UNIVERSITY OF TURKU
Turku School of Economics

Internationalizing circular economy companies

Finnish SMEs in focus

International Business

Master's thesis

Author:
Teemu Maste

Supervisors:
D.Sc Niina Nummela
D.Sc Anna Karhu

27.5.2024

Turku

The originality of this thesis has been checked in accordance with the University of Turku quality assurance system using the Turnitin Originality Check service.

Master's thesis

Subject: International Business
Author: Teemu Maste
Title: Internationalizing circular economy companies – Finnish SMEs in focus
Supervisors: D.Sc Niina Nummela, D.Sc. Anna Karhu
Number of pages: 81 pages + appendices 9 pages
Date: 27.5.2024

As the Earth's carrying capacity and resources continue to decrease, the linear economic model is coming to its end. Circular economy (CE), where materials are kept in circulation much longer and waste generation is minimized, offers a sustainable alternative to the traditional linear economy. With CE, at its best, it is possible to achieve the decoupling of economic growth from excessive use of natural resources. CE has already grown significantly in recent years, especially in the EU area but there is still a strong global growth potential in CE as it continues to grow and replace the traditional linear economy worldwide.

As Finland is a small country with a small domestic market, the key to significant growth can only be found in international markets. Even though Finland has traditionally been a technologically advanced and innovative country, statistically Finland's CE figures are not even at the level of the EU average. But, looking beyond statistics there is a significant amount of potential for the international success of the Finnish CE industry. The purpose and goal of this study is to understand the opportunities for Finnish CE companies to grow internationally and to provide possible solutions for Finnish CE companies to successfully internationalize their operations.

Existing literature of CE has focused on various circular economy business models (CEBMs) and CE ecosystems. The role and significance of CE ecosystems becomes particularly important when viewed from the perspective of an internationalizing company. Successful internationalization emphasizes the utilization of networks and the significance of the institutional environment. Both of these factors are also highly emphasized in the success of CE ecosystems. This research aims to find ways for Finnish CE companies to utilize ecosystems in their internationalization efforts.

The empirical findings of the study were collected by interviewing Finnish CE companies, each representing a specific CEBM. Interviews were conducted to ensure representation of all different CEBMs to provide a comprehensive picture of the Finnish CE industry as a whole. The interviews were conducted as theme interviews, which were aligned with the research questions and the theoretical framework. The interviews were transcribed carefully, and the interview material was analysed thematically.

The empirical results of the study confirmed several observations from the literature, such as the significance of ecosystems in the internationalization of CE companies, and especially the importance of partners and financing when entering new markets. However, the significance of financing was much more emphasized in the empirical data of the study compared to the literature, as was the variability in how successfully CE companies were able to utilize partners. The interviews also emphasized the importance of the home CE ecosystem more than the literature; Finland's business environment significantly influences the opportunities for Finnish CE companies to achieve international growth.

This study identified the different challenges and opportunities Finnish CE companies face in the international markets and eventually offered implications for various stakeholders of the Finnish CE ecosystem that could accelerate the international growth of the whole Finnish CE industry.

Key words: circular economy, ecosystems, institutions, networks, Finland, internationalization.

Pro gradu -tutkielma

Oppiaine: Kansainvälinen liiketoiminta
Tekijä: Teemu Maste
Otsikko: Internationalizing circular economy companies – Finnish SMEs in focus
Ohjaajat: KTT Niina Nummela, KTT Anna Karhu
Sivumäärä: 81 sivua + liitteet 9 sivua
Päivämäärä: 27.5.2024

Maapallon kantokyvyn ja resurssien jatkuvasti huvetessa on lineaarinen talousmalli tulossa tiensä päähän. Kiertotalous, jossa materiaalit saadaan pidettyä huomattavasti pidempään kierrossa ja jätteen määrä vähäisempänä, on tarjoamassa kestävän vaihtoehdon perinteiselle lineaariselle taloudelle ja mahdollistamassa taloudellisen kasvun ja luonnonvarojen liikakäytön irtikytkennän. Kiertotalous on kasvanut viime vuosina etenkin EU-alueella ja kasvupotentiaalia on merkittävästi vielä edessä, kun globaali talous siirtyy vähitellen lineaarisesta mallista kiertoon.

Suomen ollessa pieni valtio ja markkina on kasvun avaimet löydettävä kansainvälisiltä markkinoilta. Suomi on perinteisesti ollut teknologisesti edistyksellinen maa, jossa uusia innovaatioita syntyy vilkasta tahtia. Kuitenkin tilastojen valossa Suomen kiertotalousluvut eivät ole edes EU:n keskitasoa. Tilastojen taakse katsoessa pystyy tästä huolimatta näkemään myös suuren määrän potentiaalia suomalaisen kiertotalouskentän kansainväliselle menestykselle. Tämän tutkielman tarkoituksena ja tavoitteena on ymmärtää suomalaisten kiertotalousyritysten mahdollisuudet kansainväliseen kasvuun ja antaa onnistumisen avaimia kansainvälistyville suomalaisille kiertotalousyrityksille.

Kiertotalouteen liittyvä kirjallisuus on keskittynyt pitkälti kiertotalouden erilaisiin liiketoimintamalleihin sekä kiertotalousekosysteemeihin. Kiertotalousekosysteemien rooli ja merkitys nousee erityisen tärkeäksi, kun asiaa tarkastellaan kansainvälistyvän yrityksen näkökulmasta. Onnistuneessa kansainvälistymisessä korostuu verkostojen hyödyntäminen sekä institutionaalisen ympäristön merkitys. Nämä molemmat muuttujat korostuvat myös erityisen paljon kiertotalousekosysteemien toimivuudessa. Tämä tutkimus pyrkiikin löytämään suomalaisille kiertotalousyrityksille tapoja hyödyntää kiertotalousekosysteemejä kansainvälistymisessä.

Tutkimuksen empiiriset löydökset kerättiin haastattelemalla suomalaisia kiertotalousyhtiöitä, jotka edustivat kukin tiettyä kiertotalouden liiketoimintamallia. Haastatteluita tehtiin sen verran, että kaikki kiertotalouden eri liiketoimintamallit olivat edustettuina, jotta saatiin kattava kuva suomalaisesta kiertotalouskentästä kokonaisuutena. Haastattelut toteutettiin teemahaastatteluina, joissa teemat muodostuivat tutkimuskysymysten ja teoreettisen viitekehyksen mukaan. Haastattelut litteroitiin huolellisesti ja haastatteluaineisto analysoitiin teemoittain.

Tutkimuksen empiiriset tulokset vahvistivat useita kirjallisuudesta nousseita havaintoja, kuten ekosysteemin kokonaisvaltaisen merkityksen kansainvälistymisessä, sekä erityisesti kumppaneiden ja rahoituksen tärkeyden uusille markkinoille mentäessä. Rahoituksen merkitys oli kuitenkin tutkimuksen empiriassa huomattavasti enemmän korostunut, kun kirjallisuudessa, kuten oli myös vaihtelevuus kumppaneiden onnistuneessa hyödyntämisessä. Haastatteluissa korostui myös kirjallisuutta enemmän kotimaisen kiertotalousekosysteemin merkitys; Suomen liiketoimintaympäristö vaikuttaa olennaisesti siihen, millaiset kansainvälisen kasvun evät suomalaisten yritysten on mahdollista saada.

Tämä tutkimus onnistui ennen kaikkea tunnistamaan suomalaisten kiertotalousyritysten kansainvälistymiseen liittyvät haasteet ja mahdollisuudet, ja sitä kautta luomaan konkreettisia suosituksia kansainvälistyville suomalaisille kiertotalousyrityksille sekä muille kiertotalousekosysteemin osapuolille.

Avainsanat: kiertotalous, ekosysteemit, instituutiot, verkostot, Suomi, kansainvälistyminen

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 Introduction

1.1 Background for the thesis

According to the United Nations International Resource Panel (2017), the consumption of the world's natural resources has more than tripled in the past 50 years and it is projected to almost double from current levels by 2060 if we do not change our production and consumption manners radically. However, only less than nine percent of the consumed natural resources are kept in circulation (Sitra 2021a) and just to give some perspective of the scale, the European Union alone produces more than 2.2 billion tons of waste every year (European Parliament 2023). The problem with the high use of natural resources is that they are not increasing like our consumption but instead are finite. In other words, the more we use these resources, the less we will have them in the future and the worse it will get for the environment.

The economy we have created has been based on a linear concept, of taking, making and then wasting. This has led to a situation where we must overuse massively our natural resources to even maintain our standard of living, let alone aim for economic growth. (Esposito et al. 2018, 5.) Given these challenges, the linear economical model needs to be changed to a new approach in order to ensure long-term sustainability. By making the lifespan of products longer by for example improving their quality, we can already reduce the use of natural resources. But if we can connect the beginning and the end of linear processes, we are able to create a circular process, where the "life" of a product will always start again, potentially in a new, different form. This shift into a completely circular thinking is the start of building a sustainable future.

The idea of circular economy (CE) is to create a model that emphasizes sharing, reusing, and recycling materials and products to extend their lifecycles. This contrasts with the traditional linear economy of taking, making, consuming, and then wasting. (European Parliament 2023.) CE offers an alternative economic model characterized by a cyclical flow of materials. Although the concept of material cycle has been around since the early days of industrialization and has been associated with reduced environmental harm and new business opportunities, the linear throughput model has historically dominated other economic models. The CE approach prioritizes product and material reuse,

remanufacturing, refurbishment, repair, and various forms of sustainable energy utilization throughout the product's life cycle. (Korhonen et al. 2018, 37.)

It is important to mention that even though our natural resources are finite, due to the main principles of market economy, mineral natural resources are unlikely to actually run completely out. However, the scarcer and poorer the natural resources become, and the more these resources are desired, the higher their price will rise. With the increase in prices, alternative solutions will be taken more and more seriously into account (Sitra 2021a). This will most likely be one of the key factors driving growth in the CE industry. And there is a lot of growth to achieve since the world's economy is currently operating in line with CE principles to only 8.6 percent (Sitra 2022a).

At the moment the idea of a CE is being promoted by the European Union (EU) as well as numerous national governments and multiple global business associations (Korhonen et al. 2018, 45). The European Union (2023) expects CE to create 700 000 new jobs in the EU by 2030. Ellen McArthur, the founder of the Ellen McArthur Foundation and often referred to as the "queen of the circular economy", recently stated that while the transition from a linear economy to CE creates pain and uncertainty, it is also the greatest opportunity of our lifetime (Kauppalehti 17.9.2023).

In Finland CE has taken a significant step forward in the last years. The Finnish government made a strategic decision on the Circular Economy Program in the spring of 2021, aiming to establish a new economic foundation for Finland by 2035. The program seeks to strengthen Finland's role as a leader in the circular economy by having a vision to achieve a carbon-neutral circular economy society by 2035. Also, Finland's Sitra is for example a well-known operator in the field of CE and internationally recognized for their contributions to CE development. (Ulkoministeriö 2019.) Already in some industries Finland has managed to become a pioneer in developing innovative CE solutions, creating significant potential to internationalise these solutions to other markets (Sitra 2022b).

In today's globalized world it has become more convenient to achieve international growth since the world is shaping towards a more connected, global market. International growth has become the key to long-term success, especially for countries like Finland where the domestic market is relatively small and the whole economy is very export-

driven (Statista 2024). This is a crucial aspect to keep in mind when considering new CE business models since they must be internationally operatable in order to achieve international growth and success.

Currently, high-income countries are having persistently high levels of material consumption, while emerging economies are experiencing rapid consumption growth. However, the per capita resource consumption in wealthy nations is still approximately five times greater than in African countries and despite efforts to reduce material use, these efforts are still insufficient to offset the expected rise in demand driven by population growth and improved living standards. (World Bank 2022). To tackle this challenge, there is a high need for adaptation of CE globally.

CE is an internationally growing industry that has almost unlimited potential to grow. There has already been progress in implementing more and more CE solutions in the international markets. In the European Union there has been a 9.4 percent reduction in the overall use of materials while the share of resources obtained from recycled waste has grown by nearly 50 percent in the past twenty years (World Bank 2022). Despite the increasing knowledge of CE and the scarcity of resources, both the private as well as the public sector have not yet maximized the full potential of it (Esposito et al. 2018, 17). There is a growing international demand for CE solutions, which creates new markets and new possibilities for companies to achieve international growth.

1.2 Objectives and purpose of the thesis

The prevailing circumstances create a favourable environment for Finnish CE companies to further expand to international markets. The current academic literature has already identified a research gap on the internationalization of circular economy business models (CEBMs) (Thornton 2024, 1). This thesis aims to cover that research gap by focusing on Finnish CE companies and creating an understanding of the most important aspects for them to consider when internationalizing to new markets. Together with examining Finnish CE companies and investigating the opportunities and challenges when entering international CE markets this thesis will give tools for the Finnish CE industry to gain useful knowledge of entering new markets and eventually to achieve international growth. Thus, the main research question is:

How can Finnish CE companies successfully internationalize their operations?

This question will be divided into three sub questions that support answering the main question of this research:

- *What are the key characteristics and dynamics of international CE markets?*
- *What are the critical factors that relate to the international growth of CE companies?*
- *How can Finnish CE companies utilize ecosystems when entering new markets?*

The purpose of this thesis is to gain more knowledge about internationalising CE solutions, and more specifically, to create a clear understanding of how to utilize ecosystems when internationalizing Finnish CE companies to new markets. Ecosystems contain essential factors for the internationalization of CE companies: networks and institutions. Furthermore, the purpose of this thesis is to support the rapidly growing Finnish CE industry to achieve international growth. Finland is known for its strong technological knowledge and ability to innovate new solutions. According to Prokop (2022, 264) Finland belongs to one of the world's leaders in eco-innovations, and in 2016 with the support of Sitra, Finland became the first country in the world to have a national roadmap for CE. Sitra funded over a hundred CE projects as part of the roadmap's implementation. In the recent years Finland's role as a leader in CE has been strengthened by a cross-sectoral strategic program for CE. (Sitra 2022b). By considering all the different business models of CE, this thesis will give tools for all Finnish CE companies seeking for international growth to successfully enter new markets.

1.3 Structure of the thesis

This thesis will be based on theories of internationalization and entering new foreign markets, with a focus on CE and its characteristics as well as on data of the current state of CE in Finland and international markets. Along with the existing literature and data of home and host markets, this thesis will be carried out through qualitative research methods such as theme interviews with Finnish CE companies representing all the different business models of CE. The gathered qualitative data will be analyzed and

utilized for conclusions and recommendations for the Finnish CE industry in their internationalization efforts.

Chapter 2 will cover the basic principles of CE as well as the international and Finnish state of it. In the end of chapter 2, the different CEBMs and their business environment are examined, which gives the basis for chapter 3 that will focus on the internationalization of CE companies. Chapter 4 consists of the methodology that has been used in this research by explaining the qualitative approach, collection and analysis of interview data, as well as the evaluation and ethics of the study. Chapter 5 analyses and describes the findings of the research and chapter 6 focuses on drawing conclusions of the study with theoretical contributions and managerial implications. Chapter 7 summarizes the whole study.

2 Circular economy

2.1 From linear to circular economy

The idea of a circular economy (CE) has created a sustainable alternative for the traditional linear economy. (Sillanpaa & Ncibi 2019, 1; Aarikka-Stenroos et al. 2021, 260). Geissdoerfer et al. (2017, 766) define CE as a regenerative system that at the same time minimizes resource input and waste through different material and energy loop strategies. This creates a more sustainable flow of materials and waste. However, the linear thinking has dominated other approaches in the world's economy for most of the 20th century. The linear economy is a system that focuses on producing goods and services with a primary focus on minimizing costs. It involves extracting raw materials from nature and then converting these materials into products with minimal labour input. The products are then sold to the customer while trying to keep costs at the lowest level possible. Once the products are used, they are discarded as waste at the end of their life cycle. (European Investment Bank, 2023.) This linear flow of materials and products is illustrated in Figure 1 below.

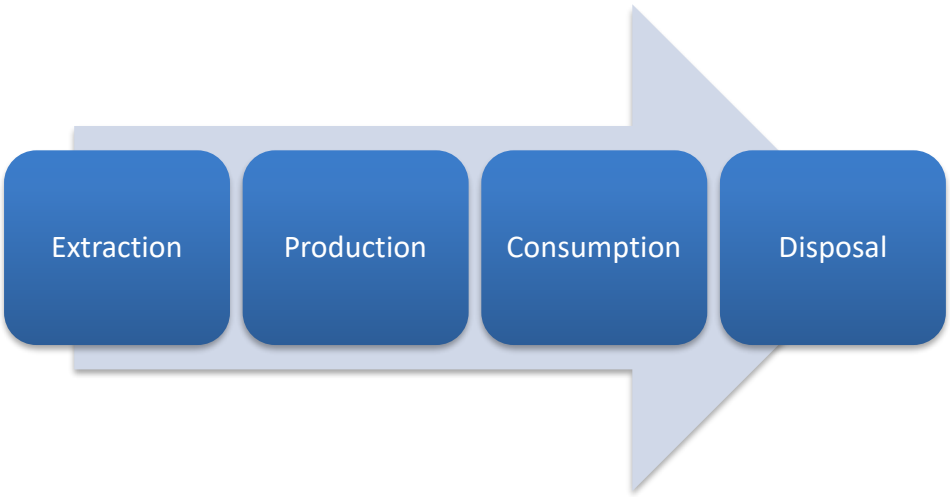

Figure 1 The linear economy model

Extraction refers to the process of extracting natural resources such as raw materials, minerals, and fossil fuels to be able to manufacture products whilst production refers to the process of creating new products from these natural resources through manufacturing.

Consumption refers to the customer purchasing the product and using it, and disposal refers to the process when at the end of the product's life cycle, it is discarded as waste.

In this linear system, resources are not fully utilized, and the flow is one-way, from raw materials to waste (Elia et al. 2017, 2741). This approach is environmentally damaging, contributing to global challenges like climate change and biodiversity loss. Since it's origination the linear model has offered various benefits for businesses that are based on mass production, but at the expense of finite resources and natural capital. (Esposito et al. 2018, 5.) The negative consequences also include environmental harm and the mismanagement of resources in various industries, such as agriculture, construction, and transportation. (Ellen MacArthur Foundation: What is the linear economy?.) In addition to the environmental issues, linear economy is an inefficient business model compared to CE. The capacity is not fully utilized, and the products are not in use throughout their whole potential lifecycle. Materials that could be used, are lost and customer value is not fully extracted. (Sitra 2022a).

The scale of the challenge makes it difficult for humans to fully understand the scarcity of resources on a planetary scale. Currently, we almost live as if natural resources were infinite, which in a way, is partly true if we think about Earth operating as a closed system where material endlessly cycles, changing form and location. (Sitra 2021a.) However, the current linear economic model does not operate based on these closed cycles but instead, it continually brings additional natural resources into the economy. When resources are used, they are discarded as waste and pollution and then removed from the economic system which leads to the situation that economic growth then requires the acquisition of new natural resources once again. (Goyal et al. 2018, 729.)

