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**Circular business models in wild berry-based food business**

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## ABSTRACT

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This research is a case study, which aims to explore and analyze circular business models that exist in wild berry-based food business and the different ways of how to utilize the food waste that is being left from the production of wild berry-based products, for it to be made into new products, to decrease the amount of waste production and to bring more value.

The commissioner of this thesis is The Oulu University of Applied Sciences (OUAS) and the research is being done to a Wax project, which is an international project between different organizations from different countries, focused on berry wax.

Initially, to understand the topic, the pre-found circular business models and the wild berry-based food business, a theoretical background has been established from a variety of different sources. Then, through a qualitative research, two different wild berry-based food companies were chosen as case companies for this case study, to be analyzed on what circular business models these companies have, based on semi-structured interviews by using a business model canvas.

A company aiming to transition to a circular business will require a set of circular thinking and circular supply chain partners, to be able to operate the circular business models and to create economic, social and environmental values. The results of this research show that both of the case companies have circular business models, such as a circular supply business model, a product life extension business model and a resource recovery business model, and they reuse the food waste from the side streams of their productions, for it to be made into new products.

However, circular business models, such as a product as a service business model and a digital sharing platforms business model, seem to be missing from these case companies, from which the latter could be taken into consideration by these case companies, to avoid their products from getting expired, by sharing them with potential buyers before they reach their expiration dates, for them to not become waste.

Furthermore, to increase the visibility and knowledge of the new wild berry-based products manufactured from the side streams of their productions, the case companies could initiate new educational and marketing strategies.

For future research it is recommended to study more about the growing potential of the digital sharing platforms and the redistribution of the wild berry-based products before they get expired.

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Keywords: Circular business, economy, business model, wild berry, food business, food waste, case study

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# 1 INTRODUCTION

The aim of this case study is to explore and analyze the different circular business models that exist in the wild berry-based food business and the different ways of how to utilize the food waste that is being left from the production of wild berry-based products, for the food waste to be made into new products, to decrease the amount of waste production and to add value. Circular business is becoming more important and popular, due to societies being more ecologically oriented, as the risk of global warming is approaching and the scarcity of natural resources due to population growth and increasing consumption leading to a global sustainability crisis. Ecology has grown significantly as a value in people's lives during the past few years. The global warming has forced people to put more effort into the new ways of exploiting waste and making the economy more circular and ecological, decreasing the amount of carbon footprints. The purpose of this research is to help reduce the waste of natural resources by exploring different circular business models for wild berries in food business, to be more ecological, while adding value for the economy. This would decrease expenses and improve the management of raw materials.

## 1.1 Wax project

This thesis' commissioner is The Oulu University of Applied Sciences (OUAS) and the research is being done to a Wax project, which is an international project between different organizations from different countries, focused on berry wax. The project is organized by University of Oulu, Centre of Microscopy and Nanotechnology in co-operation with Luleå University of Technology, Norwegian Institute of Bioeconomy Research (NIBIO) and The Oulu University of Applied Sciences. The project's aim is to elaborate ecologically sustainable ways to extract wax from wild berries from the food waste and side streams of industries. The project has also studied different marketing opportunities for the wax as a raw material, as well as the new products it could be made into. (Oamk 2019.)

The Wax project wanted to study the circular business models specifically in their field of wild-berry based food business, as it is a current topic in the economy and the environment, which has not yet been fully explored, leading to the topic of this research.

During the time of conducting this study, the Wax project came to an end. Although, a new project will be put into motion, once its financial channels will open again, then a new funding can be applied for the project. It will focus more on exploring these types of new business models, as this study is being done to support the future research of the wax project.

## **1.2 Research questions**

The main research question of this study is: What circular business models are there in wild berry-based food business? In addition to this question, the following auxiliary questions help answering this question:

1. What circular business models the wild berry-based case companies have?
2. What circular business models are missing from these wild berry-based case companies?

The methodology for answering to these research questions will be of a qualitative research, and will consist of a case study, which will include analysis of academic articles and case companies' websites for the theoretical part of this research and interviews with the representatives of the case companies, by using a business model canvas for the data collection part of this research. A limited amount of data and participants in a survey, regarding this topic, supported the choice of a qualitative research.

In the following chapters, these questions are being examined. Firstly, the theoretical framework is established. Circular economy, business models, circular business models and wild berry-based food business are examined. Afterwards, the methodology of this case study is being described, explaining its research methods, as well as introducing the chosen case companies for this research and the results, leading to conclusion and discussion.

## **2 CIRCULAR ECONOMY**

### **2.1 Circular business**

Circular business, also known as circular economy, means an economy, in which the use of resources has been designed sustainable. It follows, minimizes and deletes economies' waste streams in a way that the materials and products circulate instead of draining and vanishing. In practice, this can mean the products are designed in a way that the different materials can be efficiently separated once the product has reached its life cycle. The products would be designed to be reusable and recyclable. Non-renewable natural resources would be replaced by renewable natural resources, products would be replaced by services, energy would be produced with renewable energy sources and the industry would share and recycle products and services instead of owning them.

Circular business is not only the efficient use and recycle of materials, but it is also a completely new business model in the economy. The vision of circular business is that waste would no longer be created, instead the surplus materials from manufacturers and producers would be usable materials for the next manufacturer or producer. Globally, circular business is a current topic, and it offers companies a major potential economically, such as the decrease of costs and the added value to waste streams and products. (Sitra 2014.)

Circular business is an economic model with the aim of saving the resources' value, materials and products for the longest time possible, then reuse the materials in cycles in opposite of losing value by creating waste. Circular business is unfortunately often perceived only as a model that does not include waste, even though it also consists of other valuable points. This makes the circular business model more sustainable instead of only recycling the waste streams of the current linear business. The bigger picture of circular business can be comprehended better by studying the principals, which the circular business is based on. (Vtt 2017.)

Circular business aims at materials and other resources being used efficiently, in order to reduce the amount of waste, when often materials have become waste after they have been consumed. There are three integral parts, in which the current business model loses value. The first one is the shortage in material efficiency of manufacture, which is how efficiently the materials used in production are being used for final products and less would go to waste in production. The second is the lost value of produced waste from economic activity. After consumption and use, a significant amount of materials ends up to being waste. Nonetheless, there are value and material in waste that goes lost. The third one is the recycle of material through less valued circulation. When a product is recycled for reuse or reproduction, the recycle saves most of the product's value in economy's circulation.

The circulation of products and materials can be promoted in the following five different ways. To maintain by building the products to last longer without a repair and offering maintenance services for expanding the products' lifespan on the same owner. To reuse or share, by using the product again for the same purpose on the resale markets. Remanufacture or renew, by understanding the product's lifespan as multiple lifespans and resell the product after a thorough renewal or remanufacture. Recycle the products' material for reuse and design the products in a way that the materials are easy to sort. In recycling of biological materials, it is important to ensure that the nutrients in the circulation end up back to the nutrient cycle safely after an efficient utilization. The fifth way to promote the circulation is to utilize the materials as part of another value chain, when the materials are not utilized in the original sector. The Figure 1, as seen below, shows the process as simplified. (Sitra 2014.)





Figure 1. Four technical value cycles of a circular economy (Ellenmacarthurfoundation 2017, Cited 30.4.2020)

The principals that create the basis for circular business model are the deleting of waste in the designing part of the products and services. Waste will not be created when products and services are designed in a way that they can be reused, remanufactured or recycled as materials. The aim is to keep most of the production's and materials' value as a part of the economy's circulation. Extend the lifespan of products through adaptability and modularity to develop and improve the products without having to manufacture the whole product again. Rely on renewable energy, as it fits perfectly to circular economy's ideology of renewability, because it is naturally recyclable. In circular economy, it is integral to observe all parts of the system as its entirety, instead of pieces of it. Only then all the potential opportunities are noticeable. The ability to return the waste of food products and services safely and hygienically to be a part of a nutrient chain is an integral part of circular business. The goal of circular business is to intensify the use of resources and materials, in a way that both the value and raw materials stay in circulation longer and better than before. When a product is reused or remanufactured, a substantial amount of energy is saved from the original production of the product. (Sitra 2014.)

