
# Implementation of the Circular Economy in food & beverage companies to increase sustainability

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**Abstract**

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With the current advancements in the field of the circular economy the distinct advantages that it brings for food and beverage companies are pretty clear. Nonetheless, despite the increasing amount of literature concerning the broad concept of the circular economy and their many potential advantages there has been limited investigation into the particular techniques and methods that food and beverage corporations have implemented to incorporate circular economy principles in their operations. This encompasses methods of minimizing waste and emissions, as well as maximizing the utilization of resources such as water, energy, and materials. For this research, a multiple qualitative case method was used to gather data. Interviews were made with different food & beverage companies to understand to what extent they are familiar with CE and if they integrate these measures in their operations, as well as how they are making efforts to reduce emissions and waste effectively. Additionally, possible reasons for implementation barriers are analyzed accordingly.

Keywords: circular economy, sustainability, food, beverage

JEL classification: Q18, Q32, Q56, L66,

**Abstrato**

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Com os actuais avanços no campo da economia circular, as vantagens distintas que traz para as empresas de alimentos e bebidas são bastante claras. No entanto, apesar da quantidade crescente de literatura relativa ao conceito alargado da economia circular e das suas muitas vantagens potenciais, tem havido uma investigação limitada sobre as técnicas e métodos particulares que as empresas de alimentos e bebidas implementaram para incorporar os princípios da economia circular nas suas operações. Isto engloba métodos de minimização de resíduos e emissões, bem como a maximização da utilização de recursos como a água, a energia e os materiais. Para esta investigação, foi utilizado um método de múltiplos casos qualitativos para a recolha de dados. Foram feitas entrevistas com diferentes empresas de alimentos e bebidas para compreender até que ponto estão familiarizadas com a CE e se integram estas medidas nas suas operações, bem como como como estão a fazer esforços para reduzir eficazmente as emissões e os resíduos. Além disso, as possíveis razões para as barreiras à implementação são analisadas em conformidade.

Palavras-chave: economia circular, sustentabilidade, alimentos, bebidas

Classificação JEL: Q18, Q32, Q56, L66

**Outline**

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CE – Circular Economies

GHG – Greenhouse Gas

GMO – Genetically Modified Organism

## 1. Introduction

The current production system applied by the majority of companies in all sectors is dominated by the traditional linear model, which bears a lot of disadvantages. (Sillanpaa & Ncibi, 2019). A linear economy is a classic economic model in which resources are harvested, employed to make products, and then discarded as waste (Ibid.).This linear technique offers various advantages, including the potential to make items at a cheaper cost and on a greater scale. (Seetharaman, Shah, & Patwa, 2022). A linear economy, however, has significant drawbacks (Upadhayay & Alqassimi, 2018). One important disadvantage is the amount of trash produced, which can have severe environmental consequences such as pollution and greenhouse gas emissions (Ibid.). This procedure implies a tremendous misuse of resources, used once at the beginning and then destroyed, not to mention the negative impact on the environment, which ends up being overwhelmed by tons of unnecessary waste (Seetharaman, Shah, & Patwa, 2022). Moreover, a linear economy might lead to the exhaustion of natural resources and may not be economically viable in the long term (Ibid.). As a result, many firms and sectors are experimenting with more circular models of production and consumption in order to decrease waste and promote sustainability in their businesses. (Ibid.).

It is also no mystery that our food and beverage industry accounts for a large amount of carbon emissions and waste due to the sheer size of the world population but also due to ineffciencies in the underlying system (The Economist, 2022). Responsible for a significant portion of global greenhouse gas emissions and waste, due in part to the large amounts of energy and water needed in food production and processing, as well as the generation of food waste and waste generated due to packaging materials (ibid.). With the global trends in the food & beverage sector shifting towards more sustainability the concept of circular economy moved into the spotlight (Ibid.). This concept has attracted substantial attention in recent years as a strategy to move towards a more sustainable and resource-efficient model of production and consumption (Kirchherr, Reike, & Hekkert, 2017). In a circular economy, resources are utilized in a closed loop system, with the purpose of minimizing waste and maximizing the reuse and recycling of commodities. This strategy has the ability to greatly reduce greenhouse gas emissions, as well as the negative environmental implications of waste (ibid.). The system is inherently restorative and regenerative by design signifying its potential capacity to be entirely self-sufficient (Ellen MacArthur Foundation, Closing the Loop: A Circular Economy Handbook for Businesses, 2016). Despite the ongoing research and

advancements in the field of circular economies there is still new progress to be made. There has not been enough research on the topic of companies in the food & beverage industry and on their hindrances and obstacles that they encounter when striving to implement circular economy principles, as well as potential remedies to overcome these barriers.