To overcome the issues that the linear economy generates and to achieve sustainability, the transition to a circular economy will be crucial (Ellen MacArthur Foundation, 2020), because CE has the possibility to be a self-sustaining system that efficiently utilizes the resources we have (Goya et al. 2018, 729). Historically, the linear economy has often been seen as the primarily resource and energy-intensive industrial model that aligns with the capitalist economic principle of having constant economic growth in terms of production and consumption (Smith, 2019). This also creates the dilemma of balancing the need for economic growth without causing too much natural resource consumption

and environmental harm. Traditionally we have not been able to achieve economic growth without causing at least some sort of environmental damage. In order to achieve economic growth without damaging the environment and using too much of our finite natural resources we need *decoupling*. Decoupling means the effect of separating interconnected factors in such a way that both can be achieved independently of each other. For instance, disconnecting economic growth from natural resource extraction and environmental harm. (Sitra 2018; Guo et al. 2021, 2.) This effect is illustrated in Figure 2 below.

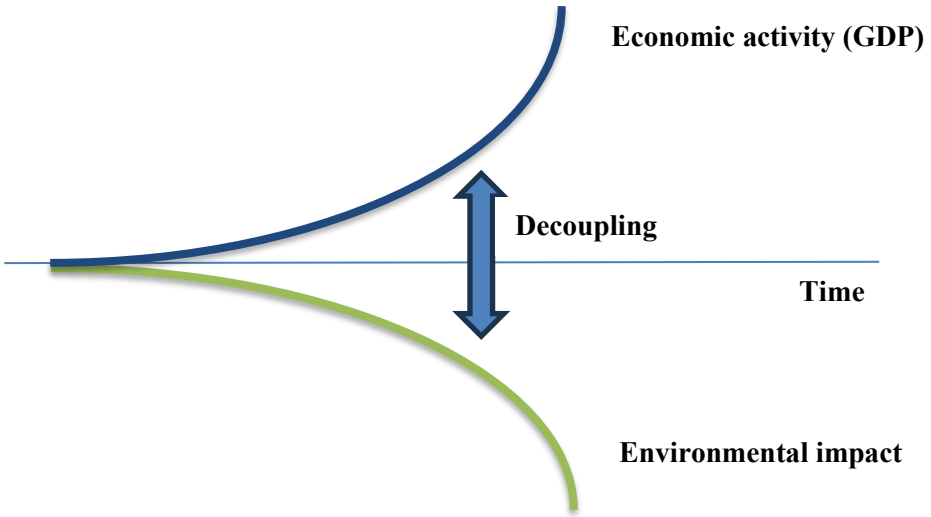

Figure 2 Decoupling (Modified from United Nations Environment Programme, & International Resource Panel 2011, 13)

There has been debate if decoupling in terms of economic growth and environmental impact is even possible and achievable (Wang et al. 2022, 1; Guo et al. 2021, 2). In 2021 Sitra published a study where an international group of economists led by the prestigious University College London (UCL) together with a company called E3-modelling, investigated the possibility to limit the temperature increase to 1.5 °C above pre-industrial levels while still achieving economic growth. While the study indicated that this seems possible and achievable, it does not address whether economic growth can be decoupled from excessive natural resource use. However, according to Sitra, the solution to decouple economic growth from excessive use of natural resources could be a complete circular economy where once-used minerals and other natural resources are kept within the economic cycle for as long as possible. This would lead to an economical model where economic growth could be possible to achieve together with production and consumption occurring within the capacity of the Earth. (Sitra 2021a; Elia et al. 2017, 2741).

There can be different forms and levels in a circular economic model. The Ellen MacArthur organization has identified two main cycles to consider: the technical cycle and the biological cycle. These two cycles and what they consist of can be illustrated in a so-called butterfly diagram. The main difference between these cycles is that the biological cycle consists of biodegradable materials and the technical cycle of non-biodegradable materials. This creates a significant difference in the nature of these cycles because in the biological cycle the nutrients originating from biodegradable materials can be returned back to the Earth and on the other hand, in the technical cycle materials are always kept outside the nature's own processes. (Ellen MacArthur Foundation, 2019.)

The differences in these two cycles are illustrated in Figure 3 below.

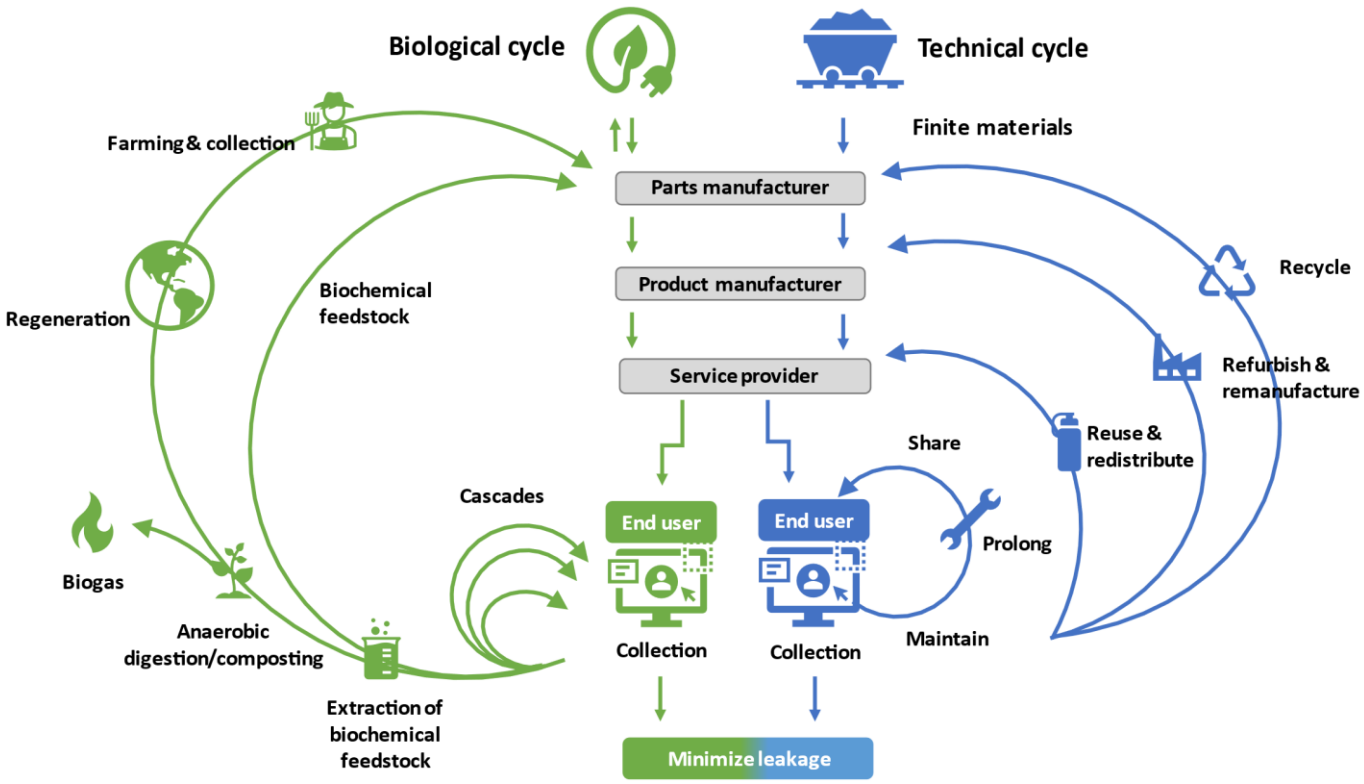

Figure 3 CE Butterfly diagram (modified from Ellen MacArthur Foundation 2019)

As we can see, the technical cycle consists of many different circular concepts, which all represent their "size" in the whole circular economy. For example, the sharing economy focuses only on the business between the service provider and the end user. However, it

has a significant impact on the sustainability of this cycle. A good example of a highly potential sharing economy is the car industry. Currently we use our cars that we own less than 10% of the time, which makes them just stand still more than 90% of the time (World Bank 2022). Or certain tools, like power drills, we only use rarely when we need them but still most of the people own one.

Sharing cars or tools would enable people to not have to buy an own car or power drill and allow people to reduce costs by sharing them with other people. However, it also reduces the overall costs of material usage. This can be explained through opportunity cost: if sharing cars or tools would not exist, people would not just stop using them, but instead everyone would still have to buy their own cars and power drills. This leads to building additional cars and tools which would otherwise not have been built if there had been a sharing economy. This material usage for building the "additional" cars and tools can be defined as the material opportunity cost of not having a sharing economy.

On the other side of the butterfly diagram, we have the biological cycle, which consists of biodegradable materials. Here you can have for example energy companies that work on producing energy through biomass, creating a circular energy production system. Also, some day-to-day waste that households produce, such as food waste, can be utilized for other purposes in the biological cycle. (Ellen MacArthur Foundation, 2019)

As the need for circularity is a global issue (United Nations, International Resource Panel 2017), it creates business opportunities globally. Therefore, it is important to study the current state and future trends of CE internationally. Because of a Finnish perspective this study will focus more on the international markets nearby Finland. However, as Suchek et al. (2021, 3698) point out, the current studies already focus primarily on the European market, which creates a need to examine other markets as well and conduct research that covers diverse regulatory conditions, social and cultural circumstances as well as technological development.

2.2 International vs Finnish CE markets

As stated before, CE is an internationally growing trend, which will continue to grow and evolve in the future as well. In November 2022 the global development for CE took an

important step when the formal talks for a United Nation's treaty to tackle plastic pollution began. The first meeting of the Intergovernmental Negotiating Committee (INC) occurred in December 2022 in Uruguay, which was followed with a second meeting in Paris in May 2023, known as INC-2. (Ellen MacArthur Foundation, 2023.) These international negotiations have led to a consensus between 175 countries to develop a legally binding agreement by 2024 to reduce plastic pollution (United Nations 2022). This can give a significant boost for the whole CE industry and especially for companies operating in the biological cycle. These kinds of agreements involving such many different countries are also a proof of the remarkable effect that important international institutions like UN can make on the international growth of CE.

While the EU has made remarkable improvements in the past 15 years to increase its resource productivity, there are quite significant differences in the development between the member states. It is measured by the circular material use rate (CMU) and resource productivity, which both indicate at least the material level of CE in the economy, Netherlands tops both indicators followed by Belgium and Luxembourg. (World Bank 2022.) while Nordic countries all perform below the average of EU in both indicators. The CMU is calculated with dividing the use of circular materials to the overall material use. The calculation also considers the effects of imports and exports of material recovery of waste. Thus, a higher circular material use rate indicates a greater utilization of recycled materials relative to raw materials, resulting in reduced environmental stress. (Tilastokeskus 2020.). The resource productivity illustrates how many euros were generated by a kilogram of domestic material consumption (DMC). In Netherlands the number for resource productivity was 5.4 in 2020, while the average of EU was 2.2. To give more perspective about how that compares to the global situation, in China the number was 0.6, US 3.1 and in the UK, it was as high as 5.3. In CMU, the Netherlands managed to reach 30.9% in 2020, while the EU average was 12.8%. Both of these indicators are highly affected by the consumption of domestic materials which is very high in all of the Nordic countries. (World Bank 2022.)

Figure 4 below illustrates the progress EU member states have achieved in terms of circularity rates in the past seven years according to Eurostat. While there can be seen progress in most of the member states, it is still rather slow and varies a lot between the countries. The European Court of Auditors (ECA) came to the same conclusion in their

report last year where they concluded that particularly in terms of the circular design of products as well as production processes, the pace of the progress remains slow within the member states (European Court of Auditors, 2023).

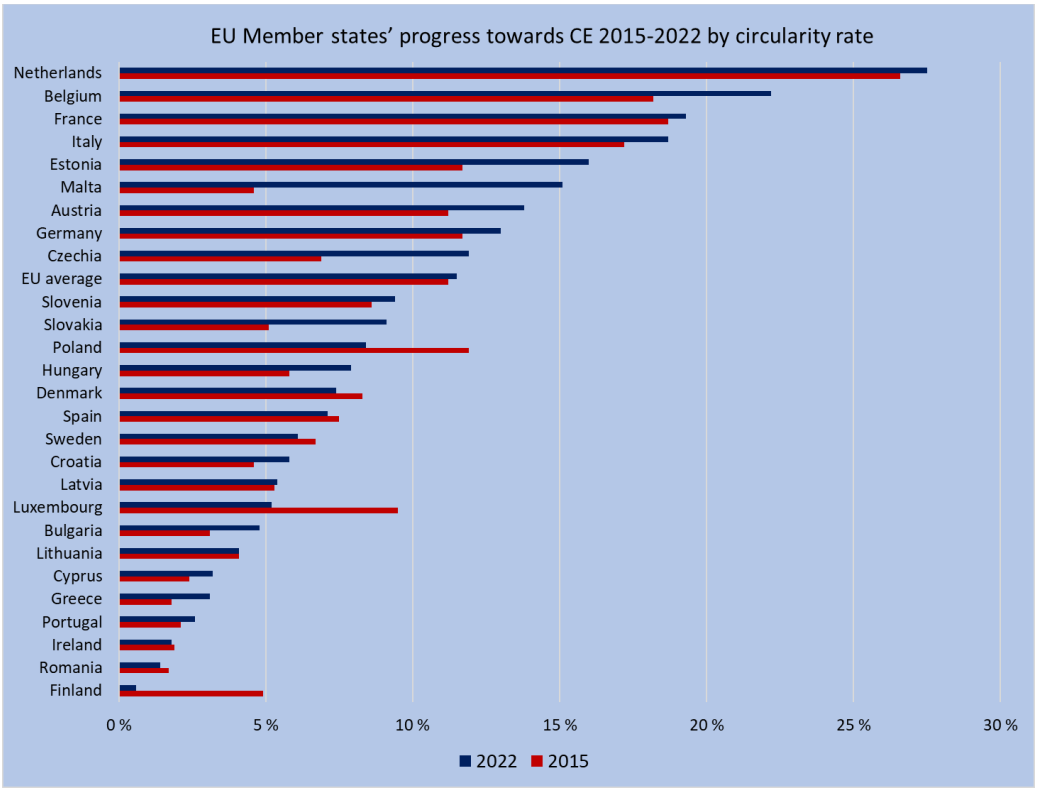

Figure 4 EU Member states' progress towards CE 2015-2022 by circularity rate (Eurostat, Material flows and resource productivity 2023)

An interesting aspect to notice from Figure 4 above is the fact that Finland has the lowest circularity rate of the EU and is also the country with the highest decrease in circularity rate between 2015 and 2022, while most of the other countries have increased their circularity rate. Another noticeable aspect is the performance of the Netherlands in terms of their circularity rate, which has remained significantly higher than any in other member state in the past 7 years. (Eurostat, Material flows and resource productivity 2023.)

While the pace of growth in CE varies between the member states, there are also variations in the CE growth potential of different industries. The Ellen MacArthur foundation has identified growth opportunities for 10 key industries in terms of CE. These industries have been ranked according to whether there is a high, increasing or limited possibilities for growth according to three different drivers which are: *innovation &*

corporate action, *policies & regulation* and *customer preferences & macrotrends*. The ranking is illustrated in Table 1 below. To give perspective, the sharing economy alone is expected to grow twentyfold between 2015-2025, creating an overall market of 335 billion US dollars. (Ellen MacArthur Foundation, 2020).

Table 1 Global CE growth potential in 10 key industries (modified from Ellen MacArthur Foundation 2020, 55)

Global CE growth potential			
Industry	**Drivers**		
	Innovation & corporate action	Policies & regulation	Customer preferences & macrotrends
Plastics & packaged goods	High	High	High
Fashion & textiles	High	High	High
Food & agriculture	High	High	High
Electronics	High	High	Increasing
Automotive, transport & logistics	Increasing	High	High
Technology, media & telecommunication	High	Increasing	Increasing
Engineering & construction	High	Increasing	Increasing
Waste management & water	Increasing	High	Increasing
Industrial manufacturing	Increasing	Increasing	Limited
Paper, pulp & forestry products	Increasing	Limited	Increasing

Throughout the history, Finland has been at the forefront of promoting CE through concrete actions (Sitra, Kiertotalous). The Nordic forestry, pulp, paper, and wood industries have embraced CE principles long before they achieved their widespread popularity. For example, in Finland, these industries have developed new products from wood biomass, like biopolymers, and integrated pulp and paper plants with biorefineries

in response to global changes in the paper manufacturing sector. (Henrysson & Nuur 2021.)

Just like the international state of CE, the current situation and trends of CE in Finland can be measured through different indicators that together help to create an overall picture of the Finnish CE market. (Tilastokeskus 2020). Figure 4 below illustrates how Finland performs in 3 different indicators compared to EU: Design, Waste, and Reuse & Recycling.

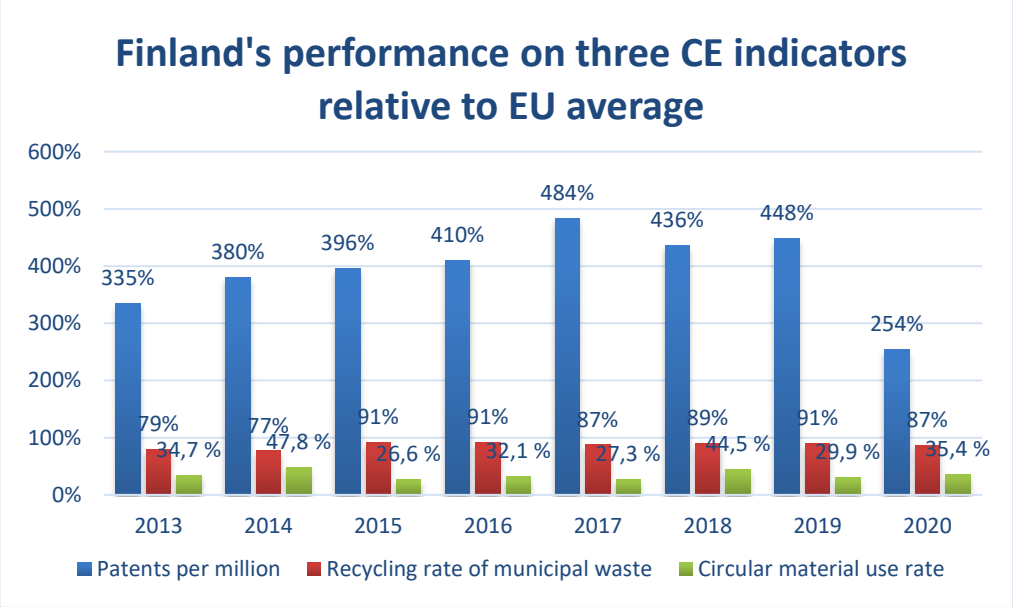

Figure 5 Finland's performance on three CE indicators relative to EU average (Tilastokeskus 2020)

Design is measured with the number of patents related to CE. Patents often represent the amount of technological development as well as the level of new innovations in different industries. Since the start of the 2010s, there has been a notable increase in the number of Finnish CE patents, reaching more than four patents per million inhabitants in 2020. In Finland, the per capita number of registered CE-related patents has been every year significantly higher than the average of EU. (Tilastokeskus 2020.)