## 2.2 Linear business

Linear business is the opposite of circular business. It is a more traditional way of business with a longer history than the circular one, and it is often applied in businesses, such as factories for instance. It is important to know the concept of the linear business, in order, to be able to compare it to the much newer circular business. In linear business, raw materials are being collected, then processed into a product or a service, which becomes waste after usage and is not being reused after that. As in circular business the amounts of raw materials are being reduced, products are being reused and afterwards recycled for new purposes with product life cycle being long-term as opposed to linear business' short-term.

The value in linear is created by the amounts of produced and sold products. The focus is not on the retention of the raw materials that is why linear handles them in an ineffective way. Linear focuses on ecological efficiency as circular focuses on ecological effectivity. The Figure 2 demonstrates the main difference between a linear and a circular business. (Kenniskaarten 2019.)

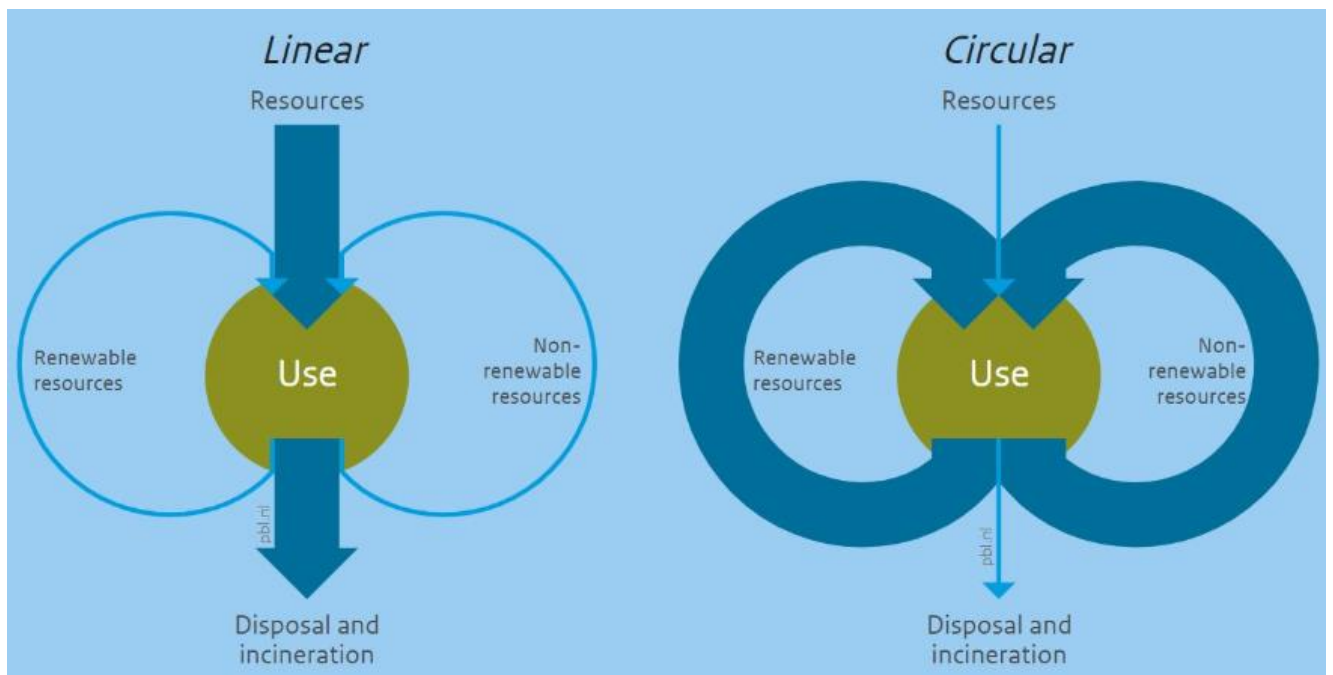


Figure 2. The difference between Linear and Circular business (PBL 2019, Cited 30.4.2020)

### **2.3 Value creation in circular economy**

In the circular economy, the value can be divided into four broad areas and defined in a holistic way. First value refers to the lasting resources that can be generated not only for a long time but for forever. In other words, complete renewable resources are productively used to overcome resource scarcity for economic activities. The second value refers to the liquid markets, where the products or assets are being used in the most favorable way to make them accessible and convertible between multiple users. Furthermore, the third value describes the extended life cycles, which means the products are made to last for a longer time, for them to be able to fulfill the demand without requiring additional natural resources. The last value refers to linked value chains, which means that waste is not produced throughout the operation and instead the waste output is being used as a useful input for the next production process. (Accenture 2014.)

### **2.4 Supply chains in circular economy**

The major objective of the circular economy is to redefine economic growth in a way that captures positive benefits for the society by focusing on renewable resources. To shift into circular business, a company should reconfigure its supply chains and create a new business model, so that the whole supply chain will function well. A company needs to redefine its value proposition, sourcing strategies, distribution channels, and customer relationships. To make this possible, a company should incorporate new business strategies that narrows, intensifies, and closes the supply chain loops. (Mattos 2019.)

Depending on the nature of the business, companies may have their own resource loops and they might need a unique approach to be optimized. It could be possible to transform a business into a circular business by establishing the circular supply chain.

Moreover, the circular supply chain is a set of circular thinking, that focuses on managing the supply chain, its surrounding businesses, and the natural ecosystem. It emphasises zero waste policy by incorporating innovations and managing all stakeholders involved in business and supply chain functions from the product or service design to the end of its lifecycle and waste management.

Furthermore, the circular supply chain promotes sustainability through a regenerative facet in its functions. It also concentrates on collaboration, in a way that the utilization of resources is increased, which results in high organizational productivity and profitability. At the same time, it reduces the economic, environmental, and social costs. (Farooque, Zhang, Thürer, Qu & Huisingh 2019.)

## **2.5 Circular business ecosystems**

When transitioning to a circular economy, circular business ecosystems are an integral part of the transition. The transition demands a new value creation protocol. Maintaining product value, decreasing the amounts of waste and the long-term use of materials, require collaboration between the complete value chain. Thus, a company is not able to operate the circular business alone, particularly when high amounts of materials are being processed. This is the reason companies need circular business ecosystems when transitioning to a circular economy. (Vtt 2017.)

Circular business ecosystem means a business commune, which is supported by a base of collaborating individuals and organizations. The business commune generates services, solutions, and products of value to customers, who are also members of the ecosystem, based on the circular business principles and using the circular business models in conducting business and in their operations. The other members are producers, suppliers, competitors, and stockholders. In time, they evolve their abilities and central roles in collaboration, and adapt to the directions set by one or more key organizations. The key organizations, which are having the leadership roles, can change, but the leader of the ecosystem is appreciated by the commune, because it permits the members to go toward common visions to focus their investments and to discover supportive roles, which are mutually beneficial.

A business ecosystem elaborates in four separate phases, which are the beginning, expansion, management, and reformation. Particularly, during the beginning of the business ecosystem, collaboration between the organizations of the value network is important and companies align to determine customer needs, which are the value of a new suggested service or a product, and to determine the best delivery form for it. (Moore 1993, 76.)

The design of the circular business ecosystems includes a complicated process with multiple phases, knowledge of materials that could be included in the process and precise limitations to the relationships between these. In the design, it is inevitable to develop a theory which can be executed in practice. (Galateanu 2013, 81.)

### **3 CIRCULAR BUSINESS MODELS**

#### **3.1 Business model**

Finding and developing an appropriate business model is an integral part for organizations, because it can lead an organization towards success. A business model does not mean the same as a business idea, or an innovation does. A business model is more than those. It focuses on how a certain business idea performs efficiently in a market scenario. To convert a good business idea or an innovation into a practical business model, many elements should be examined beforehand. A company needs to take into consideration some important aspects, such as to know the value proposition of the company, customer needs and the key resources required to meet the customer needs, before constructing a business model.