Chapter 2, the literature review, will cover a brief definition and characteristics of the concept of circular economies, while also explaining their linkage with the food & beverage sector. Additionally, the areas of food waste and emissions will be introduced and explained in this chapter. This will include a short definition and a snapshot of the current situation. Finally, the research gap and the research question will be introduced in the end of the literature review. After a thorough literature research, the methodology of the thesis will be presented. This includes explanations on why the particular type of research was chosen as well as how the data was collected. In the following empirical setting chapter, the analyzed cases will be introduced and presented, including an analysis of their current efforts in the area of circular economies and sustainability. Within the fourth chapter then the findings of the research will be presented and assessed. Linked with the previous chapters the discussion chapter will bring together the aggregated and analyzed information and conduct a critical discussion. Finally, in the last chapter a brief conclusion will be given consisting of a summary that gives a résumé of the elaborated contents, as well as some limitations and potential for further research.

## 2. Literature Review

The following literature review chapter aims to provide an overview of the existing knowledge and understanding of the research topic of circular economies in food & beverage companies by first giving a general definition and description of circular economies in the recent scientific literature. After the gathering of a broad range of scholarly publications, including peer-reviewed articles, books, and other credible sources, gaps in the literature are identified and the strengths and limitations of the evaluated studies are assessed to understand the current state of knowledge on the topic and identify areas for future research. Finally, after comprehensive analysis and synthesis of the relevant literature, the research questions will be presented, and the terms of the research questions will be defined.

### 2.1 Circular Economy Definition and Basic Principles

As previously mentioned in the introduction the inherent functionality of most current and past companies can be characterized as a traditional linear value chain. More and more companies are trying to make the transition towards more sustainable and circular economic

models (Geissdoerfer, Savaget, Bocken, & Hultink, 2017). However, clearly defining the concept of circular economies is not an easy task as there is a wide array of definitions and understandings of this broad topic. The CE concept is currently being advocated by the EU, various national governments, and numerous industry organizations throughout the world. The concept was developed primarily by practitioners, corporate leaders, and policymakers (Korhonen, Honkasalo, & Seppälä, 2018). Nonetheless, in recent years also the number of scientific and academic on this topic has gradually increased, making the framing of a common definition even harder (Kirchherr, Reike, & Hekkert, 2017). Pearce & Turner appear to be the first to explicitly utilize the phrase "circular economy" in an economic model in the year 1990 (Pearce & Turner, 1990). After that the concept has appeared in many different scholarly publications around the world. Several authors have offered definitions and/or interpretations that emphasize the necessity for closed-loop material flows, as well as resource-oriented definitions and/or interpretations, highlighting the need to minimize the use of virgin resources and the negative environmental effects that come with it (Rizos, Katja, & Arno, 2017). An attempt was made a few years ago to unite the several widespread definitions of CE under a comprehensive and systematic analysis. In total 114 definitions were examined, mostly variations of the 4R strategies: reduce, reuse, recycle and recover, and a joint definition was formulated that encompassed the most frequent and used characteristics (Kirchherr, Reike, & Hekkert, 2017). A common definition with the most shared aspects would characterize CE as an attempt to establish an economic structure that may replace the idea of "end-of-life" with alternative reuse or recovery of resources in production/distribution and consumption activities (Ibid.).