On the other hand, both the recycling rate of municipal waste and the circular material use rate (CMU) have been constantly lower in Finland than the average of the EU. In Finland, the recycling rate of municipal waste has quite constantly stayed slightly above 40% while the average of EU has increased from 42% to 48% between 2013 and 2020,

which results Finland having in 2020 a 13% lower recycling rate of municipal waste than the average of EU. With the CMU rate, the difference between Finland and the average of EU is even larger. Finland's CMU rate has quite consistently been around 1/3 of the CMU rate of EU, being only 4,5% in 2020, while the average of EU has managed to be always higher than 10% between 2013 and 2020. (Tilastokeskus 2020.)

What could be the potential reasons behind these differences between Finland and the average of EU? Looking at the number of new patents in CE, Finland tends to have every year significantly more of them compared to the average of the EU. This can at least partly be explained through the fact that Finland is a relatively innovative and technology-oriented country with being classified as one of the innovation leaders of the EU. Finland´s level of innovation has also grown 5th fastest from the EU countries in the past 7 years, making it the fastest grower of the EU:s innovation leaders that are Denmark, Finland, Sweden the Netherlands and Belgium. Finland's current level of innovation has now almost reached Denmark, which has been recognized as the most innovative EU Member State in 2023. Along with being one of the front runners in the level of innovation, Finland also managed to be the runner-up, just behind the Netherlands, in the level of digitalisation in 2023. (European Commission 2023).

The characteristics of the Finnish economy give some explanation for the fact, that Finland's performance has not been on the same level as EU in the other two indicators. In Finland, the use of domestic materials is significantly higher than the average of EU, particularly in mining and quarrying, which makes a remarkable difference in terms of waste and its potential to be recycled. (Tilastokeskus 2020). Because the overall material use is higher in Finland, the circular material use must be higher as well in order to even match the average CMU of the EU. This is difficult to achieve in Finland, since the rate of mining and quarrying is very high, which leads to producing relatively more waste that is harder to recycle (Tilastokeskus 2020).

To improve the performance in these different indicators and to increase the circularity of a society, growth is needed in the whole sector of CE. This is why it is important to understand the different business models of CE and what they require to grow internationally (OECD 2019). The next chapter will further examine the different business models of CE.

2.3 The business models of CE

According to Lüdeke-Freund et al. (2019, 36) there is a broad range of different CEBMs and six major CEBMs with the most potential to reduce raw material usage: repair and maintenance; reuse and redistribution; refurbishment and remanufacturing; recycling; cascading and repurposing. These CEBMs can also be found in the Ellen MacArthur foundation's butterfly diagram, which illustrates the overall picture of CE. In other words, different CEBMs are the components that form a CE. While the butterfly diagram gives a comprehensive understanding of the two main cycles of CE, it does not profoundly explain the "smaller cycles" which represent the different business models of CE.

Many of the research look at the different business models of CE in terms of value. Centobelli et al. (2020, 1747) conclude that there are different dimensions of value that form CEBMs: value creation, value transfer and value capture while Goyal et al. (2020, 738) refer to four different dimensions related to CEBMs: value proposition, value creation, value delivery and value capture. The CEBMs align with the different dimensions of value. In the context of the butterfly diagram, the creation of value can be generated through four different types of business models. The first cycle represents a business model where the value is created through prolonging the lifecycle of materials by focusing on sharing and maintaining products and services. The second cycle represents a business model where the already existing product is resold to a new customer while minimizing the costs of the redistribution and reuse. The third cycle represents a business model of refurbishment and remanufacturing, which involves using tools and components to form used products into either completely new products or to extend their lifespan. In the fourth cycle, the business model of recycling transforms materials into their original forms, such as through milling and re-melting metals in order to produce new metal feedstock. (Hopkinson et al. 2018, 72-73.)

Chabowski et al. (2023, 1) have identified 5 main business models for circular economy: *circular inputs, sharing platforms, product as a service, product life extension* and *resource recovery*. These business models have also been used by Sitra to identify and categorize Finnish CE companies (Sitra 2021b). The models and their alignment with the Ellen MacArthur Foundation's butterfly diagram are illustrated in Table 2 below.

Table 2 The five CEBMs (modified from Sitra 2022a; Ellen MacArthur Foundation 2019; Chabowski et al. 2023, 1)

CEBM	Butterfly diagram	Main characteristics of the CEBMs
Circular inputs	Biological & Technical cycle	➢ Circular resources ➢ Serves as the foundation for other actors in the same value chain. Enables the possibility for a fully circular value chain ➢ Example: Renewable energy providers and companies using bio-based materials.
Sharing platform	Technical cycle	➢ Work as digital marketplaces ➢ Relatively similar to linear platform business models (Uber, Wolt) but focus on sustainability and peer-to-peer sharing ➢ Enables maximizing resource and asset utilization and lowers the need for new production ➢ Assets become more accessible to everyone → social sustainability
Product as a service	Technical cycle	➢ Shift in incentives, customers only use the products while ownership of the product stays in the company. Importance on quality and durability over cheap production and high sales volume ➢ Closer customer relationship throughout the product lifecycle ➢ Owning products throughout their lifecycle opens up new aftermarkets → new partnerships
Product life extension	Technical cycle	➢ Using a product in its original form for as long as possible ➢ Take-back systems needed ➢ Reselling ➢ EU legislation driving repair and maintenance services
Resource recovery	Biological & Technical cycle	➢ Value created from utilizing waste → waste management ➢ Ability to reuse waste in own production or sell as feedstock ➢ Enables to "close" the CE loop

Table 2 describes the different characteristics of each CEBM identified by Chabowski et al. (2023, 1). It is valuable to note that the technical cycle seems to offer more different CEBMs than the biological cycle. However, there are business models that can be utilized in both cycles as circular inputs and resource recovery work as the foundation and closing of CE in both cycles. All the CEBMs differ from each other quite significantly but can work together in many different types of value chains. For example, a sharing platform could benefit from an actor who has a business model focused on product life extension.

For extending a products life, you sometimes need to resell a product to a new market which could then require a sharing platform to maximize the whole potential when extending a product's lifecycle.

For CEBMs to successfully operate, other actors are needed to complete the value chain. An important part of all CEBMs are their networks and the ability to utilize them in value creation. (Centobelli et al. 2020, 1744.) Implementing CE business models requires a new way of thinking for many linearly operating companies since they to need to shift from a focus on the firm itself to engaging more in an ecosystem of various actors, emphasizing networks and collaboration (Pieroni et al. 2019, 199). An ecosystem is defined as a collaborative network of multiple actors, formed around a common vision and goal, focusing on solving problems that an individual organization cannot address alone. It is a dynamic and evolving community where new features, functions, and innovations emerge through interaction and mutual dependencies among the participants. (Sitra 2024.)

Zucchella et al. (2022, 1093) describe how for example companies can engage customers in the recycling process of different materials which ultimately help the companies that are working with recycled materials to have more supply on resources, which eventually makes them cheaper. Thus, companies need to reframe their relationship with customers and bring them as a part of their business model. Customers should not be seen only as consumers that seek to buy the cheapest products but instead as a part of a value chain to create shared value and sustainability. This works similarly for suppliers where the most value is co-created with suppliers that are innovative and able to create and develop new sustainable materials. (Zucchella et al. 2022, 1093.)

The challenge for scaling the CE business models globally comes from the fact that many business models which operate within the principles of linear economy have still currently an easier availability for utilizing low-cost resources (Hopkinson et al. 2018, 91). Thus, at the moment the competitive advantage for CE companies has to come from somewhere else than pure cost-effectiveness. The competitive advantage for CE companies could come from the utilization of ecosystems since together with the regulations and agreements of different institutions, they are playing a very important role in the success of CE companies (Aarikka-Stenroos 2022, 337). Sitra has identified the utilization of ecosystems as the most overlooked area when trying to scale CE business models. As

engaging with other actors in a CE ecosystem is one of the most, if not the most critical capability and success factor when scaling circular business models, it becomes also a very crucial part when CE companies are aiming for international growth. (Sitra 2022a.)

3 Entering international CE markets

Finland is recognized as a pioneer in CE. However, the good CE solutions developed here are not enough to drive global change unless they are adopted internationally. Finland's and the EU's trade and development policies, along with actors operating in other countries, especially in developing countries, play an important role in accelerating the global transition to a fair CE. (Sitra, Kiertotalous.)

As ecosystems have been recognized to play a key role in the success of all the different CEBMs, it is important to focus on that aspect also when internationalising to new markets. To have a better understanding about the different aspects of CE ecosystems, this chapter will be divided into the effects that networks and partnerships as well as institutions have on CE companies when entering new markets. These aspects will be then examined in the context of the internationalisation of Finnish CE companies.

3.1 Networks and partnerships facilitating market entry of CE companies

Networks and partnerships play a very crucial role in companies' market entries. It has been widely discussed how important it is for a company to have certain networks, especially when internationalising to new markets. But how are networks defined? A general definition of a network is "a structure which is formed by relations between different actors". However, networks can be defined by many various ways and the definition influences how we think about networks and what they truly mean for a company. (Axelsson 2016, 243). Also, an important factor to consider is that networks can be both inter-organizational and inter-personal and they both should be taken into account when internationalising to new markets (Fernandes et al. 2023, 150).

Zain and Ng (2006, 202) highlight the importance of managers being able to form networks in order to facilitate the internationalization process of a company. These networks rely often on personal relationships. A key element in interorganizational relationships is the trust in each other's abilities and a shared commitment to common goals. Mutual goals and a high level of trust facilitate the development of close relationships among actors in different organizations. (Mattsson & Johanson, 2013, 290).

For many different types of companies, one of the most important factors when internationalising to new markets is the knowledge of the current and future economic situation in the target market. Knowledge gained from international networks, both inter-organizational and inter-personal, has been proved to be a valuable asset for a company when internationalising to new markets. Collaboration within network agreements, based on trust, shared values, and strategies, is crucial for companies when reducing for example complexity, risks, and uncertainty, and thereby facilitating their internationalization efforts. (Magni et al. 2022, 641). Enhanced understanding of a foreign market enables companies to exhibit greater creativity and innovation (Stoian et al. 2017, 142). Acquiring knowledge about a foreign market through networks can also be viewed as a continuous process of gathering information, leading to the further accumulation of more networks and more information (Stoian et al. 2017, 142). In other words, networks can create additional networks, which together eventually create more knowledge for a company.

Whilst knowledge plays an important role when internationalizing to new markets, internationalization is particularly important for knowledge-intensive industries. According to Torkkeli et al. (2016, 211) network competence plays a significant role in the successful internationalization and growth of SMEs, particularly in knowledge-intensive industries. The positive impact of network competence is expected to be even stronger when internationalizing to new markets, allowing knowledge-intensive SMEs to create an advantageous position in larger markets and promote their overall growth. Knowledge-intensive industries are characterized by advanced technology, where companies are often small and have a very specific focus area. A technology-oriented CE company is a very good example of a company operating in a knowledge-intensive industry.

According to Tonelli and Cristoni (2019, 61) it is especially important for CE companies to partner with different types of suppliers and focus on creating new possible relationships which could be more flexible than the traditional supplier-buyer relationships. In the study of Bohnsack et al. (2021, 840) technology providers of the European energy-industry emphasized the need for building local partnerships when entering foreign markets and possibly to consider adapting their distribution model to match the market needs of the foreign market. As partnerships can give valuable insights for a company about the characteristics of the target market (Zain et al. 2006. 203), they

become especially crucial for CE companies since by cooperating with partners who understand local environmental regulations and market demands, CE companies can identify and prioritize markets that are specifically suitable for them.

The utilization of networks and partnerships when internationalising to new markets can be viewed from different perspectives depending on the CEBM of the company. For example, a company using sharing platforms as their CEBM, will have to focus on building a platform that is suitable for different markets. This will accelerate the company's market entry process by improving the acquisitions of new users, which will lead into a faster growing user network. (Thornton 2024, 16.) It is also important to note that scalability is a significant characteristic in sharing platforms since gaining more users will not only improve the revenue but also the profitability of the business model. In addition, it will also create a so-called network effect where more users lead to more options for sharing things, creating a positive feedback loop where the sharing platform becomes more attractive to new users. This makes internationalization a very crucial aspect for sharing platforms since international users are often a must for them to achieve a highly profitable business, especially when having a small domestic market. (Thornton 2024, 5.)

On the other hand, for companies having product-as-a-service as their primary CEBM, it is especially important to focus on partnering with companies that can prolong the product's lifecycle, such as repair and refurbishment actors (Fallahi et al. 2023, 3244) since the lifecycle of a product is one of the most important factors in this business model (see Table 2). Additionally, companies that have resource recovery as their CEBM, need to focus on building partnerships with companies that are dealing with reverse logistics and renewable materials. These differing partnerships highlight the importance of focusing on those networks that are especially important for the company's main CEBM. (Aarikka-Stenroos 2022, 337.)

Torkkeli et al. (2019, 45-46) emphasize the significance of institutional drivers and network competence for the foreign market expansion of small- and medium-sized enterprises (SMEs), especially in the context of Finnish SMEs. Managing the network level as a whole, as opposed to individual alliances, plays an important role when entering foreign markets.

According to Torkkeli et al. (2016, 222-223) the importance of network competence for the growth of Finnish SMEs is particularly highlighted when they are operating in an international environment. In fact, their study suggests that, for international growth, maintaining the business network through network-level activities is even more crucial than focusing on just individual international relationships. In addition to developing and maintaining an international business network, it is also very important for Finnish SMEs to focus on monitoring and controlling the network in a sense that it keeps being beneficial for the company.

3.2 Effect of institutions when entering new CE markets

The definition of an institution is broad and complex but in general institutions can be described as complex arrangements involving various economic and political entities within economic and industrial systems. Besides formal regulatory frameworks, agreements, rights, constitutions, laws, taxation, and regulation, they also include informal norms, such as shared self-sustaining beliefs, cultural aspects, and expectations. (Henrysson & Nuur 2021.) This chapter focuses especially on formal institutions and their effect on CE companies when entering new markets.

As stated before, powerful international institutions such as the United Nations and the European Union play an important role in providing an optimal business environment for different kinds of sustainable industries by supporting the growth of sustainable solutions through research, regulations, agreements and financing. This provides opportunities also for businesses operating in line with CE principles. When considering the regulatory environment, EU has significant power to adjust regulation in order to, for example, steer the market into a certain direction (Centobelli et al. 2020, 1747). EU has set different regulations and directives that have different effects on CE companies, depending on the CEBM used. For example, CE companies that have circular inputs or resource recovery as their main business model, will be affected by the EU's Waste Framework Directive since it sets out some of the fundamental principles considering waste management, which affects the resources that can be recovered and used for reproduction and manufacturing (European Commission, Waste Framework Directive 2023).

The effect of national and international policies plays also an important role when companies start to internationalize to new markets (World Bank 2022.) When perceived institutional drivers are strong, companies tend to perform better in international markets than in a situation where the institutional drivers are weak. These drivers lead also to an increased network competence which is a significant determinant of international performance. The importance of institutional drivers comes especially into play in the company's initial foreign market entry and the initial entry might even be more influenced by the drivers rather than the perceived barriers. (Torkkeli et al. 2019, 44.)

Companies need also to be flexible and able to adapt to the differences in both informal aspects like cultural norms and behaviours, as well as formal aspects like laws and regulations between countries when implementing strategies on an international scale. This adjustment is necessary in order to align the approach when entering a new market with the specific conditions and requirements of each market. (Chabowski et al. 2023, 16.) Especially the changes in the formal institutional environment may happen suddenly and unexpectedly. However, they typically align with the directions set by local governments. (Bai et al. 2022, 13.) In terms of CE, Henrysson and Nuur (2021) highlight that CE models should align with local technology, cooperative patterns, and markets with interrelated institutional structures. Regulations of a market also influence the partnerships between the CE company and its' suppliers (Aarikka-Stenroos 2022, 329), which needs to be taken into account when internationalizing to new markets.

Like many other previous economical transitions, the transition towards CE does not happen independently but depends on the business environment that can both facilitate and hinder the opportunities for new CE innovations (Henrysson & Nuur 2021). As discussed before, many important indicators of CE development are very dependent of the natural resources and domestic material use of a country. However, it has also been noted that geographical and structural factors alone do not define the transformation to become more circular. Technological development and innovation require an understanding of the local institutional context which is an important part of the business environment (Henrysson & Nuur 2021).

Levänen et al. (2018, 373) emphasize how business models are closely connected to the institutions specific to each context, the principles governing valuable and less valuable

materials, and the variations in how different countries promote the concept of CE. The EU is a leader in CE policies which are vital for achieving a carbon-neutral EU by 2050. To achieve carbon neutrality in 2050, The European Commission introduced the Circular Economy Action Plan (CEAP) in March 2020 as a pivotal component of the European Green Deal, which outlines Europe's strategy for sustainable growth. This plan signifies the EU's shift towards CE, focusing on reducing the use of natural resources, achieving more sustainable economic growth, while also increasing the level of employment. (European Commission 2020.) However, as was stated before, the pace of the development of these actions varies significantly between the member states, which was illustrated in Figure 4. The European Court of Auditors stated in their report that also the pace of implementing national CE strategies has been varying a lot between the member states. The report concludes that it will be very challenging for the EU to achieve their target of doubling the EU:s circularity rate by 2030. (European Court of Auditors 2023).

One of the powerful tools that institutions can use to increase circularity throughout the whole society is financing. The EU has implemented several financial programs to develop the level of circularity in the member states. Between the years 2014 and 2020, the EU planned funding of over 10 billion euros for the transition towards CE. However, despite the available EU funds and general support for CE, the member states did not allocate funding in an impactful manner to investments focusing on the design of products and production processes in line with the principles of the CE. The main purpose of the funding was specifically to invest into new innovations and to transform the industrial companies to have more circularity in their business operations. (European Court of Auditors 2023.)

As institutions play a significant role in driving CE growth and facilitating opportunities for new CE solutions, they become a very important factor for CE companies to consider when deciding to enter new markets since they will be affecting the company’s performance in the new market. According to Bohnsack et al. (2021, 841) companies can encounter significant regulatory obstacles when attempting to integrate their business models in a foreign market. These challenges arise when the regulations in a potential foreign market do not allow the company to combine their business model with local resources. However, the impact of these barriers varies, with more liberalized countries requiring mainly only some adaptation of the business model to the local context, while

in other less liberalized nations, there can be more regulatory obstacles which can prevent a successful market entry.