The business model can be defined as a design of the company that is being used for exploiting the opportunities and generating value. It is constructed based on a company's plan to link or to support different activities that they have. The business model can only be viable when different organizational elements are aligned and addressed on resources, operations, and value creation coherently and consistently. There are numerous frameworks, that can be used in order, to define, examine, change or to modify the business models. A company needs to test its potential business model in practice, in order, to find out the result of it. (Bock & George 2017.)

According to Gennaro (2020), a compelling value proposition, unique brand positioning, goal setting, customer segment, and distribution channels are the key elements of any business model. Presenting value as the target audience wants it, offering something that helps to generate more demand than the existing products or services that are available in the market, knowing the target customer, distribution channels and the profitability are the key elements that need to be defined when making a business model.

Moreover, the business model framework has four different aims. The first aim is to make a heuristics-based business model, which means a simple and practical business model. The second aim is to make a specific data-based business model, which means selecting only valuable data instead of addressing a massive amount of data. The third aim is to make a systematic business

model to build an effective distribution network and a strong brand. Lastly, the final aim is to establish financial sustainability for a company.

### **3.2 Business model canvas**

A business model defines a way of how a company creates, delivers, and seizes value. A business model can be described by and divided into a business model canvas, which consists of nine different blocks that include customer segments, value proposition, channels, customer relationship, revenue stream, key resources, key activities, key partnership, and cost structure. The major focus area of these nine blocks is to cover the company's customers, offers, infrastructure and financial sustainability. In other words, a set of nine different blocks can visualize the logical framework of the company to generate revenue. Thus, the business model can be described as a blueprint for a plan to be applied through the company's structure, process, and systems. (Osterwalder & Pigneur 2010.)

### **3.3 Circular business model**

A circular business model can be unique for companies that are looking for value creation with an environmentally friendly operating system, compared to the traditional linear business model. The circular business model concentrates on the logical framework of an organization to create, offer, and deliver value to its large participants with minimal environmental and social costs. Circular business does not primarily concentrate on profitability by reducing operation-related costs or factory costs, rather it focuses on redesigning of products and services in order to achieve market competitiveness and to ensure the future sustainability of the business and the overall environment. Furthermore, it emphasizes on utilization of the products and generates revenue by provisioning services rather than selling products. To shift to a circular business model from a traditional linear business model, requires innovative and sustainable ways of thinking and conducting business. (Hofmann, Jokinen & Marwede 2017.)

The Figure 3, demonstrates the main differences between three different business models.

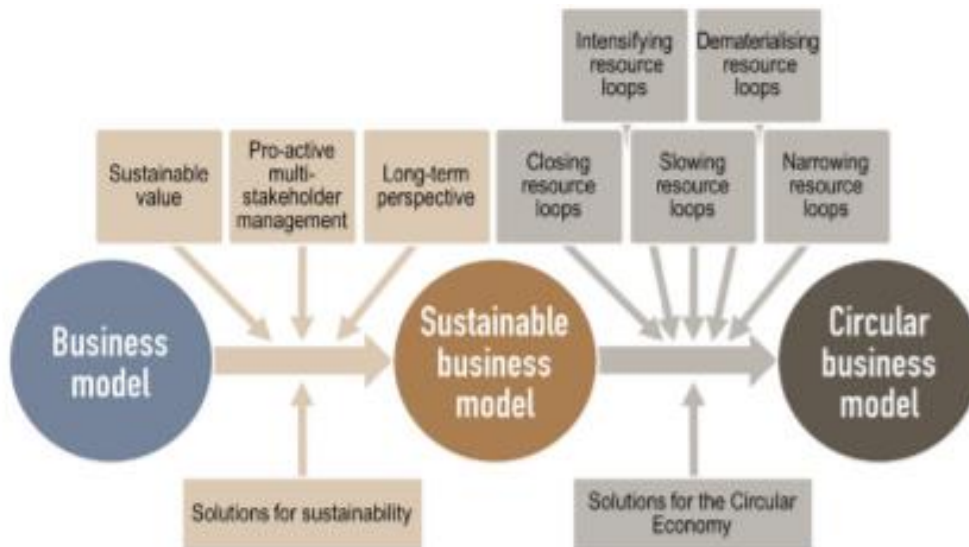


Figure 3. Comparison of traditional, sustainable, and circular business models (Geissdoerfer, Morioka, De Carvalho & Evans 2018, Cited 12.5.2020)

### 3.4 The five types of circular business models

A company can use one or more of these circular business models at the same time or then combine them to improve the resource productivity in innovative ways, that will reduce organizational costs and risks, improve customer value and generate revenue. These different circular business models have their own characteristics, which means a company should find the most appropriate business model for them to be able to benefit from it. A circular supplies business model focuses on the replacement of scarce materials and elimination of waste. This business model could be useful for companies dealing with scarce commodities and an environmentally friendly practice. It focuses on replacing scarce resources with complete renewable, recyclable, or biodegradable resource inputs. Likewise, a resource recovery business model focuses on acquiring embedded value at the end of a certain product lifecycle to feed into another by innovative recycling and upcycling services. For this model, new technologies or capabilities might be needed in order, to reprocess waste materials into new resources. Some food industries are a prime example of the resource recovery business model. A product life extension business model focuses on expanding the lifecycle of products and assets in a way that they can be used when needed. The resources are preserved and promoted by remanufacturing, repairing, upgrading, and remarketing, for a company to be able to find a new source of revenue. A sharing platforms business model concentrates on collaboration between different stakeholders to utilize the resources. In other words, the resources are utilized by sharing the platform among the different stakeholders, for



example, with an organization, individual or a product user, to enhance the productivity and to generate value. This business model can be beneficial to companies whose products or assets have a lower utilization or ownership rate. Finally, a product as a service business model highlights a lease or a pay-for-use approach for a product instead of a buy-to-own approach. This circular business model can be convenient for companies with high operational costs and the capacity to maintain the product for the service. (Accenture 2014.)

In the Figure 4 below, the distinct circular business models can be understood more precisely.