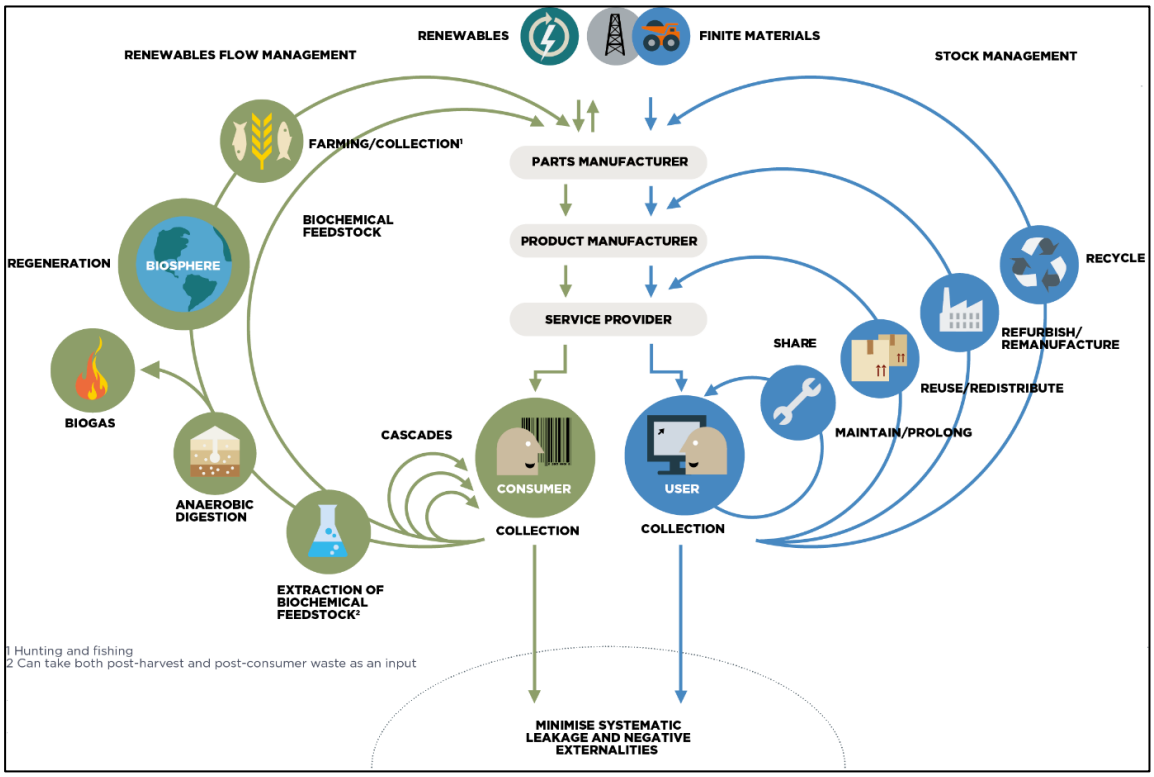
The European Union also gave a definition of the CE concept. Under a joint definition by the European Parliament and Commission CE could be defined as a production and consumption model that involves sharing, renting, reusing, repairing, renovating, and recycling existing materials and products for as long as possible and reducing waste to a minimum, offering a better alternative to the current economic development model, the "take, do, and dispose of" model, with a view to economic, environmental, and social sustainability (European Parliament, 2015; European Commission, 2015).

Another widely common definition is given by the Ellen McArthur Foundation, which is globally known as an organization that focues on accelerating the transition to a circular economies (Ellen MacArthur Foundation, Ellen MacArthur Foundation, 2022). By their definition a circular economy is an economic system that is designed to maximize the use of

natural resources and minimize waste (Ellen MacArthur Foundation, 2016). In a circular economy, materials and resources are kept in use for as long as possible, and waste and pollution are minimized (Ibid.). This is in contrast to the traditional linear economy, in which resources are extracted, used, and then discarded as waste (Ibid.). Also important to mention is that the definition by the Ellen MacArthur Foundation emphasizes goals rather than tactics: eliminating waste and pollution through design, promoting the continued use of products and materials, and regenerating natural systems (Ibid.).

The Ellen MacArthur Foundation also gave the most widely used graphic to visualize the circular economy, the so called “Butterfly-diagram, shown in Figure 2 (Ellen MacArthur Foundation, 2013).

Figure 1 Butterfly Diagram/Circular Economy




Ellen MacArthur Foundation Circular economy systems diagram (February 2019); Drawing based on Braungart & McDonough, Cradle to Cradle (C2C)

The unique features of this model are delineated by the segregation of organic and man-made materials, which, through their recurring processes, give structure to the blueprint, known as the "CE butterfly diagram" (Ellen MacArthur Foundation, 2016). Specifically, in line with this model, the notion of a circular economy is rooted in nature's principles: it borrows

concepts from living organisms, known for their versatility and toughness, and observes the step-by-step transmission of materials (Ibid.). There are several key principles that are central to the concept of a circular economy in this diagram. These include the design of products and services to be reusable, repairable, and recyclable; the use of renewable and non-toxic materials; the optimization of resource use through the sharing, leasing, and remanufacturing of products; and the creation of closed-loop systems that minimize the need for disposal (Ellen MacArthur Foundation, 2022). The main responsibility of the business model is to design or redesign business operations and partnerships in accordance with the principles of the circular economy and to develop a cost and revenue structure that is compatible with both sustainability and profitability (Zucchella & Previtali, 2019).