Institutions are also often seen as part of the network a company needs to successfully enter a new market. By cooperating with different actors in the institutional network internationalizing companies can get for example get more information and knowledge about the legal environment in the target market. (Costa et al. 1182.) Oparaocha (2015, 870) emphasizes the vital role of institutional network support for SMEs' entrepreneurial internationalization. Governments, policymakers, and public institutions are encouraged to promote institutional support networks to enhance the international competitiveness of national economies. Financial support alone is not a solution, and policymakers should collaborate with SMEs to plan various institutional support programs for improved awareness and access. In the same study, it was also discovered that in order to utilize institutions to their full potential, SMEs should themselves seek more proactively for institutional support in a beneficial way for them. This indicates a need for better awareness programs and efforts from both SMEs as well as institutional agencies for optimal resource utilization (Oparaocha 2015, 871).

As institutions are identified as an important factor that can affect the CE company's international growth, they become an important player in the CE ecosystem. The next chapter will focus on how CE companies can utilize the whole CE ecosystem when internationalizing to new markets.

3.3 Utilizing ecosystems in the internationalization of CE companies

Like in other business environments, also in CE, companies should not operate in isolation. Building connections within the broader ecosystem is crucial. (Lacy et al. 2020, 283.) In a CE ecosystem, companies operate in a value chain where each company has a role in enabling circularity. This involves collaborating with various stakeholders within the same market, including other companies that might usually feel as competitors, as well as partners along the entire value chain. It also means engaging with government entities, non-governmental organizations, and academic institutions, which are part of the institutional environment of a CE ecosystem (Lacy et al. 2020, 283.) Ecosystems also require management and efforts from all the CE companies. This aspect of CEBMs is

often not considered enough when CE companies are scaling their businesses. (Sitra 2022a.)

The growth of CE requires engagement with many stakeholders, that include diverse organizations, cities, municipalities, as well as consumers, that together are able to operate within a complex multi-actor environment. In Finland, there are several dozen CE ecosystems, which include for example recycling parks, industrial parks, or business clusters. The CE ecosystems primarily focus on research activities to generate new knowledge and share information. They also focus on accelerating collaborative commercial innovations to achieve significant industrial-scale international growth within CE. (TEM 2022.) A collaborative ecosystem requires an organizational model that supports cooperation. Trust-building measures, such as agreements specifying roles and responsibilities, are essential among ecosystem members. (Sitra 2024.)

CEBMs are often dependent on coordinated interactions within complex value networks and thus can face challenging issues of complexity and coordination. Shifting towards an ecosystem view can help CE companies to deal with these challenges, emphasizing the interdependence of ecosystem components and their influence on CEBMs. This perspective requires companies to develop additional capabilities to manage diverse system components effectively. (Kanda et al. 2021, 2826.)

An important aspect in sharing information in an ecosystem is amount, quality and usability of the data that organizations gather. Combining the expertise and data of various actors can particularly be beneficial for an ecosystem when dealing with issues that individual actors cannot solve alone. On the other hand, combining the data from different actors has the potential to increase the value of the data itself, which could lead to new observations and solutions. In this case, data from various actors in an ecosystem should be consolidated into a unified entity, such as a database. (Sitra 2024.)

Aarikkala-Stenroos et al. (2021, 265) have identified five different CE ecosystems that have been used in Finland: **industrial ecosystems**, **urban ecosystems**, **knowledge ecosystems**, **entrepreneurial ecosystems**, and **innovation, platform and business ecosystems.** These ecosystems and their characteristics with examples of Finnish actors are illustrated in Table 3 below.

Table 3 ecosystems in Finland (modified from Aarikkala-Stenroos et al. 2021, 266)

Ecosystem type	**Industrial ecosystems**	**Urban ecosystems**	**Knowledge ecosystems**	**Entrepreneurial ecosystems**	**Innovation, platform and business ecosystems**
Outcome of the ecosystem	Sustainable production	Urban amenity	New knowledge	New business models	Value proposition
Actors in the ecosystem	Service providers, resource providers and manufacturers	Local governments, transportation authorities, consumers	Universities, public research institutions	Investors, accelerators, coworking spaces, educational and research institutions	Focal firm, complementors, suppliers, consumer-prosumers
Examples in Finland	Eco-industrial park Eco3	Hiedanranta smart city	Textile ecosystem Telaketju	CE event organizer Frush	Resq Club, Neste, Netlet

Table 3 shows the different characteristics of CE ecosystems defined by Aarikkala-Stenroos et al. (2021, 265) as well as examples of CE ecosystems in the Finnish context. Industrial ecosystems, like Eco-Industrial Parks (EIPs), are geographical ecosystems where circular resource flows drive sustainable industrial production. Urban ecosystems on the other hand, focus on building an urban environment that supports CE by facilitating cooperation between administrative actors, infrastructure, and resource flows. Industrial- and urban ecosystems are ecosystems that are based on the flow of materials. (Aarikkala-Stenroos et al. 2021, 268.)

Knowledge ecosystems and entrepreneurial ecosystems are based on the flow of knowledge. Entrepreneurial ecosystems form regional clusters where actors leverage digital technologies to support the creation and scaling of new ventures. Simultaneously, knowledge ecosystems represent research clusters where actors collaboratively develop

CE-related knowledge. (Aarikkala-Stenroos et al. 2021, 269). Knowledge ecosystems might be especially beneficial for companies operating knowledge-intensive industries. The fifth ecosystem, innovation, platform and business ecosystem is based on the flow of economic value. CE innovation ecosystems, often involving a focal firm and complementary components, align their efforts to deliver sustainable value creation. For example, platform ecosystems can utilize digital platforms to connect companies operating in the construction industry in order to reduce waste and enhance resource efficiency. (Aarikkala-Stenroos et al. 2021, 270.)

These ecosystems create possibilities for improving growth of individual CE companies (Aarikkala-Stenroos et al. 2021, 269), which can be beneficial also when aiming for international growth. Ferreira et al. (2023) focus specifically on the impact entrepreneurial ecosystems have on the internationalization of SMEs. Their study concludes that support services, partners, and digital transformation technologies significantly impact SMEs' internationalization within entrepreneurial ecosystems (Ferreira et al. 2023, 6-7). Support services have also been proved to be helpful and even essential in the internationalization of Finnish SMEs specifically (Kuivalainen et al. 2018, 136).

As was stated before, institutions are part of the CE ecosystem that plays an important role for CE companies when entering new markets. While institutions are not specifically a part of the core business network of a company they can be distinguished into an own network and thus, can be seen as part of the overall ecosystem influencing a company’s entry into a foreign market. Figure 6 illustrates how institutions and business networks together form CE ecosystems.

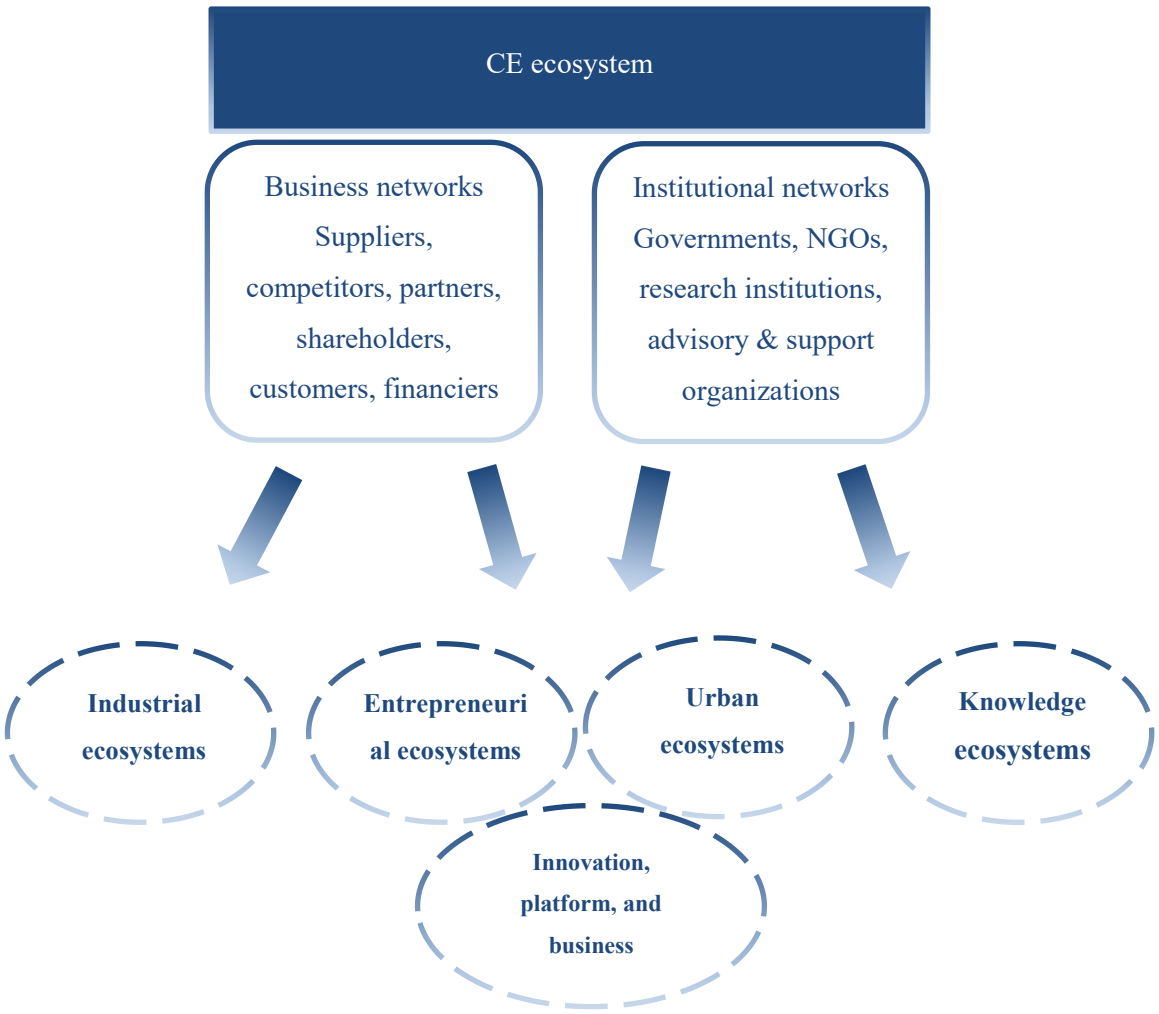

Figure 6 Networks and institutions forming CE ecosystems (modified from Oparaocha 2015, 864 and Aarikkala-Stenroos et al. 2021, 266)

In Figure 6 above, the different types of networks and their connections to the different CE ecosystems are illustrated. Industrial ecosystems and entrepreneurial ecosystems consist mainly of business networks while urban ecosystems and knowledge ecosystems consist mainly of institutional actors. The innovation, platform and business ecosystem is a combination of institutional networks and business networks.

In the European Commission, these ecosystems are considered to be an important part of the development of CE. A knowledge ecosystem is even highlighted in the CEAP, where

it is mentioned as one of the Commission's key actions: "*The new SME Strategy will foster circular industrial collaboration among SMEs building on training, advice under the Enterprise Europe Network on cluster collaboration, and on knowledge transfer via the European Resource Efficiency Knowledge Centre".* (European Commission 2020.) This is a practical example of how institutions and networks can together improve circularity and give better opportunities for CE companies to achieve growth within the EU. Finnish CE companies, especially the ones that are operating in knowledge-intensive industries will gain benefit from these actions set by the European Commission.

The Finnish Ministry of the Environment started to prepare a national Circular Economy Green Deal in 2022 with an idea to accelerate Finnish society's transition to being more circular. This deal involves shared frameworks, criteria, and commitments from different operators to promote low-carbon CE initiatives completely voluntarily. (Ympäristöministeriö, Kiertotalouden Green Deal.) This is an example of a larger ecosystem that consists of both institutional actors as well as private companies since the participating operators are not limited to be specifically a certain type of actor. The preparation of the project consisted among other things, of research institutions, municipalities and Finnish industrial companies (Ympäristöministeriö, Kiertotalouden Green Deal).

4 Methodology

4.1 Research approach

To examine the internationalization of companies, there are various research methods that can be used, which all fall into two main categories: quantitative and qualitative research methods. These categories are both difficult to compare and define since they have also a lot of variation within them. Quantitative research methods have historically been used more in business research than qualitative research methods. While quantitative approaches lean towards explanation, hypothesis testing, and statistical analysis, qualitative methods often seek interpretation and understanding. (Eriksson & Kovalainen 2008.) This research focuses to create a profound understanding of the challenges and opportunities Finnish CE companies face when internationalising to new market, which makes a qualitative approach a logical choice for this research.

When doing research, the goal is to discover new insights and eventually communicate findings to the targeted audience. However, the findings and conclusions of a research should be reliable, so that they can be trusted and used for different purposes. Reliability involves ensuring independence of research results from random factors. Because of the nature of qualitative research, it can lack objectiveness and preciseness. (Aaltio & Puusa 2011, 153.) While organizations as research subjects are conceptually sensitive and cannot be directly observed, they are studied through conceptualization. Therefore, in qualitative research, the theoretical framework of the study guides the empirical research of the subject. (Aaltio & Puusa 2011, 154.) In this research the theoretical framework formed the structure of the qualitative approach to gather empirical data.

The amount of data collected should be sufficient to reveal the theoretical framework related to the phenomenon under investigation. Saturation, where the researcher reaches a point of diminishing returns in terms of new findings from the data, is a crucial point in data collection. However, in qualitative research, it can be very challenging to determine beforehand the required amount of data. (Aaltio & Puusa 2011, 161.)

In the description of the data analysis, the researcher should aim for detail and provide justifications. A common practice is to include different quotations from the gathered data in the results of the report, allowing the reader to follow the researcher's reasoning of chain. (Aaltio & Puusa 2011, 161.) This was also be done in this research and can be found in chapter 4.3. An important factor to consider when analysing the research data of a qualitative study is that the analysis of the data should not be started after all the data is the collected because of the continual nature of a qualitative data analysis process. A continual approach involves moving between data collection and analysis to accumulate rich data and findings. (Moser & Korstjens 2018, 15.) In this study, the collection of the empirical data required many months and thus, gave an opportunity for the researcher to start data analysis while gathering more empirical information.

4.2 Data collection

As the qualitative method to gather data, this research used interviews, which is the most common way of gathering qualitative research data in Finland (Eskola & Suoranta 1998). Interviews are a in a way a very simple method to gather information about what someone thinks about something. The popularity of interviews comes mostly due to their flexible characteristic and an ability to provide deep understanding of the subject. In addition, interviews are a method that mostly give a comfortable feeling for the participants, which increases their popularity. (King 1994, 14.) Based on this information, interviews would be the most ideal method for studying the internationalization of Finnish CE companies whilst they can provide in-depth insights of the different aspects considering their internationalization to new markets.

Recently, there has also been a general shift in the characteristics of research interviews from a traditional question-answer method towards a more conversational style (Eskola & Suoranta 1998). The most important target of a research interview is to gain as much information as possible (Tuomi & Sarajärvi 2018), which could be achieved more conveniently with a more conversational style.

One factor that makes interviews a very popular method to use in qualitative research is their variability. There are many different types of interviews, which all have different purpose and objectives. Puusa (2011, 81-84) identifies 5 different types of interviews:

structured and semi-structured interviews, open interviews, theme interviews, group interviews and in-depth interviews. Theme interviews have become a very popular interview type within the field of qualitative research in Finland (Eskola & Suoranta 1998) and it was also used in this research, because they offer a possibility to profoundly understand the interviewees real thoughts of the subject through a conversational interview style.

Theme interviews hold the idea that individual experiences, beliefs, and thought structures can be studied through themes, and they emphasize the participants' lived experiences and subjective views, which makes also the researcher's understanding of the subject important. Theme interviews are less strictly structured than semi-structured interviews, they are more structured and limited than open interviews. (Eskola & Suoranta 1998). The planning of themes is a critical phase, where the themes help break down the subject into different parts. (Puusa 2011, 81.) In this research the themes were formed from the theoretical framework.

To enhance the gathering of information from an interview, it is justified and useful to give the interview questions or themes to the interviewee beforehand so that they have time to prepare their answers for the interview (Tuomi & Sarajärvi 2018). This research followed this recommendation by sending the interview themes to the interviewees at least a week before the interview took place. Ensuring a clear connection between the research questions, literature, and the gathered empirical data, the researcher operationalized the research questions into interview themes. To illustrate this process the researcher made an operationalization table (Table 4 below). Based on the operationalization table the researcher developed a pre-structured interview guide, which can be found in Appendix 1.

Table 4 Operationalization table

Research question	Sub questions	Themes	Interview themes
How can Finnish CE companies successfully internationalize their operations?	*What are the key characteristics and dynamics of international CE markets?*	CE	➢ Role of CE in the company ➢ International CE industry ➢ CE in Finland
	What are the critical factors that relate to the international growth of CE	Internationalization	➢ Current and planned operations on international markets ➢ Factors affecting the company's internationalization ➢ Most potential international markets for the company
	How can Finnish CE companies utilize ecosystems when entering new markets?	Institutions affecting CE internationalization strategies	➢ Effect of institutions (EU regulation, politics, national goals) when entering new markets
		Networks in CE internationalization	➢ Role of networks and ecosystems for the company when entering new markets ➢ Most important partners for the company and why

The operationalization table shows how the main research question as well as sub-questions lead to three large themes, which are then split into smaller interview themes. The operationalization table allowed the researcher to build an interview guide, which would serve as a tool for structuring the interviews. This was done also due to the recommendations of Tuomi and Sarajärvi (2018), who state that interview questions should also in theme interviews hold onto a certain structure to create consistency and reliability for the gathered data of the interviews.

The interviewees in this research consisted of Finnish CE companies. The Finnish CE companies to be interviewed were chosen based on Sitra's classification of 41 pioneering Finnish CE companies that have the most potential for growing and scaling their business. Sitra has categorized these companies into the five different circular economy business models identified by (Chabowski et al. 2023, 1): *circular inputs, sharing platforms. product-as-a-service. product life extension* and *resource recovery*, based on the company's main business model. To gain as comprehensive understanding as possible of the whole Finnish CE landscape, all the five different CEBMs were represented in the interviews. Sitra's classification contains also CE companies, which have most of their revenue generated from other business models than CEBMs. However, in this research interviewed CE companies have all a CEBM as their main business and source of revenue, because it creates a more precise understanding of the CE context; the more the company operates within CE principles, the more it also represents the overall field of CE. Table 5 below shows the basic information of the interviews conducted.