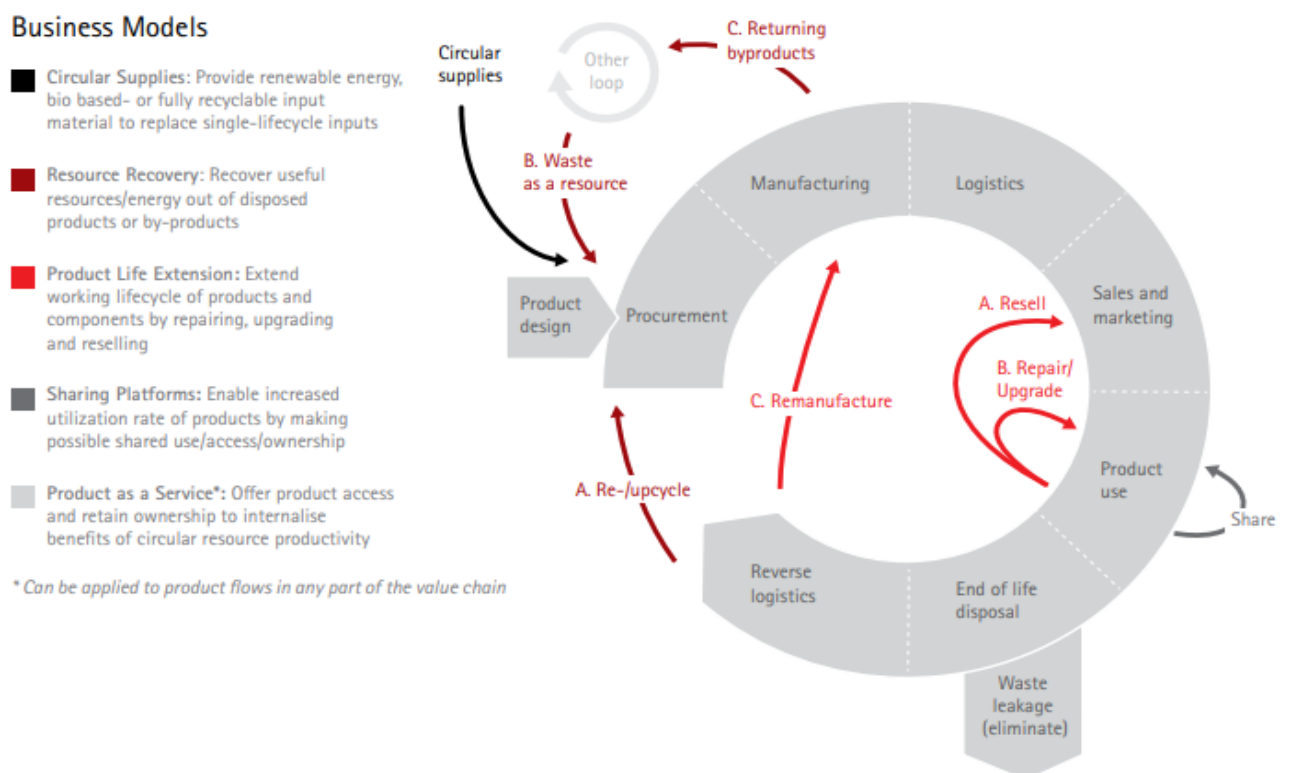


Figure 4. The five distinct circular business models (Accenture 2014, Cited 15.04.2020)

### 3.5 Considerations for food companies to transition into circular business

Approximately one third of the world's food gets lost or becomes waste, which is equivalent to one trillion United States Dollar (USD), each year. That represents a significant loss of food as well as an environmental problem. Thus, the food industries should prevent the creation of food waste by aligning its supply and demand, offering discounts for food products, which are close to their expiration dates and creating new food products from the leftovers of their food production and distributing them to potential buyers. Some organizations, such as Feedback and FoodShift have

already started this kind of a redistribute approach by sharing digital platforms, such as Too Good to Go, for instance.

Moreover, food designers and chefs also play a vital role on offering food products, recipes, and menus. Therefore, they can be considered as key players when transitioning a food business into a circular business. Similarly, organizations, such as food brand companies, stores, restaurants, schools, hospitals, and other food providers have a significant impact on consumers, because they shape the consumers' preferences and habits. For that reason, the food designers should design environmentally friendly products, which are produced regeneratively and locally or seasonally. Then, the organizations could promote and position these regeneratively produced, seasonally, and locally available products, in a way that the consumers can have access to them effortlessly on a regular basis. (Ellenmacarthurfoundation 2019.)

### **3.6 Wild berry-based food business**

It has been scientifically proven, that wild berries have great health benefits. They are a good source of vitamins, minerals, fiber, antioxidants, and other nutrients. Some berries consist of anti-inflammatory properties, which help to defense the body from injuries and infections. (Spritzler 2019.)

One research has shown that raspberry helps in improving liquid profile, maintaining vascular function, recovering of a brain injury, controlling diabetes, and lowering blood pressure. (Burton-Freeman, Sandhu & Edirisinghe 2016). Similarly, bilberries consist of a high anthocyanin and polyphenol content, thus consumers are appreciating bilberries. (Arcticbilberry 2020).

Furthermore, cranberry and lingonberry consist of Proanthocyanidin, which minimizes the chance of infections caused by bacteria in the urinary tract. Lingonberry is a good source of Vitamin E and consists of a significant amount of resveratrol, which is a stilbene. (Turunen 2020.)

Therefore, a regular consumption of berries protects the human body from many different dangerous diseases.

On the other hand, health-conscious international consumers are demanding better nutritious foods, which are leading to a change in the food market. (Munguti 2017).

Due to the increasing amounts of health-conscious consumers and the great health benefits of the wild berries, the demand of the wild berries and wild berry-based products are on the rise. When concentrating on the global trade of blueberry only, it seems to be rapidly growing and the consumption has increased by 45 percent from the year 2015 to 2016, but two thirds of the blueberry is being produced in the North and South America. The United States can be considered as the most developed country for the berries, because during the year of 2017, 0.8 million tons (6.4 billion United States Dollar) of berries were sold and the annual consumption per capita was 3.6 kilograms in the year 2016. (Escodo 2018.)

Additionally, the Figure 5, as seen below, illustrates how blueberry has been used by different food industries in the world to produce blueberry-based products from the year 1998 till 2018. The food and beverage industries, cosmetic industries and the other industries seem to have been active, but among those, the food and beverage industries have been the most active. Specifically, the berry ingredients have been used in the making of dairy products, sugar and gum confectionary related products, snacks, juices and smoothie-based products, breakfast cereals, desserts, ice creams and bakery products. (Blueberrytech 2020.)

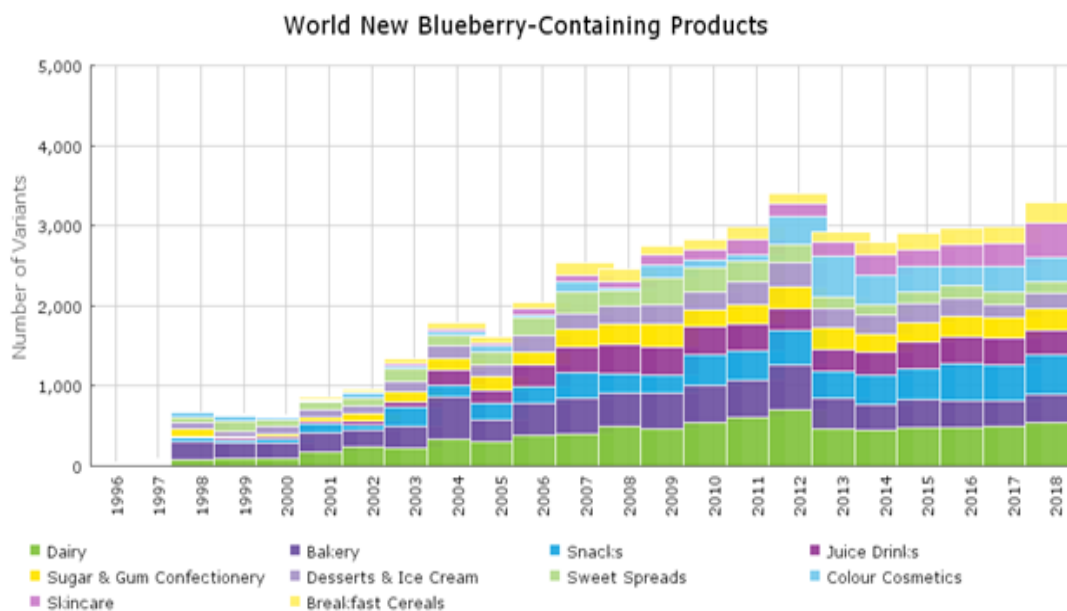


Figure 5. Mintel Global New Products Database (Blueberrytech 2020, Cited 2.4.2020)

There are multiple different companies and projects involved in the promotion and development of the wild berry-based products. One of these projects is the commissioner of this thesis, the Wax project, which focuses on the berry wax. The berry wax is a natural wax that can be extracted from the wild berries. The project aims to minimize the wild berry-based food waste and wants to produce the berry wax, for it to be used for other wild berry-based products, such as cosmetics or candy. (Oamk 2019.)

Likewise, many different Finnish wild berry-based companies, such as Kiantama Oy, Marja Bothnia Berries Oy Ltd, Kaskein Marja Oy and Riitan Herkku Oy, as well as many others, are playing a pivotal role on the trading and production of wild berries and the different wild berry-based products. Some of these companies are designing different wild berry-based products from the side streams of the wild berry production and selling them domestically and globally, to support the circular economy by reducing the amounts of the wild berry-based food waste. In addition, many other wild berry-based food manufactures can be found operating outside of Finland. (Finpro 2017.)