Overall, the concept of a circular economy is gaining increasing attention and support as a way to address the challenges of environmental degradation, resource depletion, and climate change. While the transition to a circular economy will require significant changes to current economic and technological systems, it offers the potential for a more sustainable and resilient future.

### 2.3 Benefits of the Circular Economy

The circular economy's basic notion is based on companies' and consumers' willingness to close material cycles, minimize inputs, and reuse or recycle goods and trash in order to attain a higher quality of life through greater resource efficiency (Perey, Benn, Agarwal, & Edwards, 2018). This mean that the transition to a circular economy offers many benefits, including reduced greenhouse gas emissions, improved resource efficiency, and enhanced economic resilience. (Geissdoerfer, Savaget, Bocken, & Hultink, 2017). It also has the potential to create new jobs and support economic development (World Economic Forum, 2018). However, the sophisticated concept brings along a plethora of many more benefits in the ecological, economic, and social spectrum that need to be highlighted (Sehnem, Vazquez-Brust, Pereira, & Campos, 2019). All the ecological benefits include things such as raw materials reduction, waste reduction, energy reduction, air emissions reduction, water effluents reduction, land use reduction, hazardous waste reduction, reduction of pollution, increase of eco-efficiency (increase of profitability and environmental performance), water use reduction, improvement of biodiversity and increased sustainable innovation (Ibid.). These opportunities for recycling and remanufacturing can promote prospects for new markets and revenue streams can enhance the profits of established firms and give them a competitive edge over their counterparts (Ellen MacArthur Foundation, 2016). However,

there are many more economic benefits with advantages such as increased profitability, increased revenues, increased market share, increased brand reputation and end-of-life product benefits (Sehnem, Vazquez-Brust, Pereira, & Campos, 2019).

At the end of a product's useful life, it should be reclaimed as the value chain no longer terminates with consumers. This approach results in closer alignment between businesses and customers, enabling companies to better comprehend the public's needs and expectations and design products accordingly (Ellen MacArthur Foundation, 2013). By doing so, they can meet their customers' demands and attract many others (Ibid.). This also bring many social benefits such as increased benefits for customers, more engaged employees, a positive impact on the health of people, food security, transparency, and community development (Sehnem, Vazquez-Brust, Pereira, & Campos, 2019).

### 2.4 Barriers to the Circular Economy

As sustainability begins to be an increasingly prominent matter, food & beverage companies feel the need to look for new approaches to innovate their operations and despite the compelling concept of a circular economy, several companies encounter difficulties in its implementation (Takacs, Brunner, & Frankenberger, 2022). There are many practical barriers to the implementation mainly due to the lack of consistent and precise information about resources, products, and processes (Bianchini, Rossi, & Pellegrini, 2019). Identified implementation barriers can be classified into five different areas, namely: Internal processes; technical; market; Institutional, regulatory, and social; Economic and financial (Ibid.). The first barrier area bears challenges for the implementation such as lacking organizational capabilities which are necessary for implementing circularity across different organizational functions (Sousa-Zomer, Magalhães, Zancul, & Cauchick-Miguel, 2018). The integration and engagement of multiple organizational functions, which are complementary and mutually supportive and additionally the involvement and collaboration of multiple stakeholders play an important role in circular business model implementation and operation (Ibid.). Also very important is the put in effort in terms of the inherent business strategy defintion and company structure as well as organizational competences such as team motivation, participation and company culture (De los Rios & Charnley, 2017). The next problem area are technical challenges, which include the lack of technical and technological expertise (Rizos, et al., 2016). This also includes the challenges for the adaptation of the specific technologies needed for the redesign of circular products and production systems (Linder & Williander, 2017). Another important problem area that can pose problems for the implementation is the market

of operation, which includes the very important issue of stakeholder relationship. Is it of utmost importance for a company to maintain a good stakeholder relationship to ensure good compatibility with business partners and a firm supply network with all involved parties (Geissdoerfer, Morioka, Monteiro de Carvalho, & Evans, 2018). This also involves the customer acceptance of proposed new circular products and processes since they are representing the end consumer (Rizos, et al., 2016). Also from very high importance are the institutional, regulatory and social challenges companies must face, due to a high complexity of regulations, a lacking legal system that is favorable towards an easier and faster resolution of disputes and the general underlying instituonal framework (Roos, 2014). Lastly, and probably a very big challenge for most companies regardless their size is the need for very high long-term financial investments and the costly management and planning processes that are inherent with the implementation of the circular economy in their business models (Rizos, et al., 2016).