Table 5 Conducted interviews

Interview	Date	Duration	Person	Company's CEBM
Interview 1	24.1.2024	52min	Interviewee A	Sharing platform
Interview 2	30.1.2024	43min	Interviewee B	Product as a service
Interview 3	7.2.2024	45min	Interviewee C	Resource recovery
Interview 4	13.2.2024	57min	Interviewee D	Product life extension
Interview 5	15.3.2024	47min	Interviewee E	Circular inputs
Interview 6	22.3.2024	49min	Interviewee F	Resource recovery

For contacting potential interviewees, Hart (1991, 191) suggests the initial contact to be made three to four weeks in advance of the scheduled interview, especially if the interviews involve executives who may be frequently away from business or have a tight working schedule. Since the interviewees in this research consist mainly of top executives of Finnish CE companies, Hart's suggestion was followed when planning on contacting potential interviewees.

Determining the optimal number of interviews for high-quality and reliable data analysis can be challenging. When additional interviews do not bring new information and begin to repeat previous responses, the saturation point of the data is reached. (Tuomi & Sarajärvi 2018.) In this research, after conducting interviews with companies representing all 5 CEBMs, the researcher decided to do one extra interview with a company representing one of the CEBMs to make sure that the gathered interview content had reached the saturation point.

In contacting the interviewees, the researcher utilized the already interviewed people for Sitra's classification of the 41 most potential CE companies in Finland by searching the person's contact information from the company's website. The interviewed people worked mostly in top management positions, which was useful for this research since those roles require a broad knowledge of the company's strategy and operations, including their international operations. However, the classification of Sitra is from the summer of 2021 (Sitra 2021b), which means that some of the interviewees had already moved to other organizations. The researcher then searched for other candidates from the organizations' websites that could have the most knowledge of the company's international operations. There were also times that the interviewed company decided to have someone else do the interview than the person that was interviewed by Sitra in 2021. Besides utilizing the people interviewed by Sitra and the contact information from the company's website, the researcher utilized personal contacts that the researcher had with people working in companies of the Sitra's classification.

The interviewees were contacted by email and after arranging the time for the interview the interview themes and official permission forms were sent to the interviewees, at least a week before the interview (Appendix 3). Due to the lack of time and strict schedules of the executives of Finnish CE companies, it was not easy to arrange interviews. However, the researcher managed to conduct interviews with companies representing each of the CEBMs as well as adding one extra interview to see if the saturation point of the data had been achieved. This resulted in total of six interviews that were all conducted in January-March of 2024.

4.3 Data analysis

Data analysis is one of the most important parts of a research. Besides emphasizing the importance of interview techniques, Hart (1991, 191) highlights the importance of focusing on analysing the gathered interview data. The purpose of analysing the data is to bring clarity to the gathered content and by doing this, bringing new useful information of the subject. Traditionally the analysis of a qualitative research is in a descriptive form and usually analysing the gathered content is seen as one of the most, if not the most difficult part of the research process. (Eskola & Suoranta 1998.) While the analysis is one of the most challenging phases of a research, it creates the possibility to truly find new additional information and bring value to the studied field of subject.

The process of data analysis assumes that the researcher possesses complete interview transcripts. However, transcriptions can be challenging and time-consuming, which is something that needs to be taken into account when preparing for analysing the data. (King 1994, 25). In this research, the researcher first carefully listened through the recorder interviews and then transcribed them. The initial transcription was conducted using the transcriptions feature of Microsoft Teams, which was then reviewed and adjusted manually to ensure accuracy of the interview. After that, the researcher studied thoroughly and carefully the transcribed interview data.

Typically, qualitative analysis starts by arranging and organizing the collected data. This also means that large amounts of data will be divided into more manageable sections. (Moser & Korstjens 2018, 15-16.) In this research that would mean the categorization of data into the three different interview themes. The interview themes were also based on the research questions which then helped to connect the interview data with the already collected literature of the subject. By dividing the gathered data into themes, the content of the different interviews can be mixed together and categorized into the different themes, creating new unified entities of interview data (Eriksson & Koistinen 2005, 30). Lack of categorization and classification leads to disorder, and whilst there is no universally correct method for analysing and interpreting qualitative data, assembling data by specific cases allows to do in-depth case studies (Hart 1991, 197)

One common method in analysing empirical data is pattern finding, which means to look for certain patterns that recur in the gathered content (Eriksson & Koistinen 2005, 30). After the whole interview data was divided into the themes, it provided a basis to find similarities and differences between the interviewees, which created an organized and categorized qualitative data analysis structure as was recommended by Auerbach and Silverstein (2003, 128) This form of the interview data aligned also well with the operationalization table. This thematically structured document was utilized by the researcher to conduct analysis of the data and make observations about the similarities and differences of the answers between the interviewed CEBMs.

4.4 Evaluation of the study

The evaluation of the trustworthiness of this research follows to the guidelines outlined by Lincoln and Guba (1985). According to Lincoln and Guba (1985, 300) the four factors that determine the trustworthiness of a study are *credibility, transferability, dependability* and *confirmability.*

Credibility means that the research generates research findings that accurately represent the real-world phenomena. In other words, the research is credible in the sense that it answers to the research questions in line with reality. (Lincoln & Guba 1985, 296). This requires precision from the researcher to comprehend and interprets the data accurately.

This research is credible due to several factors: Firstly, the interviewees were competent and understood well the subject matter, which ensured that they provided insightful responses. All the interviews were conducted in Finnish, which was also the mother language of the interviewees as well as the researcher. This ensured clear communication and prevented any miscommunication that could have occurred if the interviews would have been conducted in another language.

The researcher felt that the interviewees also spoke truthfully, with anonymity enhancing their honesty. The use of recordings further promoted accuracy of the data, although it may have sometimes slightly reduced the interviewees' openness. However, the researcher felt that the interviewees answered the questions very honestly. Additionally,

the operationalization table enhanced the consistency and alignment of data collection methods, thereby strengthening the credibility of the research findings.

However, it is important to note that there are general weaknesses in qualitative interviews. Qualitative interviews are time consuming, which will inevitably limit the number of interviews that can be done within a certain timeframe. Interviews can also be tiring for both parties, which can potentially impact even the quality of data. There might also be challenges to arrange the right number of interviews due to participants' time constraints. King (1994, 33-34.) The researcher felt that especially the time constraints of the interviewees made it challenging to arrange enough interviews, which limited the amount of data that could be collected.

However, the researcher felt that the saturation point of the data collection was achieved by doing one extra interview in addition to interviewing the five CEBMs, which resulted in interviewing two companies that had resource recovery as their main CEBM. The answers of the second company were very similar to the first company that had resource recovery as their main CEBM which indicates that if there had been extra interviews also with other CEBMs the answers would be rather similar to the previous ones. This could indicate that the saturation point of the data had been achieved.

The transferability of a research is crucial for assessing the relevance and applicability of the research. (Lincoln & Guba 1985, 296.) It determines how well the findings of the research can be transferred to a broader context and utilized for other purposes (Tynjälä 1991, 390). It requires that the research subject is selected based on specific criteria, ensuring alignment with the study's objectives and potential relevance to various scenarios (Lincoln & Guba 1985, 297). In this research one of the most relevant criteria for deciding the research subject was the relevance of the topic since CE is a rapidly growing trend across the world that has still so much potential to grow that this moment will be very crucial for Finnish companies to have as much useful information about the opportunities, threats and potential new strategies for international growth.

Additionally, the research findings were compared with the existing literature and prior studies, which made it possible to connect the findings with prior knowledge. However, the fact that the study focused on the whole CE landscape made the findings more diverse

and probably less specific and accurate which may decrease the transferability but also increase it since the findings can now be utilized for a broader context than if the research subject had only focused for example on a specific CEBM.

Dependability refers to the importance of the research situation, circumstances and the objectivity of the study (Lincoln & Guba 1985, 299). The researcher felt that the research situation was objective, and the interviewees had sufficient time to answer the interview questions as well as the possibility to familiarize themselves with the interview themes well beforehand. However, the last interview theme about networks and institutions affecting the internationalization of Finnish CE companies could have naturally steered the interviews to discuss those aspects already before even before moving on to address that point in the interview. On the other hand, it is important to remember that those aspects were naturally selected as an interview theme, because they were highlighted in the literature of the internationalization of CE companies.

Confirmability of the research highlights the importance of the objectivity of the data analysis (Lincoln and Guba 1985, 300) as well as the understanding of the effect that the theoretical framework has on the gathered empirical data (Tynjälä 1991, 392). This requires the researcher to describe all the necessary steps from data collection to the interpretations of the gathered data. To ensure the confirmability of the research, the researcher carefully and transparently described how the interview data was collected and analysed, allowing another possible researcher to conduct a similar data analysis which would lead to similar findings. This enhanced the transparency of the research process and the overall objectivity of the study.

4.5 Research ethics

It is important to evaluate the ethics of a research since it gives trustworthiness and credibility to the research. Codes of ethics have become increasingly considered in studies nowadays. Bryman and Bell (2007, 73) propose that in the context of management research an ethics code has the potential to inspire fresh perspectives on the relationships. According to the European research ethics guidelines the basic principles of good scientific practice are reliability, honesty, respect, and responsibility (Tenk 17.10.2023). This study carefully follows these principles to ensure that the research is conducted in an ethical way.

The interview themes were sent to the participants beforehand, so that they had the opportunity to familiarize themselves with the research topic and prepare their answers for the interview. According to Tuomi and Sarajärvi (2018), this is an important ethical aspect to consider when conducting interviews for a study. All interviewees were also sent an official consent letter at least a week beforehand so that they had sufficient time to consider their participation in this study. At the start of each interview, the interviewees were informed and asked for a permission to record the interviews.

Artificial Intelligence (AI) was used in this research as a tool to help the researcher in translating text from his own native language (Finnish) to the language used in this study (English) and the other way around, in order to understand some phrases that the researcher was not familiar with. AI was also used to help the researcher with the writing style of the text as well as to brainstorm new ideas regarding the flow and structure of the text[1].

The study adheres to the European Union's General Data Protection Regulation (GDPR, 2016/679 EU). A register containing personal data handled during the research process is managed according to a detailed data management plan and privacy notice. These documents are made in compliance with the Data Protection Policy of the University of Turku, which aligns with the EU GDPR. The privacy notice includes all necessary information outlined in Articles 13 and 14 of the EU GDPR. In appendices 2, 3 and 4 can be found the data management plan of this study, privacy notice as well as the consent letter that was send to the participants before the interviews.

[1] Occassional use of ChatGPT for brainstorming ideas

5 Findings

The findings of this research are divided into three parts: The first part will focus on the phenomenon of CE, the second part on the internationalization of Finnish CE companies and the third part discusses how Finnish CE companies can utilize ecosystems in their internationalization. The findings made about the current situation, history, and future trends of CE both in Finland and internationally, will provide a basis and justifications for the international growth of Finnish CE companies. The findings concerning the internationalization of Finnish CE companies will give an overall outlook on the challenges and possibilities Finnish CE companies face when seeking for international growth.

5.1 The market of circular economy

5.1.1 Defining CE

> *"To maximize the utilization of everything that is produced in the world."*
> *(Interviewee A; Sharing platform)*

This is how one of the interviewees described the meaning of CE in practice, which covers the whole idea of CE very profoundly. When asked about what CE means personally, all the interviewees saw it as a very broadly affecting phenomena that can be seen in many different areas of our economy and of our everyday life. It is something that can be utilized for many purposes, but the interviewees extensively agreed that the main purpose of CE is to reduce the increasing consumption of the Earth's raw materials. Some of the interviewees saw CE as the only way for us to have a future on this planet.

All the interviewees saw the meaning of CE also as personally significant for them. CE was seen as a very broad concept that covers many smaller areas of e.g. recycling, sharing and extending the life of materials. However, each interviewee emphasized different aspects of CE. Some interviewees intuitively focused more on their personal everyday experiences and habits related to the CE, while others approached CE more broadly from a societal and business perspective. The interviewees agreed that CE is an increasing trend that will continue to grow in the future, although regulations will play an important role in determining the pace of the growth.

The interviewees emphasized the efficient utilization and reuse of resources, which reduces waste and promotes overall sustainable development. They all recognized the significance of CE in protecting the environment and promoting sustainability. Many of the interviewees highlighted the unsustainability of the traditional linear economic model, which aligns with the concerns raised in the literature regarding environmental impact, increasing consumption of finite resources, and contribution to waste generation (Dzhengiz et al. 2023, 273).

Table 6 The meaning of CE to the interviewees

Interviewed CEBM	The meaning of CE
Sharing platform	"To maximize the utilization of everything that is produced in the world."
Product as a service	"To try to give a new life to already existing things rather than by a new one"
Resource recovery	"Very important, the linear economy is unsustainable in the long run"; "I definitely see it as the only possible way forward"
Product life extension	"Through children, you see things differently and hope that they will also have a safe and healthy planet in that regard"
Circular inputs	"Already when designing products, it's important to consider their recyclability and think about the entire lifecycle"

As the interviewees were all from companies that represented different CEBMs, they naturally had different viewpoints on CE, which could be seen also in some of their answers. However, it was also recognized by the interviewees that whether the viewpoint was from the professional company perspective or from a personal perspective, it affected how the interviewees defined CE. Some of them asked if they could answer the question of "What CE means to you?" both in terms of personal life an also in terms of the perspective of the company. Some interviewees answered more naturally from a personal perspective and some more from the professional business perspective.

5.1.2 The state of CE in Finland compared to international markets

The interviewees had various opinions and views about the current state of CE in Finland and how it relates to the international development of CE. However, all the interviewees saw CE clearly as an inevitably growing trend both in Finland and globally.

The interviewees saw Finland's technologically advanced, clean country image and brand as a strength that could create competitive advantage when operating in international markets. Although, there were many aspects of the current state of CE in Finland that the interviewees agreed on, there were also specific things that each CEBM individually highlighted. A company with a sharing platform as their main CEBM emphasized the commercial part of CE as an aspect where there is still room for development in Finland but also noted that the public sector's situation regarding CE is in a relatively good shape. However, they also highlighted the weak financial and capital networks in Finland.

The weak financial and capital networks were emphasized by many other CEBMs as well and was one of the aspects that was most agreed on. On the other hand, many of the interviewees pointed out the generous financial help Finnish CE companies have been able to get from domestic institutions such as Business Finland. However, the need for financial help when internationalizing to new countries was highlighted throughout most of the interviews. This was seen as a very important factor especially within those CEBMs that required to physically move the business into new markets.

The company that had product as a service as their main CEBM saw Finland's progress of CE as somewhat slow but steady, driven by current trends and the high potential of the growing international market. However, it also acknowledged the challenges in competing against large players in European markets. This was supported by the companies with resource recovery as their main CEBM, which both underlined that the CE statistics of Finland are not even on the average level of the EU but rather significantly below them, especially when considering the national circularity rate. This was stated also in this thesis earlier with the statistics showing that the circularity rate of Finland is one of the lowest in the EU (Eurostat, Material flows and resource productivity 2023). However, they both noted a growing international momentum in CE and a lot of potential in international markets. On the other hand, the company with product life extension as their main CEBM considered Finland as one of the leaders in CE, backed with a persuasive national brand and highlighted the strong development of CE in Nordic countries.

Despite differences in focus, all CEBMs agreed on the importance of accelerating Finland's progress in CE, addressing challenges such as insufficient financial support,

regulatory barriers, and the need for stronger government guidance. They also recognized that the global momentum towards CE is growing but at the same time emphasized the importance of concrete actions and support of societal structures also in Finland to drive real change towards CE.

> *"CE in Finland is somewhat in the position of an organic food section, being somewhat on the fringe, a bit expensive, and somewhat small." (Interviewee E; Circular inputs)*

The company that had circular inputs as their main CEBM noted Finland's relatively small CE market and logistical challenges, especially due to long distances. However, those are not the only problems that the Finnish CE industry faces. The lack of discussion and attention on CE was highlighted and it has been very much dependent on the national economic cycle. When there is more money and the economy keeps growing, there is also more room to put attention on CE but when the national economy starts to weaken, the focus shifts more towards cheap production. This was seen as a factor that hinders the national development of CE. The company emphasized also the need for support towards CE from national regulation and better alignment with EU standards.

The interviewees' image of Finland as a technologically advanced, innovative country aligns well with the current statistics (Tilastokeskus 2020). However, the possibilities for really growing and expanding the business are still limited, especially in industries that typically require large initial investments, which can require a great amount of financing. In addition, it is important to recognize that regulations that are set by institutions do not only play a role in the target markets, but they also affect the market environment of the home market, which can either hinder or promote the growth of domestic companies. This also affects the possibilities for Finnish CE companies to achieve international growth. Some interviewees pointed out the regulatory environment for CE in Finland, which might not be as competitive as for example in some other European countries.

5.2 Internationalization of Finnish CE companies

Based on the interviews, the internationalization of Finnish companies is very Europe-oriented. Europe seems to be the main market area for Finnish CE companies no matter

what their main CEBM is. This phenomenon is highlighted especially in the early stages of the company's internationalization. Other Nordic countries are most of the times the first countries to enter, mainly due to their near location and advanced state of CE in the country. The advanced level of CE in Central Europe and Benelux countries has as well been an influencing factor for many CEBMs to internationalize their operations there.

Generally, the interviewees held relatively similar opinions about the challenges and opportunities Finnish CE companies face when internationalizing to new markets. One common aspect across all the CEBMs is the acknowledgment of Finland's small domestic market size and geographical isolation, which often necessitates international expansion in order to achieve growth. This was an expected acknowledgement since it also aligns with the current literature and statistics (Statista 2024). In general, the interviewed CE companies were all open-minded about aiming for international growth and understood the necessity of it in today's globalized world, especially with CE since it is a globally growing industry (United Nations, International Resource Panel 2017; World Bank 2022)

Another aspect, where CEBMs agreed very profoundly agreed on is the sustainable and innovative national brand and reputation of Finland, which is a strong asset in international markets and could give competitive advantage for Finnish CE companies. However, these strengths should be fully utilized when operating in international markets. This also requires confidence to talk about the strengths of Finnish CE companies and to highlight those abilities. This was put well into words by one of the interviewees:

> *"In Finland, there's sometimes a bit of an overly humble attitude. There's not really that kind of bragging, so there should be a bit more confidence when going to international markets" (Interviewee B; Product as a service)*

While the Finnish business environment may not be the easiest to strive for international growth and success, many of the CEBMs agreed that if a business can succeed in Finland, it is likely to perform well in international markets due to its already tested strategies and products in a rather challenging market. Challenges related to limited financial resources, regulatory disparities, and differing market dynamics were acknowledged across many CEBMs. However, many of the CEBMs noted that by leveraging networking and collaboration with key partners, these challenges can be overcome. Strategic partnerships

with support organizations, research institutions, and internationally operating companies play a vital role in navigating complex international markets and understanding diverse regulatory environments.