## **4 CASE COMPANIES**

Two different, but still similar Finnish wild berry-based companies using circular business models, were chosen as the case companies for the interviews of this research, to gain answers to the research questions. Also, the commissioner of this thesis, the Wax project, had recommended these companies to be studied and the companies' depictions fitted well to the topic of this research. The authors of this thesis were also familiar with these companies beforehand, from earlier personal experiences with the companies, which helped the authors to choose them as the case companies for this research.

### **4.1 Kiantama Oy**

Kiantama Oy is a Finnish wild berry-based food company established in the year 1973, whose aim is to pick, process and supply wild berries to the food industry. The company offers many different types of wild berries such as, Bilberry, Lingonberry, Cranberry, Blackcurrant, Redcurrant, and wild berry-based products, such as berry concentrates, juices, syrups, berry powders, frozen berries, and dried berries. Kiantama Oy uses and promotes a sustainable business model that not only financially benefits the company, but also takes the environment and the society into consideration. Corporate social responsibilities are strictly followed based on an ISO 26000 standard in the company. As a responsible company, it focuses on decreasing the amount of waste and utilizing the available resources. Therefore, this company was chosen as a case company for this research. (Kiantama 2020.)

### **4.2 Marja Bothnia Berries Oy Ltd**

Marja Bothnia Berries Oy Ltd is a family-owned food company, which was founded in the year 2010 and it locates in Finland. It specializes in selling frozen berries to industrial companies. The company organizes the picking, freezing, and cleaning of wild berries as well as delivering them to customers all around the world. Marja Bothnia Berries has decades worth of experience in the wild berry-based food business. Exporting covers approximately 70 percent of the company's turnover. Their most sold products are frozen blueberries and lingonberries. Their berries are mainly sold to the food supplement industry and the pharmaceutical industry as a material. The berries are picked

from the clean forests of Finland and Sweden. The company's strengths are long-term customer relationships with both domestic and foreign customers. It is a sister company of another Finnish company, called Riitan Herkku Oy, which is a food company that was initially approached for an interview for this research, but the authors of this research were being directed to their sister company Marja Bothnia Berries Oy Ltd, as it handles the berries of the company Riitan Herkku Oy, which sells many different wild berry-based food products to its customers. Marja Bothnia Berries is certified organic and it utilizes the food waste from multiple different side streams of their berry productions and avoids creating unnecessary waste. Thus, this company was chosen as another case company for this research. (Marjabothniaberries 2020.)

## 5 DATA COLLECTION AND RESULTS

### 5.1 Research methodology and data collection

This chapter will describe the applied method for collecting data for this research. A research refers to an academic activity, that focuses on finding a solution to a problem in a systematic way. In other words, a research is a scientific approach, which concentrates on the generalization and formulation of a theory. A research aims to find answers to questions and the truth, which are undiscovered. There are two basic approaches that are used in a research, which are a qualitative approach and a quantitative approach. (Kothari 2004, 1-5.)

Two wild berry-based food companies were chosen as the case companies for a case study to this research, to analyze their circular business models. According to McCombes (2019), a case study is an effective research design, when a researcher wants to accomplish real and contextual knowledge about a certain topic, such as a company or a phenomenon. It is beneficial for explaining and understanding a research problem. Most often, a case study includes a qualitative research approach. As this research aims at studying the circular business models in the wild berry-based food business, the data of these two case companies were gathered through the case study. Data from academic articles and the case companies' websites were also included in the theoretical part of this research, to describe the topic of this research, as part of the case study.

To collect data from the chosen case companies in the case study, the authors of this research have chosen a qualitative data collection method. A qualitative research refers to a broad term of data collection method and it is the study of natural social life. In qualitative research, the data is collected and studied in a non-quantitative way, which means the data is collected and analyzed based on human experiences. The qualitative research has its own specific goal to find documented materials, such as interview transcriptions, photographs, and video recordings, which are then analyzed to get results. (Saldana 2011, 3-4.)

Furthermore, the qualitative research should be structured, as it helps researchers to collect the specific information required for the study. (Smyth 2019).

Interviews are appropriate in the qualitative research, as they help to understand the respondents' real-life experiences, views, and beliefs on a specific topic. There are three distinct types of interviews, that can be used in a qualitative research, which are unstructured, structured, and semi-structured interviews. The unstructured interview does not necessarily have to be prepared beforehand and its questions do not have to be written before the interview. The researcher should be able to form the questions during the interview so that answers could be obtained. The structured interview consists of predetermined questions and any further follow-up questions are not being asked from the respondent. The semi-structured interview is a combination of the structured and the unstructured interview, which means that the researcher plans and writes the interview questions before the interview and the potential follow-up questions can also be included, during or after the written interview questions, to understand the topic more profoundly and to allow space for more ideas during the interview. (Bhasin 2019.)

Compared to the structured interviews, the semi-structured interviews are more open-ended. (Smyth 2019).

Thus, due to the nature of this thesis, the semi-structured interview was chosen to collect the relevant data, as it was the most suitable option for this research. The authors of this thesis organized the interviews with the case companies, Kiantama Oy and Marja Bothnia Berries Oy Ltd, which were chosen for this research.

The respondent of the case company Kiantama Oy, Riitta Ryyti, who is the quality control and corporate social responsibility manager of the company, was interviewed, as well as the respondent of the other case company Marja Bothnia Berries Oy Ltd, Kåre Björkstrand, who is the export manager of the company, was interviewed for this research.

The interviews were conducted and recorded via Microsoft Teams and the collected data was later transcribed into a written form via Microsoft Word. A business model canvas, which was described earlier in the chapter 3.2 of this thesis, was used in the questionnaire of the interviews, to get an overview of the circular business models in these wild berry-based case companies. The questionnaire of the conducted interviews can be seen in (Appendix 1).

According to Taylor (2019), a researcher should craft the research questions concisely and align them with the research objective. For that, the researcher needs to narrow down the topic of the



research and to think about the potential research questions, which would bring valuable results. Before conducting the interviews with the case companies, the objective of this thesis was analyzed, and the relevant interview questions were prepared.

The written interview questions were sent to the commissioner of this thesis for a review and to give feedback on. Afterwards, the interview questions were reorganized and sent to the respondents of the case companies before the interviews, for them to be able to prepare appropriate answers for the interview questions. Some further follow-up questions were also included during the interviews.

When a researcher is conducting an interview, it is necessary to get the respondent's consent, because it ensures that the collected data from the respondent is complied with the data protection law. Also, the respondent then understands why the data is collected and that makes the research ethical. (User research community 2018.)

Therefore, the authors of this research informed the interviews' respondents and got the permission to record the interviews after asking for it.

Most often, the researchers use recording devices to record the data of the interview, when conducting a research. The usage of the recording devices is beneficial for the interview sessions, because then the researchers do not have to write the dialogues of the interviews at the same time while engaging in them. The researchers are then able to transcribe the interviews' dialogues into a written form by listening to the recordings of the conducted interviews. This enables the researchers to properly analyze and process the data of the interviews. An accurate transcription of the interview data plays a vital role in the qualitative research, as it impacts the interpretation of the interview results. (Stuckey 2014, 6-8.)

For these reasons, the authors of this research have transcribed the conducted interviews' recorded data and then analyzed the results from it.

## 5.2 Results

In this chapter, the results from the interviews are being analyzed and the circular business models of the wild berry-based case companies, Kiantama Oy and Marja Bothnia Berries Oy Ltd, are overviewed. The authors of this research were focused on how these companies create, deliver, and capture value. Therefore, the nine different blocks of the business model canvas were analyzed as well as the opportunities and challenges for the companies (Appendix 1).

### Partners

The company Marja Bothnia Berries Oy Ltd collaborates with its sister company, Riitan Herkku Oy, which makes juices from their lower quality berries that comes as a side stream from their class one berry production. The company has business to business customers from the food industry and the pharmaceutical industry. They share the same corporate social responsibility policies with their customers, and they aim to provide good quality products for the companies.