### 2.5 Global food & beverage industry

This chapter will give an in-depth analysis of the global food & beverage industry. The global food and beverage industry is a significant contributor to the global economy, accounting for approximately 10% of global GDP and employing over 400 million people worldwide (FAO, The State of Food and Agriculture 2021: Food systems and rural transformation. , 2021). The industry encompasses a wide range of sectors, including agriculture, fishing, forestry, food processing, and food service (Ibid.). The demand increase for food products is highly correlated with the global population increase, urbanization and rising incomes (Rosegrant, Paisner, Meijer, & Witcover, 2020). This has led to increased production and trade of food and beverage products, with many countries relying on imports to meet their domestic demand (Ibid.). However, the food and beverage industry also have significant environmental and social impacts. For example, the sector is a major contributor to greenhouse gas emissions, with the production, processing, and transportation of food accounting for up to 30% of global emissions (Smith & Landry, 2021). In addition, the industry has been linked to deforestation, water scarcity, and other environmental degradation (Ibid.). A very small number of transnational corporations have evolved to exercise significant influence inside the global food system. Firms all over the agrifood supply chain have merged and acquired one another in recent years, forming massive mega-companies that are major actors in what can only be defined as a radical restructuring of the global food economy (Clapp, 2021). This is

happening in farm input markets, agricultural commodity trading, and food processing and retail sector (Ibid.).

### 2.5.1 Waste in the Food Industry

As the global population grows, it is anticipated that both food consumption and waste generation will rise (Tamasiga, Miri, Onyeaka, & Hart, 2022). The steady expansion in human population also necessitates an increase not only in food and food products but also food related products, resulting in an increase in agricultural food waste. (Awasthi, et al., 2018). Food waste is defined as the percentage of edible food that goes unconsumed, including resources for human consumption that are thereafter lost, degraded, discarded, or polluted (Smith & Landry, 2021). Food wastage can occur at various phases of the food supply chain, including the original farming phase, during manufacturing processes, retailing, and during domestic consumption (Garcia-Garcia et al., 2019; Bhattacharya et al., 2021). It is estimated that about one-third of all food produced for human consumption is lost or wasted, as reported by the Food and Agriculture Organization (FAO, 2011). This currently would culminate to around 1.3 billion tons of food are wasted annually due to human consumption (Galanakis, 2020) totaling in global food waste around $1 trillion annually (Septianto, Kemper, & Northey, 2020). It should be noted that food waste is much higher in volume at the household-level than at the business-level, causing households to be considered the main contributing factor to food (Hebrok & Heidenstrøm, 2019). This also mean that the promotion, advancement, and actualization of a circular economic agenda necessitate changes that must be initiated by the consumers (Tamasiga, Miri, Onyeaka, & Hart, 2022). Food waste depletes a considerable quantity of production resources, like capital and energy and continues to put pressure on natural resources such as water and land (Aamir, Ahmad, Javaid, & Hasan, 2018). Numerous studies support the implementation of a circular economy as a solution to address the issue of food waste. The circular economy model aims to reduce resource usage and achieve low carbon and environmental impact by minimizing waste and preserving resources such as raw materials, energy, and water (Tamasiga, Miri, Onyeaka, & Hart, 2022). In this model, food products and inputs are recycled within the food waste context (Ibid.). Several Small and Medium-sized Enterprises (SMEs), for example, have attempted to recover food waste on a small scale. However, large-scale application remains an issue that must be addressed (Khanra, et al., 2021; Batista, et al., 2019).