> *"Finland's business environment is not the easiest or optimal for CE companies to operate, which hinders the opportunities for international growth. If competitiveness were promoted in one way or another, there would indeed be much greater potential for the expansion of CE businesses in Finland." (Interviewee E; Circular inputs)*

> *"Internationally, Finland is perceived to have weak capital markets. If you're a company coming from Finland, you need to be exceptionally good to succeed internationally" (Interviewee E; Circular inputs)*

One of the interviewees stated that there could be a lot more potential for the growth of Finnish CE companies, had the business environment of Finland been more supportive, especially considering the construction regulations and barriers on utilizing for example waste in construction and industry as well as the lack of strong capital markets. Some of the interviewees also highlighted the fact that Finland is still relatively rich in raw natural resources which also makes the use of them rather cheap compared to for example the use of waste. So, as globally trending as CE is as an industry, the growth of a CE company requires to have competitive advantage over other players as in any other industry.

> *Well, another thing in Finland's CE is that we have many natural raw materials that are quite cheap so there is clean water, there is sand, there is all this wood and they all are nearby, so the cost of virgin raw material is low, which does not encourage to use waste. (Interviewee E; Circular Inputs)*

> *"In the end, the success of any company, CE or whatever, is based on the fact that you have a great product and service" (Interviewee D; Product life extension)*

Considering the target markets for Finnish CE companies to enter, many CEBMs pointed Europe as the most convenient since European countries are located nearby Finland and have more or less similar regulatory and business environment for CE, which lowers the amount of adaption that has to made when entering a new market. However, there were various opinions about, depending on the viewpoint that the company had.

> *"In European countries, and especially in Northern-European countries CE is perceived as important and it is wanted to be promoted" (Interviewee D; Product life extension)*

> *"While the most typical materials are already commercialized in Europe, and there's already a buyer known for them, there is a lot of potential outside Europe to utilize materials that are not yet commercialized. And then, at best, we can learn from Europe and skip a few steps, or we can make all these changes faster, as the progression of CE in Europe has in my opinion been rather slow and occurred on a small scale." (Interviewee F; Resource recovery)*

While most of the interviewed companies were very Europe-oriented, A company with resource recovery as their CEBM, pointed out that there are also a lot of opportunities outside Europe. The opportunities for international growth are different within Europe and outside Europe. While European countries are logistically and institutionally more convenient for Finnish CE companies to enter, the European market is already quite competitive. On the other hand, outside Europe, especially in Asia, CE is still in more early stages, which can give opportunities and first-mover advantages for Finnish CE companies. However, it is important to note that internationalizing towards some markets outside Europe may require more adaptation since the legal and cultural differences might be bigger than within Europe.

5.3 The utilization of ecosystems in the internationalization of Finnish CE companies

5.3.1 Utilizing networks and partnerships

Finnish CE companies, across various CEBMs leverage networks in internationalization with different approaches, although many CEBMs hold similar opinions and beliefs about significance of networks in terms of entering new markets. The need for partnerships in internationalization is commonly recognized already in the early stages of internationalization when planning to enter new markets.

Finnish CE companies, irrespective of their business models, often consider support services such as consultancy firms, logistics providers, and financial institutions as important operators to facilitate their internationalization. This shows a shared recognition of the need for external expertise and resources to overcome the challenges

of entering new markets, which aligns with the findings of Kuivalainen et al. (2018, 136) about the significance of support services for the internationalization of Finnish SMEs. Many of the interviewed companies pointed out that one of the most important support services for many CEBMs is the Finnish public-sector operator Business Finland. Support services were highlighted especially with companies that had sharing platform or product life extension as their main CEBM.

One of the interviewees pointed out that there are also more public-sector support services than just Business Finland that could be utilized when internationalizing to new markets:

> *"I also want to mention embassies in this context because they've been very proactive. Their message has been clear: 'Tell us specifically what you need, and we'll help.'" (Interviewee F; Resource recovery)*

Besides embassies they also mention research institutions, different EU projects as well as the global green building councils (and especially the Finnish unit) as very important partners for the company. Embassies might not be the first partner for an internationalizing company that comes to mind and most of the interviewees did not mention embassies as one of their key partners when internationalizing to new markets. Embassies were also not specifically highlighted in the literature about utilizing networks in internationalization. This was an interesting finding of the interviews and might be an aspect to consider for Finnish CE companies when seeking for international growth as well as for public institutions when considering how to increase collaboration between the public and private sector in Finland. In terms of the overall state of sustainability in Finland, this is a crucial factor to keep in mind.

Whilst institutions such as research facilities and embassies can also be seen as important partners for a CE company, it might be more useful to examine their impact at the whole ecosystem level, where institutions and partnerships both act as influential factors for the international growth of CE companies. Without considering the whole ecosystem-level, the institutional environment and the company's partnerships may easily appear as two separate elements, which may not necessarily be the case.

As mentioned earlier in the findings, access to financing was identified as a key enabler for international expansion across all CEBMs. Whether through equity funding, grants from organizations like Business Finland, or collaboration with financial partners such as banks, financing is needed for international growth. Some of the interviewees also pointed out the that the financial market has changed quite significantly in the past years, which has brought difficulties for CE companies to finance their international operations.

> *"The financial market has changed quite significantly, which has also hindered our international growth. It was particularly good in 2021 when startups were funded quite abundantly. But now it has turned completely upside down." (Interviewee A; Sharing platform)*

Comparing to the literature of the internationalization of CE companies, the importance of financing was more highlighted in the interviews, which could at least partly be explained with the fact that the interviewed companies were relatively small Finnish SMEs who probably do not have the same financial resources as some of the larger international CE companies on their own.

The interviewed companies also consistently emphasized the significance of thorough market research and strategic partner selection in their planning which markets to enter. Whether through personal networks, recommendations from other companies, or market-specific analyses, there was a shared understanding on the importance of informed decision-making to identify suitable markets and partners.

However, having international partners does not automatically mean that the partnerships and the utilization of them are successful. Some of the interviewees highlighted the importance of having reliable and competent partners, because they have had also experiences of unsuccessful partnerships. The importance of the initial phase when building of partnerships was highlighted in many interviews as well as the need for personal contact to ensure trustworthiness and quality.

> *"We have had negative experiences with partners across the board, unfortunately. We perhaps started prioritizing price in many aspects, and that may have also influenced the end result, indicating that they were not the best." (Interviewee A; Sharing platform)*

> *"If you buy materials from afar and they come in containers, you might get whatever. Remote sellers proved unreliable but visiting them in person to see the quality usually ensured that only good products were sent. So, personal contact has been crucial in ensuring quality in purchasing." (Interviewee E; Circular Inputs)*

The negative side of partnerships have not been particularly paid attention to in the academic literature, although Torkkeli et al. (2016, 223) note the importance for Finnish SMEs to focus on monitoring and controlling the network in a sense that it keeps being beneficial for the company. So, while partnerships are crucial for a CE company entering a new market, it is also very important to choose a reliable partner that truly brings value for the CE company. While a reliable and efficient partner might not be the cheapest option, it could still be much more cost-efficient in the long run since changing partners is also always an expensive process.

The interviewed CE companies had had various ways to form partnerships and to build networks. Many of the interviewees highlighted the importance of going to different kinds of networking events to find new partnerships. As Stoian et al. (2017, 142) note that networks can create more networks, also some of the interviewees pointed out that different networks can also help the companies to find new partners. One of the interviewees described how they have formed partnerships in a very concrete way:

> "By asking other smaller Finnish companies: Hey, what partnerships do you have? And how have things worked out?" (Interviewee A; Sharing platform)

Many of the interviewees also highlighted the benefits from having different kinds of platforms and communities for sharing ideas, innovations and cooperation. One of the interviewees pointed out a concrete example of a new and successful international platform:

> *"There is this material bank that has gathered products from various material suppliers into one place. Architects can visit there for free to choose materials, and they'll receive everything they need for their project within a day. Then, the material supplier gets the architect's name and the project for specification, and we pay the material bank. It's a brilliant concept and it is very beneficial for the internationalization of a small company, because we*

> *are then able to be as prominently displayed on the same shelf as our competitors." (Interviewee C: Resource recovery)*

"To be as prominently displayed on the same shelf" is something that is very crucial for particularly Finnish CE companies since they come from a relatively small and unknown market. With the increasing digitalization in today's world, CE ecosystems are more and more operated on digital platforms which could be beneficial for small companies, that do not have the same reputation and fame as some larger companies with a lot of marketing resources.

Overall, the interviewees emphasized the importance of partnerships and networks for internationalization and highlighted the importance of having a complete CE ecosystem in the target market. As a part of the CE ecosystem, customers play an important role as an enabler of the entire CE ecosystem (Zucchella et al. 2022, 1093.) This was also pointed out in the interviews.

> *"The aim is to enter markets where there is already a CE ecosystem in place" (Interviewee F; Resource recovery)*

> *"It might be difficult or even impossible to succeed by just operating from Finland. So, the local actor's capabilities, abilities, and resources have been crucial in this situation" (Interviewee E; Circular Inputs)*

> *"Our most important partners are indeed our customers. We are just a part of the chain" (Interviewee F; (Resource recovery)*

5.3.2 The effect of institutions in internationalization strategies

Among the interviewees, the effect of institutions when internationalising to new markets seemed not to be that significant as the effect of networks when entering foreign markets. However, as was stated before in the literature, institutions are an important part of the whole CE ecosystem. In fact, many of interviewees saw institutional actors more as a part of their important network and highlighted their importance, especially in the initial stages of a market entry.

The institutional environment of the EU has definitely played a role in the internationalization of Finnish CE companies as the interviewed CE companies were all

mainly operating in Europe. The EU has set many legislations and regulations that affect the whole business environment, with a focus on to harmonize market regulations and standards (European Commission, Harmonized markets). Also, many of the interviewees had the opinion that the relatively consistent legislation and standards between EU countries facilitate their international operations within the EU.

> *"Thanks to the EU, legislation is quite consistent or even similar across many different markets. However, there are various reporting obligations nonetheless." (Interviewee A; Sharing platform)*

> *"When we go outside Europe, there are new legislations that require a lot of market research and searching for partners" (Interviewee B; Product as a service)*

> *"The European Union, in a way, has this great internal market, which is convenient and fantastic, but when we go outside Europe, the legislation changes, naturally." (Interviewee D; Product life extension)*

However, not all the interviewees agreed on the statement that the legislations and regulations are consistent between EU countries. As the pace of the progress towards CE has varied significantly between the member states (European Court of Auditors, 2023), even the slightly varying legislations and regulations might give an explanation for it, since policies and regulations have been identified as key drivers for most of the large industries in the world (Ellen MacArthur Foundation, 2020).

> *So even though we're in the EU, the legislation isn't consistent, and even if we go to Germany, there may be different regulations in different states (Bundesländer). So, in terms of that, we don't have a single market, which has been a bit surprising. (Interviewee E; Circular Inputs)*

According to the interviewees, regulations set by national institutions have mostly slowed down rather than accelerated their internationalization, at least for the time being. The interviewees recognized however, that in the future the regulatory environment might be more favourable for CE companies since CE has become an important target for many countries. The regulations of CE already require different certificates from companies or allow companies to achieve these certificates by which they can prove their circularity. Many of the interviewees saw the importance of different certificates also as an affecting factor for the future.

> *“Perhaps the regulation has more often hindered than accelerated our internationalization efforts.” (Interviewee A; Sharing platform)*

> *“I don't know yet, but I think that future legislation will indeed promote it.” (Interviewee C; Resource recovery)*

> *“What we have needed to pay more attention to are various environmental certifications and other similar aspects that customers are increasingly interested in.” (Interviewee B; Product as a service)*

The impact of regulations seemed to be especially important for circular inputs business models. For example, regulations on what is and what is not considered as waste can have a very powerful impact on how circular inputs can be utilized in industrial processes. The EU’s Waste Framework Directive guides the regulatory framework of member states concerning waste management and utilization.

> *“Countries where legislation supports the CE are naturally considered not only as export markets but also as potential locations for future operations, so it has a significant importance.” (Interviewee E; Circular inputs)*

However, many of the interviews pointed out the use of partners, especially support services, to overcome institutional challenges in the target markets. Without them the companies must study all the regulations and legislations in the target by themselves, which costs time and money, although it increases the level of internal knowledge about the regulatory environment in different markets.

> *“We've had to independently go through everything, digging through all the government websites. It would be nicer if there were an international consulting firm that could directly say, 'This is how things are, do these things and everything will be fine.' Otherwise, there are always some surprises (Interviewee A; Sharing platform)*

> *"You must utilize consultants." (Interviewee D; Product life extension)*

> *“With these legislative differences there's all sorts of things that always need to be taken into account in a certain way, and then you have to consult lawyers a lot in different countries." (Interviewee B; Product as a service)*

Overall, the interviewed CE companies emphasized the importance of aligning national legislation with EU directives and promoting a supportive regulatory environment in the home market to promote international growth. Government initiatives and support from institutions like Sitra and Business Finland are crucial for creating an enabling environment for Finnish CE businesses. To overcome institutional barriers, the interviewees highlighted the use of partners that understand the regulatory and legislative environment of the target market as well as the needed adjustments that needs to be made in order to adapt with the new CE ecosystem.

6 Conclusions

6.1 Theoretical contribution

This thesis contributes to the overall academic literature about CE and offers various answers on the already recognized existing research gap of the internationalization of different CEBMs (Thornton 2024, 1). Whilst there is a research gap on the internationalization of different CEBMs, it also means that there is a gap in the knowledge of internationalizing Finnish CE companies, which leads to a situation where the potential of the Finnish CE industry cannot be fully utilized because of the lack of information and knowledge. Whilst the Finnish CE industry benefits on the new information about CE and strategies for international growth, so does also the whole the academic community around CE.

According to Makadok et al. (2018, 1530) the majority of theoretical contributions in strategic management build upon, clarify, or employ existing theories in innovative and interesting ways. So does this thesis also, as it contributes to the broader discussion around CE as well as to the existing literature about the internationalization of Finnish companies by combining these two elements in such way that it brings a completely new perspective to the academic literature.

Overall, the existing literature of both CE as well as on the internationalization of SMEs aligns well with the findings of this thesis. However, there are some additional factors that this research will contribute to the literature of CE as well as to the literature about the internationalization of CE companies. Also, it is important to note, that this research focuses on a very specific subject that is not previously studied, at least from this perspective. As the linear economy has been the leading economic model already since the beginning of industrialization (Korhonen et al. 2018, 37), it has naturally gained more attention than CE and the companies having a linear model have been thus studied more, including their internationalization. That also implies that there are not as many similar studies available for comparison with the results of this research.

The findings of this study align well with the existing literature and theories about CE ecosystems and their impact on the internationalization of CE companies. As Lacy et al.

(2020, 283) emphasize the essentiality for CE companies to avoid operating in isolation and rather collaborate within the broader ecosystem. In a CE ecosystem, these ecosystems consist of other CE companies as well as partners, government entities, non-governmental organizations, and academic institutions (Lacy et al. 2020, 283). Similar aspects were pointed out in the interviews with an addition that there are also already, and probably in the future even more, platforms that gather together different actors of a CE ecosystem in order to enhance collaboration and create more value together.

Adding to the existing literature, this study emphasizes the importance, and the impact financing has on the internationalization of Finnish CE companies. This was highlighted significantly more in the interviews made in this research than in the literature of internationalization. It could be explained by the fact that the interviewed companies were all Finnish SMEs, who need financing to grow internationally more than larger companies with already remarkable resources or companies that come from countries where the capital markets are large and strong.

This study aligns well with the literature on the role of institutions when entering new markets. However, looking at the empirical data and comparing those results with the existing literature, the effect of institutions in the home market was more highlighted than in the literature, where the focus has been more on the target markets both in general as well as in the context of CE (Chabowski et al. 2023, 16; Henrysson & Nuur 2021). The interviewees pointed out the regulatory environment of the home market, Finland, as rather challenging in some respects which may have been a hindering factor in the growth of the Finnish CE industry. Considering institutions as a factor affecting a company's internationalization, this thesis contributes to the existing literature by adding the importance of institutional environment of the home market. In addition, this study adds the factor of using support services to tackle institutional challenges faced in the target markets, which was pointed out by multiple interviewees.

6.2 Managerial implications

The managerial implications of this research will be targeted towards various stakeholders in society, particularly the Finnish society. Although Finland excels in many metrics related to technology, innovation, and the overall cleanliness of the society, its CE figures are among the weakest in Europe in several respects. (Tilastokeskus 2020).

The implications of this research will hopefully give some tools and ideas for the Finnish society as a whole to find ways to increase circularity.

The managerial implications of this research will mainly be for the management of Finnish CE companies. However, considering that in this research, institutions were recognized to have a powerful impact on the internationalization of Finnish CE companies and on the overall state of CE, the implications and recommendations of this research will be partly for the Finnish institutions that have an effect on the business environment of CE companies. The regulations and legislations set by national institutions should help the Finnish CE industry to achieve international success and not in any way work against that.

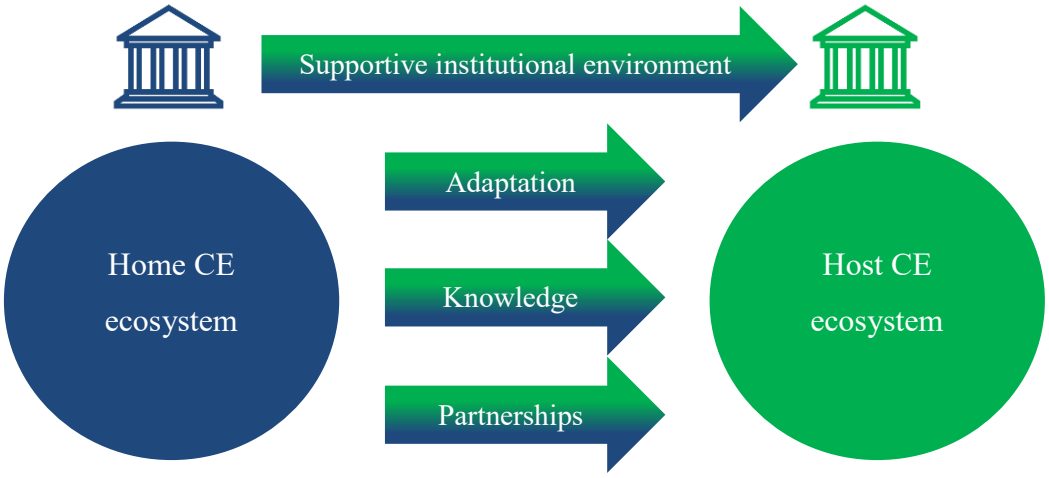

Figure 7 Illustration of the managerial implications

Figure 7 illustrates the main managerial implications this research brings for a successful internationalization of Finnish CE companies. The arrows represent the implications for different actors in the CE ecosystem. An internationalizing CE company cannot successfully enter a new market without the help of different kinds of institutions and other companies. Also, an internationalizing CE company needs to adapt its operations to match the new ecosystem, which requires knowledge of the target market as well as partnerships to facilitate the whole internationalization process. The figure represents implications on CE companies, financial institutions, national institutions as well as on all the necessary partners for an internationalizing CE company. These implications are further explained in Table 7 below:

Table 7 Managerial implications

Group	Factor	Managerial implication
Finnish CE companies	Partnerships	Focus on building high-quality partnerships that help you enter a CE ecosystem in a new market.
	Knowledge	Try to understand the different aspects of a new market as much as possible. Utilize partners for this.
	Adaptation	Align your products and processes to fit well with the CE ecosystem as well as the institutional environment of the target market.
	Boldness	Think about markets where CE has the most growth potential and boldly showcase yourself on international stages.
Financial institutions	ESG	When looking for sustainable financing, Finnish CE companies are one of the best options for that.
Public institutions	Regulations	National regulations and legislations should help the Finnish CE industry to achieve international success by promoting circularity already in the home market.
	Cooperation	Cooperation between public actors and CE companies should be tighter. Embassies and research institutions can really help the companies to achieve international success.
Industrial companies	Cooperation	Industrial companies should collaborate with Finnish CE companies, for example, in sustainable raw material procurement or utilizing them for production side streams.