The company Kiantama Oy collaborates with its raw material suppliers, berry purchasing partners, waste logistics and research groups, in which they develop the use for the side flows of their wild berry production. They have common values and policies towards a better use of raw materials and the goal to produce as low amount of waste as possible. The company has a code of conduct, which they request their raw material suppliers and partner organizations to sign on.

### Activities

Marja Bothnia Berries Oy Ltd cleans berries to get class one berries, then after re-cleaning the berries they get second class products, which are cheaper jam products, for instance. After cleaning the berries for a third time, they get juice or puree quality, which are lower quality berries.

The company tries to use all the materials that they can from their wild berry production. All the materials that are left out after cleaning the wild berries to class one products, they can use to other products. During the past few years, the usage of the side streams of the wild berry production in the company has increased significantly, after they found the right partners, which were interested in purchasing the lower quality wild berries from the side streams, therefore improving the sales of these for the company.

The company extends the lifecycles of their products by recleaning the berries when manufacturing the products. At some point of their wild berry production, they only get waste after using all the

possible side streams that can be made into a final product. Then, the remaining waste is transported by the waste disposal companies.

As a business to business company, Marja Bothnia Berries Oy Ltd does not do a lot of marketing, but to the interviews in newspapers, they communicate corporate social responsibility, as having seasonal workers to pick the wild berries for the company and having good working conditions for them, as well as increasing the employment in their local areas, where they have factories.

Aside from having local workers, the company, as well as most of its competitors, invite workers from Thailand to pick the most of their wild berries annually.

Kiantama Oy aims to utilize all the possible side flows from their wild berry production. Their product development team takes the side flows into consideration when developing the products. They have innovations, which allows them to use the wild berry waste into materials of new products. Also, the company has products, which are completely manufactured from the materials of their side flows. If some of their products have gotten spoiled or reached their expiration dates before they have been sold, they are put to biowaste. The different packaging materials, such as plastic and cardboard, are being recycled accordingly.

The company promotes organic products and the international ISO 26000 standard, for the commitment to operating sustainably in a socially responsible way.

## **Resources**

Marja Bothnia Berries Oy Ltd makes frozen berries. The materials from the side streams of their wild berry production, which can be reused, are kept in cold storage until they are cleaned again for a further use in the future. The waste from their wild berry production goes to the waste containers outside their factories.

The waste from the juice production of its sister company, Riitan Herkku Oy, can be made into press cakes, which the company Marja Bothnia Berries Oy Ltd can then resell to the food industry, dog food industry and the extraction industry.

The company utilizes all the leftovers that comes from the processing of the wild berries, until there is only waste left, such as leaves, sticks, stones or unripe berries, which cannot be used for manufacturing final products.

Kiantama Oy uses Finnish wild berries in their production in Finland, which are picked mostly by foreign berry pickers from Thailand. Also, a small amount of the wild berries is being picked by the

local Finnish people, then some cultivated berries are outsourced from long-term suppliers, such as contract farmers.

The leftovers of the processed wild berries are utilized depending on the berry. The leftovers are being made into press cakes and dried berries, to separate the seeds, and then the seeds are sold to seed oil production. The fiber that is being left from those, can be made into berry powder and berry skin powder, but some of those volumes have no demand nor market, which leads to those products having to be put to biowaste. After the cleaning of the wild berries, the leftovers from that are usually leaves, sticks, needles, and stones, which have come along with the berries, and are then being put to biowaste.

### **Value Proposition**

Marja Bothnia Berries Oy Ltd's value proposition is to sell good quality wild berries from Scandinavia at a competitive price to industry customers around the world and to try to be a stable partner, which can be relied on, to their long-term customers. When focusing on the prices, their products are in the high-end, compared to their foreign competitors.

The value, that the company offers for their customers, is to be a stable supplier by offering accessibility to healthy good quality wild berries. For the society, the company invests a part of their earned money, to keep the workplaces locally in Finland, as well as in different areas. For the environment, the company is planning solar energy to power their cold storages, to get cheaper electricity during summer, as well as to save the environment and to decrease the electricity costs.

Kiantama Oy has a code of conduct and they have values, such as having responsibly good products from the nature. The nature is very important for the company, as a source for their raw materials. They respect it and they educate their berry pickers not to litter the nature, and to pick the wild berries while not damaging the surrounding plants. The working conditions are also important for them and they offer exclusive benefits for their workers. In addition, development discussions with the workers are being held annually. The company does not use limited raw materials in their production, to ensure the availability of their products for their customers during the whole year.

### **Customer relationships**

Marja Bothnia Berries Oy Ltd maintains its customer relationships, by meeting its customers at least one to three times per year, depending on the customer's location, and by delivering good quality products for them as well as trying to respond to their demands in matter of volumes,

depending on the sizes and the quality of the timely berry crops. The company aims to be honest and as stable as possible for its customers.

Kiantama Oy has many different customers from different countries. First, they sell to the customers, which order the biggest volumes from them, and they ensure that those customers will get the volumes that they need annually. After this, the company serves the smaller and new customers. This all depends on the size of the berry crops, that the company receives annually to process and sell. They want to develop their products and to listen to their customers' needs and to maintain their customer relationships.

### **Channels**

Marja Bothnia Berries Oy Ltd uses channels for the cycle of its resources, such as the reuse of leftovers, resale of press cakes and the waste disposal. The company has a contract with the local waste disposal company, which empties the waste containers outside their factories approximately once or twice a month.

Kiantama Oy assorts their materials at their factory, and then they advise their customers on how to sort and recycle the packaging materials of their products after usage. The company has outsourced the logistic distribution for their materials and products and the waste collection for their waste. They have a logistics manager, who is responsible for the transportation and storage of their materials and products. The company has designed their operation and their product volumes in a way to avoid the products from reaching their expiration dates before they are sold.

### **Customer segments**

Marja Bothnia Berries Oy Ltd's biggest customer segment is the food industry and the second biggest is the pharmaceutical industry, which are their two main customer segments, but they also have some other smaller customer segments.

The company does not create new customer segments nor does it target new environmental trends, due to the current lack of materials, which has been a common problem for the wild berry-based food companies, but some investments for the growth of the company are being planned for the future.

In addition to following the circular business models, the company also customizes its products according to their customers' needs, in a way, where some of their customers need lingonberries, which are from an early crop, whereas some of their other customers need the lingonberries, which are from the end of the crop, and these lingonberries are then delivered to those customers.

Kiantama Oy has many different customer segments due to their wide product selection. Their product brand, called Biokia, has their own consumer customers. Kiantama Oy's products are not the cheapest ones on the markets, as those are mainly targeted for the people with higher education, higher income bracket and more health awareness. The industrial ingredients are their main business, in which they have many different products, mainly targeted for the food industry, but also for the health products, nutraceuticals, cosmetics and the pet food industries.

The most common wild berry-based products are jam, juice and frozen berries, which are well-known around the world, but Kiantama Oy has noticed that many consumers are unfamiliar with and do not know how to use their newer berry powder product. This product is mostly sold to younger people, as they are more eager to learn how to use it, whereas older people do not know about it and are less interested in learning how to use it. The company promotes the use of the berry powder to increase the awareness of the product.

The company does not have any resources for creating new customer segments and targeting new environmental trends. They only have plans to widen their product selection for their consumer product group but not for the industrial one. Earlier, the company had changed one of their product's packaging material into a recyclable one, as it is important for their customers.

Mainly, the company sells their products as a bulk, and in a basic form for each of their customers, but for certain customers, they customize their products according to the customers' needs. In the company, the circular business models are more important in the consumer side, than in the industrial side, as business to customer companies want to be up to date on trends and to decrease the amount of emissions, while increasing the amount of recyclable materials.

