowledge, circular materials being expensive
CE theory	Reducing raw material and energy costs, new business & market opportunities, better brand image, innovation	Consumers' attitudes towards remanufactured products,

		implementation in practice, environmental legislation & taxation
Circular business models theory	Better brand image, new business opportunities, innovation, higher user satisfaction	Technological expertise required, higher costs, fashion vulnerability, business risks, problems in entering market, lack of experience
IB context theory	Can help in drafting new environmental standards which are required from companies (can also improve brand image)	Difficult to modify the supply chains, standard setting for poorer suppliers can fail, hard to change a current business model for a circular one, profits should be shared also outside the company

The different contexts are summarized in Table 8 where one can see the essential opportunities and challenges of circular economy by the interviews and different theoretical backgrounds.

6.2 Managerial implications

In addition to the fairly limited theoretical contributions, the findings presented in the paper display also managerial implications. This study offers perspectives on how circular economy is perceived in companies from different sectors varying from forest-industry to retail, for example. The paper could provide starting points for managers whose companies are thinking about adapting circular economy into their business, since it is crucial to consider both opportunities and challenges the concept could bring. Managers can prepare for difficulties beforehand and learn from other companies' successes. Moreover, perhaps companies realize they have already used circular economy but have not recognized the term of which methods could be used in developing new processes and building a firm's image, for instance. The presented circular business models can give ideas on how a current linear business model could be modified into a more circular one. Furthermore, the discussed international aspects of circular economy from MNC perspective may be helpful in discussing a company's role in environmental and social

contributions on international level. In addition to the company perspective, governments should design their legislation and regulations in a way that truly promotes circular economy, for instance that different parts of legislation work together and have common goals.

6.3 Limitations and topics for future research

As in research in general, this study has its limitations. To begin with, the interviews present only a narrow overview on circular economy in Finnish companies since the data consists of five interviews with six experts. As circular economy is a global phenomenon and the perspective of the thesis is mostly on national level, the findings cannot be generalized to other countries and present views of only one country of this international topic. In addition, the study consists of limited industries. For circular business models, the paper includes only some of them and thus offers a limited insight on circular business models development.

Circular economy as a current concept offers several directions for future research. What was an interesting challenge from the interviews was communicating circular economy activities to customers and it could be studied further, for example what kinds of messages get the most attention from consumers. Also, the role of legislation was seen important both in national and international level and there is room for research in that regard. Furthermore, circular economy could be studied from the employee perspective, for instance if CE could be a pull factor for attracting employees to a company.

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APPENDICES

Appendix 1. Interview guide

Date	
Place	
Interviewee	
Company	
Job title	

Theme	Questions
Opening/Warm up questions	Can you briefly tell me what do you do in this company? What is your role and how long have you been doing it? (Job title/function)
CE in a company	When and why did you start using circular economy? How is CE done in practice? Was CE easy to implement into your company?
Opportunities & challenges	What are the opportunities from using CE? What are the challenges?
Customer & company levels sides	Do you have problems with customers not wanting to buy circular products in your industry? Is CE important in all company levels?
Legislation & social dimension	What is the effect of legislation in CE for a company? Does CE have a social dimension? Is CE a must in your industry?
The role of CE in international business	What is the role of CE in international business? What are the opportunities of CE internationally? Is CE more important in Finland or abroad? Is there a lot of variation between areas? Is CE applicable for both small and large companies?
CE in sustainability strategies	Has CE altered your previous sustainability strategies? If yes, how?