Table 7 above illustrates the implications targeted on specific stakeholders in the Finnish society that contribute to the international growth of Finnish CE companies. This research aimed to find implications for Finnish CE companies that could be utilized for all the different CEBMs. However, it is important to acknowledge that all the CEBMs are different from each other and thus require different specific things that other CEBMs might not require in order to grow internationally. These implications of this study are made in a way that they can be applied regardless of the company's CEBM. All the different CEBMs need partnerships to successfully internationalize to new markets, it is very difficult to do it alone. Partnerships can create very important knowledge for a CE

company, which can bring competitive advantage in the international markets. And to fully be able to utilize the target market's CE ecosystem the company needs to adapt its operations to the business environment of the target market. The international competition is fierce, so it is important to have the confidence to be brave, and to avoid being overshadowed by others.

6.3 Limitations and suggestions for future research

Despite the theoretical and managerial conclusions drawn from this study, it is important to acknowledge certain limitations that gives research gaps and possibilities for future researchers to fulfil them. Firstly, the subject of this research was very specific, which meant that there was not really similar research to compare the findings with. There are a lot of general theories about the internationalization of companies but as every industry and market is very different and unique, the results can vary quite significantly between the studies.

CE is a very broad concept that consists of many different business models, which makes it challenging to find the similarities between all the business models. In this research, all the different business models of CE had to be considered since the perspective was very specifically from the Finnish market, which limited the amount of data that could be gathered from literature as well as from the interviews. Future research could focus more specifically on specific CEBMs and find more precise and accurate solutions for their internationalization efforts. Also, as this research was a qualitative study, there are always certain limitations due to the subjective nature of interviews as well as the fact that when data is not in a quantitative form, it is always more difficult to analyse it objectively and precisely.

As CE ecosystems were identified as very important factors for the international success of CE companies, future research could focus also more specifically on the ecosystems themselves. The power of cooperation is so significant that it would be very important for CE companies to be able to fully utilize them. Academic studies could help the utilization of ecosystems by bringing more knowledge and information to the table. Especially the aspect on how every different CEBM could utilize ecosystems would be a very important subject to study.

This research was done mainly from the perspective of Finnish CE companies. However, future research could focus more on the whole society level of CE in Finland. The findings made from the empirical data suggest that there are quite many different areas in the Finnish society that does not fully optimize the possibilities for the Finnish CE industry to grow internationally. The findings from the empirical data of this research create an interesting research gap for the future on how the Finnish society can create the ideal conditions for CE to really succeed in Finland. Future research done from this perspective need to consider many different stakeholders related to CE in Finland, including companies, investors, public institutions etc.

In conclusion, this research suggests that future research focuses on three main areas that are illustrated in Figure 8 below.

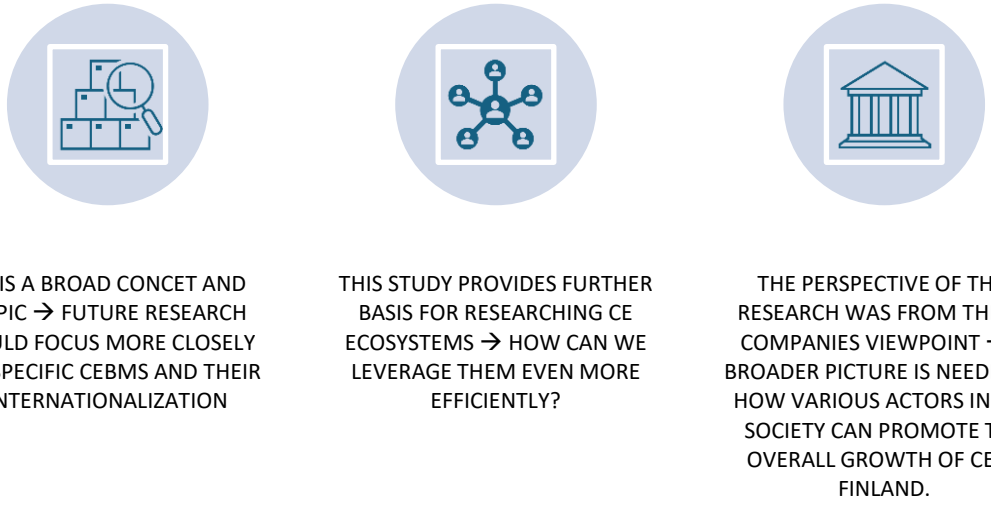

Figure 8 Suggestions for future research

With the business models of CE being more or less different from each other, it is impossible to make implications that suit them all perfectly. If the future research would focus more on the internationalization of specific CEBMs, more precise implications could be made. Whilst this this study focused on the utilization of ecosystems in the internationalization of CE companies, future research could focus more on the CE ecosystems itself and how they can be developed in a way that CE businesses can grow globally. When we understand more about all the different factors of a CE ecosystem and how they can work together most efficiently, CE companies have also better possibilities to fully utilize them. Lastly, for future research this study suggests that if the Finnish CE

industry wants to achieve significant international growth, we need a broader picture of CE in Finland; how can all the different stakeholders promote circularity in our society?

7 Summary

As the Earth's carrying capacity and resources continue to decrease, the linear economic model is coming to its end. CE, where materials are kept in circulation much longer and waste generation is minimized, offers a sustainable alternative to the traditional linear economy. With CE, at its best, it is possible to achieve the decoupling of economic growth from excessive use of natural resources. CE has grown significantly in recent years, especially in the EU area. There is a very significant growth potential in CE as it continues to grow and replace the traditional linear economy worldwide.

As Finland is a small country with a small domestic market, the key to significant growth can only found in international markets. Finland has traditionally been a technologically advanced country where new innovations emerge rapidly. However, statistically, Finland's CE figures are not even at the level of the EU average. But, looking beyond statistics there is a significant amount of potential for the international success of the Finnish CE industry. The purpose and goal of this study is to understand the opportunities for Finnish CE companies to grow internationally and to provide possible solutions for both Finnish CE companies and to other stakeholders operating in the CE ecosystem to increase the growth of the whole Finnish CE industry in international markets.

Existing literature on CE has largely focused on various CEBMs and CE ecosystems. The role and significance of CE ecosystems becomes particularly important when viewed from the perspective of an internationalizing company. Successful internationalization emphasizes the utilization of networks and the significance of the institutional environment. Both of these factors are also highly emphasized in the success of CE ecosystems. This research aims to find ways for Finnish CE companies to utilize these ecosystems in their internationalization efforts.

The empirical findings of the study were collected by interviewing Finnish CE companies, each representing a specific CEBM. Interviews were conducted to ensure representation of all different CEBMs to provide a comprehensive picture of the Finnish CE industry as a whole. The interviews were conducted as theme interviews, with themes

formed according to the research questions and theoretical framework. The interviews were transcribed carefully, and the interview material was analysed thematically.

The empirical results of the study confirmed several observations from the literature, such as the significance of ecosystems in the internationalization of CE companies, and especially the importance of partners and funding when entering new markets. However, the significance of funding was much more emphasized in the empirical data of the study compared to the literature, as was the variability in how successfully CE companies were able to utilize partners. The interviews also emphasized the importance of the home CE ecosystem more than the literature; Finland's business environment significantly influences the opportunities for international growth that Finnish companies can achieve.

This research managed to bring concrete managerial implications regarding different stakeholders of the CE ecosystem in Finland, mainly for the Finnish CE companies. This study also contributed to academic literature of CE by increasing the knowledge of the characteristics of CE companies' internationalization, especially from the Finnish perspective. Most importantly, this study contributes to the internationalization of Finnish CE companies by increasing the knowledge of the different challenges and opportunities Finnish CE companies face in the international markets and eventually offer implications that could potentially accelerate the internationalization of the Finnish CE industry.

References

Aaltio, I., & Puusa, A. (2011). Laadullisen tutkimuksen luotettavuus. Teoksessa Puusa, A. & Juuti, P. (toim.) 2011. Menetelmäviidakon raivaajat. Perusteita laadullisen tutkimuslähestymistavan valintaan, 153–166.

Aarikka-Stenroos, L., Chiaroni, D., Kaipainen, J., & Urbinati, A. (2022). Companies' circular business models enabled by supply chain collaborations: An empirical-based framework, synthesis, and research agenda. *Industrial Marketing Management*, 105, 322–339.

Aarikka-Stenroos, L., Ritala, P., & Thomas, L. D. (2021). Circular economy ecosystems: A typology, definitions, and implications. *Research handbook of sustainability agency*, 260-276.

Auerbach, C. F., & Silverstein, L. B. (2003). *Qualitative data an introduction to coding and analysis.* New York: New York University Press.

Axelsson, B. (2016). Network research - future issues. In Industrial Networks: A New View of Reality (pp. 237–251).

Bai, W., Johanson, M., Oliveira, L., Ratajczak-Mrozek, M., & Francioni, B. (2022). Where business networks and institutions meet: Internationalization decision-making under uncertainty. *Journal of International Management*, 28(1), 100904-

Bell, E., & Bryman, A. (2007). The Ethics of Management Research: An Exploratory Content Analysis. *British Journal of Management*, 18(1), 63–77

Bohnsack, R., Ciulli, F., & Kolk, A. (2021). The role of business models in firm internationalization: An exploration of European electricity firms in the context of the energy transition. *Journal of International Business Studies*, 52(5), 824–852

Business models for the circular economy: opportunities and challenges for policy. (2019). Paris, France: OECD Publishing.

Centobelli, P., Cerchione, R., Chiaroni, D., Del Vecchio, P., & Urbinati, A. (2020). Designing business models in circular economy: A systematic literature review and research agenda. *Business Strategy and the Environment*, 29(4), 1734–1749.

Chabowski, B. R., Gabrielsson, P., Hult, G. T. M., & Morgeson, F. V. (2023). Sustainable international business model innovations for a globalizing circular economy: a review and synthesis, integrative framework, and opportunities for future research. *Journal of International Business Studies*.

Costa, E., Lucas Soares, A., & Pinho de Sousa, J. (2017). Institutional networks for supporting the internationalisation of SMEs: the case of industrial business associations. *The Journal of Business & Industrial Marketing*, 32(8), 1182–1202.

Dzhengiz, T., Miller, E. M., Ovaska, J., & Patala, S. (2023). Unpacking the circular economy: A problematizing review. *International Journal of Management Reviews* : IJMR, 25(2), 270–296. https://doi.org/10.1111/ijmr.12329

Elia, V., Gnoni, M. G., & Tornese, F. (2017). Measuring circular economy strategies through index methods: A critical analysis. *Journal of Cleaner Production*, 142, 2741–2751.

Ellen MacArthur Foundation (2019) Circular economy systems diagram https://ellenmacarthurfoundation.org/circular-economy-diagram, retrieved 12.10.2023.

Ellen MacArthur Foundation (2023) A UN treaty to end plastic pollution https://www.ellenmacarthurfoundation.org/a-un-treaty-to-end-plastic-pollution, retrieved 17.10.2023.

Ellen MacArthur Foundation, Financing the circular economy: Capturing the opportunity (2020).

Ellen MacArthur Foundation, what is the linear economy? https://ellenmacarthurfoundation.org/what-is-the-linear-economy, retrieved 6.10.2023.

Eriksson, P., & Kovalainen, A. (2008). *Qualitative Methods in Business Research (1st ed., pp. xii–xii). London: SAGE Publications*.

Eskola, J., & Suoranta, J. (1998). *Johdatus laadulliseen tutkimukseen*. Tampere: Vastapaino.

Esposito, M., Tse, T., & Soufani, K. (2018). Introducing a Circular Economy: New Thinking with New Managerial and Policy Implications. *California Management Review*, 60(3), 5–19.

Euroopan Court of Auditors (2023) <https://www.eca.europa.eu/fi/publications/sr-2023-17>, retrieved 29.1.2023.

European Commission (2020) Circular Economy Action Plan https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2020:98:FIN, retrieved 19.1.2024.

European Commission, Directorate-General for Research and Innovation, Hollanders, H. (2023). European Innovation Scoreboard 2023, Publications Office of the European Union

European Commission, Waste Framework Directive (2023) https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en, retrieved 19.3.2024.

European Investment Bank (2023) What is the linear economy? https://www.eib.org/en/stories/linear-economy-recycling, retrieved 4.10.2023.

European Parliament (2023) Circular economy: definition, importance and benefits https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits, retrieved 16.9.2023.

Eurostat, Material flow and resource productivity (2023) https://ec.europa.eu/eurostat/web/environment/information-data/material-flows-resource-productivity, retrieved 29.1.2023.

Fallahi, S., Mellquist, A.-C., Mogren, O., Listo Zec, E., Algurén, P., & Hallquist, L. (2023). Financing solutions for circular business models: Exploring the role of business ecosystems and artificial intelligence. *Business Strategy and the Environment*, 32(6), 3233–3248

Fernandes, C., Veiga, P. M., & Gerschewski, S. (2023). SME internationalisation: past, present and future trends. *Journal of Organizational Change Management*, 36(1), 144–161

Ferreira, J. J. M., Fernandes, C. I., & Mota Veiga, P. (2023). The role of entrepreneurial ecosystems in the SME internationalization. *Journal of Business Research*, 157, 113603-

Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768

Goyal, S., Esposito, M., & Kapoor, A. (2018). Circular economy business models in developing economies: Lessons from India on reduce, recycle, and reuse paradigms. *Thunderbird International Business Review*, 60(5), 729–740.

Guo, J., Li, C. Z., & Wei, C. (2021). Decoupling economic and energy growth: Aspiration or reality? *Environmental Research Letters*, 16(4), 44017-. https://doi.org/10.1088/1748-9326/abe432

Hart S. J. (1991) A first-time user's guide to the collection and analysis of interview data from senior managers. In: The Management Research Handbook, Eds. Smith, N. L. – Dainty, P. Routledge, London

Henrysson, M., & Nuur, C. (2021). The Role of Institutions in Creating Circular Economy Pathways for Regional Development. *The Journal of Environment & Development*, 30(2), 149–171

Hopkinson, P., Zils, M., Hawkins, P., & Roper, S. (2018). Managing a Complex Global Circular Economy Business Model: Opportunities and Challenges. *California Management Review*, 60(3), 71–94

Kanda, W., Geissdoerfer, M., & Hjelm, O. (2021). From circular business models to circular business ecosystems. *Business Strategy and the Environment*, 30(6), 2814–2829.

Kauppalehti 17.9.2023: ”Kiertotalouden kuningatar” hurmasi Helsingissä: ”Tämä on suurin mahdollisuus meidän elinaikanamme” https://www.kauppalehti.fi/uutiset/kiertotalouden-kuningatar-hurmasi-helsingissa-tama-on-suurin-mahdollisuus-meidan-elinaikanamme/6ba9ecda-591a-40fa-95ab-426408cd9947, retrieved 27.9.2023.

King, N. (1994). The qualitative research interview. In C. Cassell & G. Symon (Eds.), Qualitative methods in organizational research: A practical guide (pp. 14–36). Sage Publications, Inc

Korhonen, J., Honkasalo, A., & Seppälä, J. (2018). Circular Economy: The Concept and its Limitations. *Ecological Economics*, 143, 37–46

Kuivalainen, O. – Lindqvist, J. – Ruokonen, M. – Saarenketo, S. (2018). The Role of Support Services During the Internationalisation of Finnish Software SMEs. In Key Success Factors of SME Internationalisation: A Cross-Country Perspective (Vol. 34, pp. 121–143).

Lacy, P., Long, J., & Spindler, W. (2020). The Circular Economy Handbook: Realizing the Circular Advantage (1st ed. 2020.). London: Palgrave Macmillan UK.

Levänen, J., Lyytinen, T., & Gatica, S. (2018). Modelling the Interplay Between Institutions and Circular Economy Business Models: A Case Study of Battery Recycling in Finland and Chile. *Ecological Economics*, 154, 373–382

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, Calif: Sage.

Lüdeke-Freund, F., Gold, S., & Bocken, N. M. (2019). A review and typology of circular economy business model patterns. *Journal of Industrial Ecology*, 23(1), 36-61.

Magni, D., Chierici, R., Fait, M., & Lefebvre, K. (2022). A network model approach to enhance knowledge sharing for internationalization readiness of SMEs. *International Marketing Review*, 39(3), 626–652

Makadok, R., Burton, R., & Barney, J. (2018). A practical guide for making theory contributions in strategic management. *Strategic Management Journal*, 39(6), 1530–1545

Mattsson, L.-G. – Johanson, J. (2013). Internationalisation in Industrial Systems — A Network Approach. In Strategies in Global Competition : Selected Papers from the Prince Bertil Symposium at the Institute of International Business, Stockholm School of Economics (pp. 287–314).

Moser, A., & Korstjens, I. (2018). Series: Practical guidance to qualitative research. Part 3: Sampling, data collection and analysis. *The European Journal of General Practice*, 24(1), 9–18

Oparaocha, G. O. (2015). SMEs and international entrepreneurship: An institutional network perspective. *International Business Review*, 24(5), 861–873.

Pieroni, M. P., McAloone, T. C., & Pigosso, D. C. (2019). Business model innovation for circular economy and sustainability: A review of approaches. *Journal Of Cleaner Production*, 215, 198-216.

Prokop, V. (Ed.). (2022). Business Models for the Circular Economy A European Perspective (1st ed. 2022.). Cham: Springer International Publishing

Sillanpaa, M., & Ncibi, C. (2019). Circular Economy - Case Studies about the Transition from the Linear Economy (1st ed.). San Diego: Elsevier.