## **Costs**

Marja Bothnia Berries Oy Ltd has approximately from two to three per cent of waste in their total volumes of the processed wild berries, which cannot be utilized into making new wild berry-based products, and approximately from five to eight per cent of their production is side streams, which in turn, can be utilized into making new wild berry-based products.

The company has made efforts and got many customers for their products made from the side streams of their wild berry production, which has helped the company to increase their turnover significantly, as all of their side streams have been used and sold, and only real waste, which cannot be used, has been thrown away from the production.

In the uncleaned wild berries that Kiantama Oy buys from the berry pickers, there are approximately from five to six per cent of waste, which cannot be utilized into making new products. The company gets more cost benefit when they utilize the side flows of their wild berry production into making new products.

## **Revenues**

Ninety per cent of Marja Bothnia Berries Oy Ltd's revenue stream comes from their main production. Also, the company generates a lot of revenue from the side streams of their production, which is from five to ten per cent of their revenue stream, depending on the year.

Kiantama Oy's revenue stream comes from their many different products. They have lower revenue margins in the frozen wild berry products, due to a high amount of competition in that product segment. On the other hand, in the dried wild berry products, they have higher revenue margins, due to their wide knowledge and the lack of competition in that product segment. The smaller product volumes have more revenue margins than the bigger product volumes. With the utilization of the leftovers from the side flows of their production into making new products, the company can receive more revenue, when compared to some of their competitor companies, who do not utilize their leftovers.

## **Opportunities and challenges**

Lastly, the case companies were interviewed about their future opportunities and challenges, outside of the business model canvas, to get an overview of the current state and the future aspects of these companies.

The opportunities for the company Marja Bothnia Berries Oy Ltd are to co-operate with some other companies, to try to increase their purchases of raw materials from other countries and to increase the amount of purchasing channels that they have, to increase the turnover of the company in the future.

The challenges for the company are the coronavirus pandemic, which happened during the time of this research, that created difficulties to get employees to pick the wild berries from the forests for the company, as well as having a general challenge among the wild berry-based food companies, of how to get enough employees to pick the wild berries for them. That is the main challenge of this case company. If the company receives enough wild berries as their raw materials, they have the channels to sell them, but it has been difficult for the company to get the needed volumes of wild berries, which the market demands. Another challenge is the waste, that comes along when picking

the wild berries from the forests, which consists of sticks, stones, and unripe berries, as these cannot be utilized into making new products.

The company's products reaching their expiration dates before getting sold, has not become a challenge for the company, as the demand of their market exceeds their supply, due to the changing availability of the raw materials that they use into making their products.

The opportunity for the company Kiantama Oy is to find more waste, which they could utilize into making new wild berry-based products.

The challenge for the company is the preservability of some valuable wild berry materials, as they are easily destroyed in the production or during storage. Another challenge is the taste and the color of the products, which are being made of the leftovers from the side flows of their wild berry production, as the wild berry materials from the side flows may have a bitter taste, or their color might not have preserved very well. Therefore, these products may not appear attractive for the customers.

It is rare for the company to have to discard their products from their storage due to the products' expiration dates.



## 6 CONCLUSION

The circular business models in the wild berry-based food business were explored and analyzed based on the literature reviews and the case study. This research aimed to explore the existing and missing circular business models in the wild berry-based food businesses. Various relevant topics of the circular business models in the wild berry-based food business were included in this research.

Existing theories of the circular economy, the circular business models and the wild berry-based food business were explored at the beginning of this research, to establish the pre-found circular business models and the wild berry-based food business and to explain the main research question of this research.

Since the circular economy focuses on minimizing and deleting economies' waste streams, instead of draining and vanishing of materials, it is important for the food companies to use circular business models. The linear business was compared with the circular business, with the latter having many differences compared to it, such as reducing the consumption of raw materials, potential products and materials being reused and recycled into making new products with long-term product life cycles, instead of the linear business' short-term product life cycles.

Moreover, in the circular economy, value creation will require renewable resources, product life cycle extension strategies, sharing products or assets with multiple users and a linked value chain to reuse the waste for the next production process. Similarly, the companies will need a set of circular thinking and collaborative circular supply chain partners, for them to be able to manage the entire supply chain efficiently, while using circular business models.

Initially, to transition to the circular business, a company will be required to think about its business models. The nine different blocks of the business model canvas can be an effective tool for a company to visualize its business models. This research indicates that systematic business models, that are aligned with the different organizational elements, such as resources, operations, and the value creation, will be required by a company to establish a financial sustainability.

Furthermore, a company that aims to create, offer, and to deliver long-term value to its customers with minimal economic, environmental, and social costs, is required to use circular business models. There are different types of circular business models, such as a circular supply, a resource recovery, a product life extension, a product as a service and a sharing platforms business model. A company can use one or more of these circular business models at the same time or then combine them to enhance their productivity, value creation and revenue stream, as well as to minimize the organizational costs and risks. The circular business models are essential for the food industry, in order, to minimize the amount of food waste being produced each year.

The main research question of this research was what circular business models there are in the wild berry-based food business. The first auxiliary research question helped to understand and to answer to the main research question of this research, by aiming to know what circular business models the wild berry-based case companies have. The wild berry-based food companies, Kiantama Oy and Marja Bothnia Berries Oy Ltd, were chosen as the case companies for this research. These companies were interviewed, and the results showed that both case companies aim to reuse all the potential resources that they have and to manufacture products, that can last for a long period of time. The different activities, such as product design, product life cycle extension, product resale, demand forecast, resource recovery and reverse logistics are the central functions in their circular business models, that they have.

The companies' key resources are forests, human resources and technology, since the forests have the valuable wild berries, the human resources are needed for the wild berry productions and technology is required for the innovations to reutilize the food waste into making new products.

Furthermore, by having collaborative, long-term focused and circular thinking supply chain partners, that manage the entire circular supply chain from the logistics to the reverse logistics, is essential for the case companies to be able to use the circular business models, to create circular value and to capture the potential resources for their reutilization.

The results also indicated, that for the long-term oriented companies, not only the economic values are important, but also the social and environmental values. For these companies, corporate social responsibility and creating a new product segment from the reusable resources, that not only generates more revenue for the company, but also creates new employment opportunities for the

people in the society and minimizes the environmental costs, is important and represents the core values of the circular business models.

Building strong customer relationships, by meeting the customers' responsibility assessment criteria and offering them new circular products made from the materials of the side flows of their production, seem to be important for the case companies. Besides this, they have arranged different channels, such as cold storage and transportation, for them to store, redistribute and remanufacture the leftover resources from the wild berry production in a systematic way. To reuse all the possible resources and to manage the different channels, these companies might develop some additional costs, but the amount of revenue it creates for the companies exceeds the amount of costs, which makes it economically cost-effective.

The results of this research showed that both case companies have circular business models, such as the circular supply business model, as having circular supply chain partners, the product life extension business model, as the companies are extending the lifecycles of their products, by recleaning the wild berries when manufacturing products and having innovations to reutilize the food waste from the side streams of their productions into making new products, as well as having cold storages, for making frozen berries and for the storage of their wild berry-based products, to extend the life cycles of these products. Lastly, the companies have the resource recovery business model, as they reuse all the possible resources that they have, and they reutilize the food waste from the side streams of their productions, for it to be manufactured into new products. The case companies are active in closing the resource loops in their circular business models and focused on the replacement of scarce materials and the elimination of waste, by also having recyclable packaging materials for their products and not focusing too much on the customization of their products according to their customers' needs.

The second auxiliary research question was what circular business models are missing from these case companies. The theoretical framework and the interview results of this case study were analyzed and compared between, to answer to this question. This research showed that there are still a few circular business models missing from these case companies, such as the digital sharing platforms business model, which could be taken into consideration by these case companies, to avoid their products from getting expired, by sharing them with the potential buyers before they reach their expiration dates, for them to not become waste. This way, the products' life cycles could be even further extended. In addition, the product as a service business model is missing from

these case companies, as well as from the entire food industry, due to the nature of their products not being possible to be made into services, as the products are edible and disposable.

The consumers act as an important final part of the circular business models of these case companies, because when they buy and consume a food product, it leads to the product not becoming waste.

In the recycling of biological materials, especially the wild berries, which consist of many different healthy nutrients, it is important to ensure, that the nutrients end up back to the circulation safely after an efficient utilization.

To conclude, the circular business is an important topic for the food business, which benefits not only the companies, but also the society and the environment, by creating value for them, while reducing the economic, social, and environmental costs and decreasing the amount of food waste that is being produced.

## 7 DISCUSSION

The aim of this research was to explore and analyze the circular business models in the wild berry-based food business, as wanted by the Wax project. Initially, this research overviewed the concepts of circular economy and the circular business models. Then, two different Finnish wild berry-based case companies were interviewed, to get answers to the research questions. During the case study, the nine different blocks of the business model canvas were analyzed, based on the circular economy. This research showed what circular business models are there in the wild berry-based food business and what circular business models these two case companies have and what they are missing.

Firstly, based on the available sources, the theoretical framework for this research was established. To make this research easy to understand for its readers, the circular business was compared to the linear business and their characteristics were described. Furthermore, some important concepts of the circular economy, such as value creation, supply chain design and ecosystem were presented, because these concepts provided a more holistic picture of the circular economy.

Moreover, the definitions of the business models, their key elements, and aspects that need to be taken into consideration when constructing a business model, were also included in this research. Then, the concepts of the circular business models were addressed. Lastly, for the theoretical part of this research, the considerations for the food companies to transition into circular business, and the wild berry-based food business, were described.

The qualitative research method was chosen for the data collection of this research. To understand the case companies' circular business models, the questionnaire of the semi-structured interviews was based on the nine different blocks of the business model canvas. These methods proved to be useful for collecting valuable and reliable data from the case companies.

The results of this research indicated that the use of the circular business models is effective and beneficial for the case companies, the economy and for the environment, because it helps the companies to generate more value, by reusing and remanufacturing the available resources that they have, while decreasing the amount of waste that is being created.

The companies that aim to transition to the circular business will require a set of circular thinking and circular supply chain partners to be able to operate the circular business models and to create economic, social, and environmental values.

The topic of this research was current, as well as important, and it was aligned with the values and interests of the authors of this research. It provided a great opportunity for the authors to learn more about the circular business and specifically, the circular business models.

It is recommended for the case companies to increase the visibility and knowledge of their new wild berry-based products, which are being manufactured from the food waste of the side streams of their productions, to the customers, to increase the sales of those products to different customer segments, to boost the circular economy and to prevent these products from becoming waste, by initiating new educational and marketing strategies for these products.

For future research, it is recommended to study more about the growing potential of the digital sharing platforms and the redistribution of the wild berry-based products before they get expired.

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**The questionnaire for the interview of the case companies:**

The Figure 6, below this questionnaire, illustrates the business model canvas, which was used for the interview of the case companies.

**Business model canvas:****Partners**

- What are your partner organizations and supply chain actors for supporting circular business and how your company collaborates with them?
  - For example, product designers, technology suppliers, logistics and the waste logistics (people who manage the leftovers of processed wild berry).
- Is your company's policies and values aligned with your key partner organizations and supply chain actors? Or do they differ? If yes, how?

**Activities**

- How your company's products were redesigned to support circular economy?
  - For example, product development strategy.
- How the products' lifecycles are extended while manufacturing?
- How the products are disposed at the end of their life cycle?
- How visible is corporate social responsibility in your company's marketing?

**Resources**

- How the recyclable materials are collected for the use of the company?
- Are the leftovers of the processed wild berries utilized? If yes, how?
  - For example, by remanufacturing and with technology.

## **Value Proposition**

- What is the value proposition of the company?
- What are the values the company wants to offer for the customers, the society and the environment?
  - For example:
    - a) Creating a new income stream for value chain actors from the waste resources.
    - b) Sustainability: Creating social, economic, and environmental value by generating employment and minimizing environmental harm.
    - c) Accessibility: available on customer demand.

## **Customer Relationship**

- How the company maintains its customer relationships?
  - For example, by demonstrating potential value through the company's marketing and by encouraging customers to a circular economy.

## **Channels**

- What channels the company uses for the cycle of its resources?
  - For example, reuse, re-sale, distribution, and waste return channels.
- How the logistics and the waste logistics channels are arranged in the company?

## **Customer Segments**

- Do you have different customer segments or just one target market?
- Does the company create new customer segments or target new environmental trends?
- Does the company customize products according to customer needs or does it just follow the circular business models instead? Or both?

## **Costs**

- How much waste, approximately, is being produced after the processing of the wild berries into products?

- What would be the cost if the leftover waste of wild berries would be utilized into making a new product from it, compared to when it would not be utilized into making a new product?
  - For example, there might be different costs, such as a distribution cost, technology cost, labour cost, waste logistics cost, and other similar costs related to those actions.

## Revenues

- What is the revenue stream of the company?
  - For example, the waste being reused into new products to provide more value and revenue for the company.

## Opportunities and challenges

- Are there some opportunities and/or challenges that the company has faced regarding circular economy and the use of circular business models?

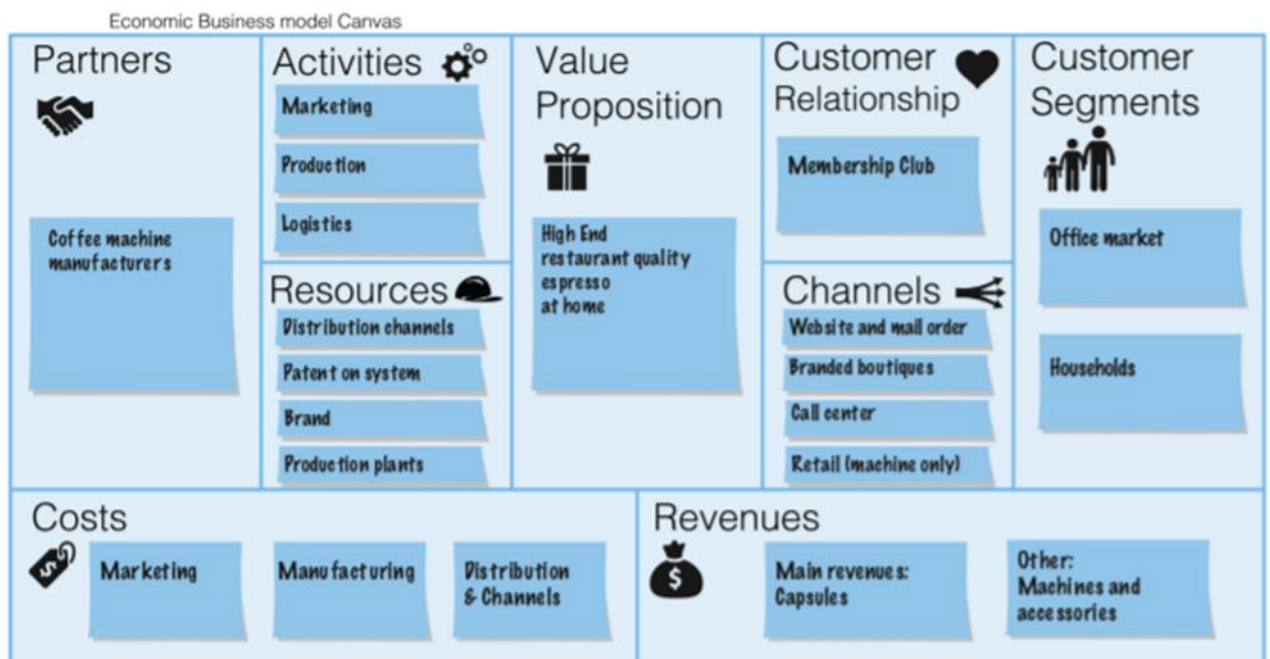


Figure 6. Business model canvas (Osterwalder, 2010. Cited, 12.5.2020).