Sitra (2018) Mitä nämä käsitteet tarkoittavat? https://www.sitra.fi/artikkelit/mita-nama-kasitteet-tarkoittavat/, retrieved 7.10.2023

Sitra (2021a) Luonnonvarojen käytön irtikytkentä talouskasvusta – onko se mahdollista? https://www.sitra.fi/artikkelit/luonnonvarojen-kayton-irtikytkenta-talouskasvusta-onko-se-mahdollista/, retrieved 3.10.2023.

Sitra (2021b) <https://www.sitra.fi/artikkelit/tassa-ne-ovat-41-kiinnostavaa-kiertotalousyritysta-suomesta/>, retrieved 21.10.2023.

Sitra (2022a) Kestävää kasvua kiertotalouden liiketoimintamalleista https://www.sitra.fi/julkaisut/kestavaa-kasvua-kiertotalouden-liiketoimintamalleista/, retrieved 12.10.2023.

Sitra (2022b) 10 kiertotalousehdotusta Suomelle https://www.sitra.fi/julkaisut/10-kiertotalousehdotusta-suomelle/#johdanto, retrieved 27.9.2023.

Sitra (2024) Kilpailukykyä datasta -käsikirja https://www.sitra.fi/julkaisut/kilpailukykya-datasta-kasikirja/#esipuhe, retrieved 16.2.2024.

Sitra, Kiertotalous https://www.sitra.fi/aiheet/kiertotalous/#mista-on-kyse, retrieved 7.1.2024.

Smith, R. (2019). An ecosocialist path to limiting global temperature rise to 1.5 C. In J. Morgan (Ed.), Economics and the ecosystem. World Economic Association Books.

Statista (2024) https://www.statista.com/topics/6910/key-economic-indicators-in-finland/#topicOverview, retrieved 31.3.2024.

Stoian, M., Rialp, J., & Dimitratos, P. (2017). SME Networks and International Performance: Unveiling the Significance of Foreign Market Entry Mode. *Journal of Small Business Management*, 55(1), 128–148.

Suchek, N., Fernandes, C. I., Kraus, S., Filser, M., & Sjögrén, H. (2021). Innovation and the circular economy: A systematic literature review. *Business Strategy and the Environment*, 30(8), 3686–3702

Tenk 17.10.2023 https://tenk.fi/fi/hyva-tieteellinen-kaytanto-htk, retrieved 1.4.2024.

Thornton, H. C. (2024). Business model change and internationalization in the sharing economy. *Journal of Business Research*, 170, 114250-.

Tilastokeskus (2022) https://www.stat.fi/tup/kiertotalous/kiertotalousliiketoiminnan-indikaattorit_en.html, retrieved 16.10.2023.

Tonelli, M., & Cristoni, N. (2019). Strategic Management and the Circular Economy (1st ed.). Milton: Routledge

Torkkeli, L., Kuivalainen, O., Saarenketo, S., & Puumalainen, K. (2019). Institutional environment and network competence in successful SME internationalisation. International Marketing Review, 36(1), 31–55.

Torkkeli, L., Kuivalainen, O., Saarenketo, S., & Puumalainen, K. (2016). Network competence in Finnish SMEs: implications for growth. *Baltic Journal of Management*, 11(2), 207–230

Tuomi, J., & Sarajärvi, A. (2018). Laadullinen tutkimus ja sisällönanalyysi (Uudistettu laitos.). Helsinki: Kustannusosakeyhtiö Tammi.

Tynjälä, P. (1991). Kvalitatiivisten Tutkimusmenetelmien Luotettavuudesta. *Suomen Kasvatustieteellinen Aikakauskirja Kasvatus*, 22, 387–398.

Työ ja elinkeinoministeriö (2022) Kiertotalouden digitalisaatio ja ekosysteemit: Nykytila, tavoitearkkitehtuuri ja toimenpiteet

Ulkoministeriö (2019) Kiertotalous on vakiinnuttanut paikkansa Alankomaiden taloudessa https://um.fi/edustustojen-raportit/-/asset_publisher/W41AhLdTjdag/content/kiertotalous-on-vakiinnuttanut-paikkansa-alankomaiden-taloudessa/384951, retrieved 20.9.2023.

United Nations (2022) https://www.unep.org/news-and-stories/press-release/historic-day-campaign-beat-plastic-pollution-nations-commit-develop, retrieved 17.10.2023.

United Nations Environment Programme, & International Resource Panel (2011). Decoupling Natural Resource Use and Environmental Impacts from Economic Growth. https://wedocs.unep.org/20.500.11822/9816.

United Nations, International Resource Panel (2017) https://www.resourcepanel.org/reports/assessing-global-resource-use, retrieved 3.10.2023.

Wang, Q., Zhang, F., Li, R., & Li, L. (2022). The impact of renewable energy on decoupling economic growth from ecological footprint – An empirical analysis of 166 countries. *Journal of Cleaner Production*, 354, 131706-

World Bank (2022) Squaring the Circle: Policies from Europe's Circular Economy Transition https://www.worldbank.org/en/region/eca/publication/squaring-circle-europe-circular-economy-transition, retrieved 7.10.2023.

Ympäristöministeriö, Kiertotalouden green deal https://ym.fi/kiertotalouden-green-deal, retrieved 23.3.2024.

Zain, M. – Ng, S. I. (2006). The impacts of network relationships on SMEs' internationalization process. *Thunderbird International Business Review*, 48(2), 183–205

Zucchella, A., Previtali, P., & Strange, R. (2022). Proactive and reactive views in the transition towards circular business models. A grounded study in the plastic packaging industry. *International Entrepreneurship and Management Journal*, 18(3), 1073–1102

Appendices

Appendix 1 Interview guide

Taustatiedot

- Rooli yrityksessä, Oletko mukana tekemässä päätöksiä kansainvälistymiseen liittyen?
- Työkokemus kiertotalouden parissa
- Työkokemus yrityksessä

Teema 1: Kiertotalous

- Mitä kiertotalous sinulle tarkoittaa käytännössä? Esimerkkejä
- Kiertotalouden markkina Suomessa
    - Millaisena näette kiertotalouden markkinan Suomessa? Historiallinen kehitys, nykytilanne, tulevaisuus ja niiden vaikutukset yritykseen
- Kiertotalouden markkina kansainvälisesti
    - Millaisena näette kiertotalouden markkinan kansainvälisesti? Historiallinen kehitys, nykytilanne, tulevaisuus ja niiden vaikutukset yritykseen

Teema 2: Kansainvälistyminen

- Kansainvälistymisen haasteet suomalaisille kiertotalousyrityksille
    - Miten näette suomalaisen kiertotalouskentän kansainvälisen kasvun mahdollisuudet?
    - Miten näette suomalaisen kiertotalouskentän kansainvälisen kasvun haasteet?
- Operatiivinen toiminta kansainvälisillä markkinoilla ja tulevat kansainvälistymisaikeet
    - Millä markkinoilla toimitte nyt

        - Millä perustein nämä ovat valikoituneet?
    - Tulevat kansainvälistymisaikeet ja niihin vaikuttavat tekijät
        - Mille markkinoille?
        - Perustelut
    - Oletteko aikaisemmin toimineet joillain markkinoilla ja sittemmin vetäytyneet niiltä (ja miksi)?
- Kansainvälistymiseen vaikuttavat ulkoiset ja sisäiset tekijät
    - Yleisesti sekä positiiviset ajurit että hidasteet yrityksenne kansainvälistymiselle
        - Esimerkit näihin

Teema 3: Verkostojen ja instituutioiden vaikutus kansainvälistymiseen (kiertotalousekosysteemit)

- Kirjallisuudesta nousseet tärkeät tekijät kiertotalousyritysten onnistuneeseen kansainvälistymiseen. Verkostot ja instituutiot ovat nousseet esiin kirjallisuudesta erityisen tärkeinä tekijöinä kiertotalouden parissa toimivien yhtiöiden kansainvälistymiselle.
- Instituutioiden vaikutus (EU regulaatio, politiikka, kansalliset tavoitteet)
    - Minkä verran institutionaaliset tekijät ovat vaikuttaneet kansainvälistymisaikeisiinne?
    - Onko esimerkiksi tiettyjen markkinoiden regulaatio edistänyt tai hidastanut sinne kansainvälistymistä?
    - Esimerkkejä
    - Millaisena näette instituutioiden merkityksen tulevaisuuden kansainvälistymissuunnitelmiinne?
- Kotimaisten ja kansainvälisten verkostojen rooli

- Yrityksenne tärkeimmät kumppanit onnistuneen kansainvälistymisen kannalta ja miksi?
- Miten näitä kumppanuuksia on muodostettu?
- Millainen vaikutus näillä on ollut kansainvälistymissuunnitelmiinne? Esimerkkejä
- Onko kumppaneista ollut negatiivisia kokemuksia?
- Mitä muita toimijoita nimeäisitte merkittäviksi kansainvälistymisenne kannalta (sekä suomalaisia, että ulkomaalaisia)

Appendix 2 Data management plan

Research data

Research data type	**Contains personal details/information***	**I will gather/produce the data myself**	**Someone else has gathered/produced the data**	**Other notes**
Data type 1: *Interviews*	x	x		
Data type 2: *Transcriptions*	x	x		
Data type 3: *Notes*	x	x		
Data type 4: *Transcriptions*	x			

* Personal details/information are all information based on which a person can be identified directly or indirectly, for example by connecting a specific piece of data to another, which makes identification possible. For more information about what data is considered personal go to the Office of the Finnish Data Protection Ombudsman's website

Processing personal data in research.

I will prepare an official permission form and give it to the research participants before collecting data ☒

The controller** for the personal details is the student themself ☒ the university ☐

My data does not contain any personal data ☐

** More information at the university's intranet page, Data Protection Guideline for Thesis Research

Permissions and rights related to the use of data

Data type 1: Interviews

- The interviews are recorded for analysis, and I will do personal notes during the interviews.
- The collected data will be used for research purposes only.

Data type 2: Recordings

- Recordings are stored on the researcher's personal computer during the research.
- The collected data will be used for research purposes only.

Data type 3: Notes

- Notes are kept on the researcher's personal computer during the research.
- The collected data will be used for research purposes only.

Data type 4: Transcriptions

- The transcribed results do not contain personal information about the interviewee or identifiable information about the organization.
- The transcribed results will be kept on the researcher's personal computer until the thesis is completed and evaluated.
- The collected data will be used for research purposes only.

Storing the data during the research process

In the university's network drive ☐
In the university provided Seafile Cloud Service ☐
Other location, please specify: ☒

Other location: Researcher's personal computer. I will record the interviews on the Teams platform on my personal computer.

Documenting the data and metadata

To document the data, I will use:

A field/research journal ☐

A separate document where I will record the main points of the data, such as changes made, phases of analysis, and significance of variables ☒

A readme file linked to the data that describes the main points of the data ☐

Other, please specify: ☐

Data arrangement and integrity

I will keep the original data files separate from the data I am using in the research process, so that I can always revert back to the original, if need be. ☒

Version control: I will plan before starting the research how I will name the different data versions and I will adhere to the plan consistently. ☐

I recognise the life span of the data from the beginning of the research and am already prepared for situations, where the data can alter unnoticed, for example while recording, transcribing, downloading, or in data conversions from one file format to another, etc. ☐

Metadata

Metadata is a description of you research data. Based on metadata someone unfamiliar with your data will understand what it consists of. Metadata should include, among others, the file name, location, file size, and information about the producer of the data. Will you require metadata?

I will save my data into an archive or a repository that will take care of the metadata for me. ☐

I will have to create the metadata myself, because the archive/repository where I am uploading the data requires it. ☐

I will not store my data into a public archive/repository, and therefore I will not need to create any metadata. ☒

Data after completing the research

I will store all data until the thesis is completed, approved, and assessed. Data will be stored on the researcher’s personal computer until destroyed.

Appendix 3 Privacy notice

(The model includes the information required under the Articles 13 and 14 of the EU GDPR):

1. Name of the register:
Internationalization of Finnish CE companies – views from the company representatives

2. Data Controller:
Teemu Maste, 0445336696, tmmast@utu.fi
Turku School of Economics, Department of Marketing and International Business,

Rehtorinpellonkatu 3, 20500 Turku

3. Contact information of the responsible person:
Teemu Maste, 0445336696, tmmast@utu.fi

5. **Purpose and legal basis for the processing of personal data:**
The research collects experts' views and experiences on factors affecting the internationalization of Finnish CE companies. Email addresses are used when sending out invitations to interviews. The interviews involve collecting information on experts' experiences and views on e.g., CE internationally and in Finland, characteristics of the internationalization of CE companies as well as the role of institutions and networks.

The legal basis for processing personal data in the Article 6 of the EU General Data Protection Regulation is:

X Processing is necessary for scientific research (public interest, Point 1a of the Article 6)

☐ Data subject has given their consent to processing personal data (consent, Point 1e of the Article 6)

☐ Other, what_____

6. Processed personal data:
The following information of the data subjects is stored in the register:
Name, email address, profession, title, organization.

7. Recipients and recipient groups of personal data:
The data will not be transferred or disclosed to parties outside the research group.

8. Information on transferring data to third countries:
Personal data will not be disclosed to parties outside the EU or the European Economic Area.

9. Retention period of personal data or criteria for its determination:
The recorded interviews will be transcribed into text files and the recordings will be destroyed. Simultaneously, the research data will be anonymised by erasing identifiable

personal data. Personal data is stored until the thesis is completed, approved, and assessed, after which the data is disposed of securely.

10. Rights of the data subject:
The data subject has the right to access their personal data retained by the the Data Controller, the right to rectification or erasure of data, and the right to restrict or object the processing of data. The right to erasure is not applied in scientific or historic research purposes in so far as the right to erasure is likely to render impossible or seriously impair the achievement of the objectives of that processing.

The realisation of the right to erasure is assessed on a case-by-case basis.

The data subject has the right to lodge a complaint with the supervisory authority.

11. Information on the source of personal data:
In order to send the invitations to the interview, email addresses or the possibility of forwarding a message are requested from the universities. The other data is collected directly from those who participate in the interviews for the study.

12. Information on the existence of automatic decision-making, including profiling:
The data will not be used for automatic decision-making or profiling.

Appendix 4 Consent letter

Tutkimus suomalaisten kiertotalousyhtiöiden kansainvälistymisestä uusille markkinoille muodostaa Turun yliopiston kauppakorkeakoulun opiskelijan Teemu Maste pro gradu -opinnäytetutkimuksen. Tähän liittyen Teemu Maste suorittaa haastatteluja, joilla pyritään selvittämään pääasialliset haasteet ja mahdollisuudet suomalaisten kiertotalousyhtiöiden kansainvälistymiseen liittyen. Tämä tieto on tärkeää koska se antaa konkreettisen käytännön näkökulman tukemaan teoriapohjaa suomalaisten kiertotalousyhtiöiden kansainvälistymisestä.

Haastattelututkimus toteutetaan keväällä vuonna 2024 ja mukaan kutsutaan noin 5–10 osallistujaa. Haastattelu kestää noin 45-60min ja se nauhoitetaan haastateltavan luvalla. Haastatteluun osallistuminen on täysin vapaaehtoista ja tutkimuksesta voi halutessaan vetäytyä ja osallistumisen peruuttaa kesken tutkimusprosessin, ilman että siihen tarvitsee kertoa syytä. Kieltäytymisestä tai vetäytymisestä kesken tutkimusprosessia ei aiheudu haittaa, ja jo mahdollisesti kerätty aineisto tuhotaan viikon kuluessa.

Yksittäisiä henkilöitä ei mainita tunnistettavasti tutkimusraporteissa. Tutkimuksen suorittaja käsittelee tietoja luottamuksellisesti ja käyttää peitenimiä, joten yksittäiset henkilöt tai yritykset eivät ole identifioitavissa. Koodiavain nimitietoihin on tutkimuksen suorittajan hallussa. Haastatteluaineisto tallennetaan pseudonymisoituna (peitenimiä käyttäen) Turun yliopiston verkkotietokantaan, jonne on pääsy ainoastaan tutkimuksen suorittajalla. Hän sitoutuu siihen, ettei luottamuksellista, henkilökohtaista tietoa saateta ulkopuolisten tietoon. Opiskelija tuhoaa pseudonymisoidun (ei yksilöitävissä olevan), litteroidun haastatteluaineiston, kun pro gradu -tutkielma on arvosteltu.

Aineistosta saatuja tuloksia hyödynnetään etsittäessä mahdollisuuksia ja keinoja suomalaisen kiertotalouden kansainvälisen kasvun edistämiseen. Lisäksi tutkimustuloksista julkaistaan pro gradu -tutkielma. Mikäli aineistoa käytetään tieteellisiin julkaisuihin tätä laajemmin, pyydetään siihen erikseen lupa haastatelluilta. Tutkimuksen riskinä osallistujat voivat kokea henkilökohtaisen tiedon jakamisen tutkijoille. Korostan, että osallistujien turvallisuus, identiteetti, yksityisyys, terveys ja hyvinvointi huomioidaan ja suojataan tutkimuksen kaikissa vaiheissa ja että tutkija sitoutuu noudattamaan hyviä tieteellisiä käytäntöjä (Ihmistieteiden eettisen ennakkoarvioinnin ohje | Tutkimuseettinen neuvottelukunta (tenk.fi)) ja laadukasta tutkimusetiikkaa.

Teemu Maste (tutkimuksen suorittaja)

KTK, kansainvälinen liiketoiminta

Turun yliopiston kauppakorkeakoulu

tmmast@utu.fi / 0445336696

Lisätietoja Turun yliopiston tietosuojasta: tietosuoja@utu.fi. Minua on pyydetty osallistumaan **suomalaisten kiertotalousyhtiöiden kansainvälistyminen**–tutkimuksen haastatteluun. Olen perehtynyt edellä olevaan selvitykseen ja saanut riittävästi tietoa tutkimuksesta ja sen yhteydessä suoritettavasta tietojen keräämisestä, käsittelystä ja tallentamisesta. Tutkimuksen sisältö on kerrottu minulle myös suullisesti ja olen saanut riittävän vastauksen kaikkiin tutkimusta koskeviin kysymyksiini. Selvityksen antoi _____. Minulla on ollut riittävästi aikaa harkita tutkimukseen osallistumista.

Ymmärrän, että tähän tutkimukseen osallistuminen on vapaaehtoista. Minulla on oikeus milloin tahansa ja syytä ilmoittamatta keskeyttää ja peruuttaa tutkimukseen osallistuminen.

Allekirjoituksellani vahvistan, että osallistun tässä asiakirjassa kuvattuun tutkimukseen.

_____ _____

Allekirjoitus *Päiväys*

_____

Nimen selvennys

Suostumus vastaanotettu

_____ _____

Suostumuksen vastaanottajan allekirjoitus *Päiväys*

_____

Nimen selvennys