Effectively reducing food waste through circular business models requires a number of practices. There is a pressing necessity of fostering collaboration among government bodies, private enterprises, academic institutions, and researchers (Tamasiga, Miri, Onyeaka, & Hart, 2022). They should work together to advance, integrate, and accelerate the adoption of circularity, which has the potential to mitigate greenhouse gas emissions linked to food loss and waste (Ibid.). It is also very important to quantify the amount of food waste and greenhouse gas emissions resulting from it across the food value chain as it is critical for examining the "food leaks" in the food supply chain, which can guide targeted strategies for addressing specific areas of concern (Ibid.).

### 2.5.2 Emissions in the Food & Beverage Industry

While emissions occur in various ways, this section will concentrate on the pollution that arises from burning fossil fuels for the purposes of food & beverage production, storage, and distribution. The global food system is thought to be responsible for around one-quarter to one third of all greenhouse gas (GHG) emissions, meaning that reducing GHG emissions from food production is a significant task (Mrówczyńska-Kamińska, Bajan, Pawłowski, Genstwa, & Zmyślona, 2021). Food must be grown, harvested, or fished, transported, processed, packaged, distributed, cooked and the leftovers disposed or recycled (Crippa, et al., 2021). Each of these procedures produces anthropogenic greenhouse gases (GHGs) and necessitates the use of energy (ibid.). According to a UN FAO report, roughly one-third of the greenhouse gases released by the agri-food sector originate beyond the farm gate, and approximately one-third of produced food is lost along the supply chain and not consumed (Sims, Flammini, Puri, & Bracco, 2015). While acknowledging the subjectivity in delineating food system boundaries, there is no denying the considerable reliance on fossil fuels (Liaros, 2021). Any system that consumes more energy than it produces is evidently wasteful and unsustainable (Ibid.) In envisioning a circular food system that eliminates pollution, it is imperative to create a system that necessitates no fossil fuels for food production, storage, or transportation (Ibid.). The Circularity Gap Report suggests that circular economy strategies can reduce global greenhouse gas emissions by 39% and prevent climate change (Circularity Gap Report 2021).

In literature, there are three main methods through which the advancement towards a circular economy with proficient business methods and practices can lower greenhouse gas (GHG)

emissions. Primarily, a circular economy can curtail the GHG emissions arising from the manufacturing of discarded materials by eliminating waste and pollution (Hailemariam & Erdiaw-Kwasie, 2022). Secondly, a circular economy can cut down GHG emissions by recycling products and materials to maintain their embodied energy rather than producing fresh primary products and materials that contribute to GHG emissions (Ibid.). Lastly, a circular economy empowers the sequestration and retention of carbon in the soil, which augments soil and environmental quality (Ibid.).

### 2.6 Research Gap and Question

Despite an increasing amount of literature concerning the broad concept of circular economies and their potential advantages across various industries, there has been limited investigation into the techniques and methods that food and beverage corporations have implemented to incorporate circular economy principles in their core operations. This encompasses methods of minimizing waste and emissions, as well as maximizing the utilization of resources such as water, energy, and materials. Furthermore, research on the hindrances and obstacles that food and beverage corporations encounter when striving to implement circular economy principles, in addition to potential remedies to overcome these hindrances, is inadequate. There is also a necessity for research regarding the enduring economic and environmental repercussions of circular economy initiatives in the food and beverage industry, to comprehend the potential benefits and disadvantages of these initiatives. In general, more comprehensive research is essential to grasp the specific techniques and methods that food and beverage companies can implement to successfully incorporate circular economy principles, as well as the hindrances and obstacles they might face and possible remedies to surmount them. This research could aid in the formulation of more effective methods for decreasing emissions and waste in the food and beverage industry, as well as identifying best practices for other sectors that aim to adopt circular economy principles. To contribute to fill this gap, I propose to explain how food and beverage companies can increase and foster their sustainability inside their operations with the aid of the circular economy. Hence the research question: "How can food and beverage companies implement the principles of the circular economy to foster sustainability."

## 3. Methodology

The methods of the study will be highlighted in this part. The study approach, a complete transcription of the sample, the interview process, and the data collection method will be highlighted in this context. Finally, the data treatment approach will demonstrate how the results were obtained, laying the groundwork for the conclusions provided in the next chapter.

### 3.1 Methodological Approach

For my thesis I chose a qualitative approach. Qualitative research allowed me to gain practical perceptions from professionals on this subject (Birkinshaw, Brannen, & Tung, 2011). Having multiple different, subjective, point of views for each of these questions was crucial to distinguish the broader picture (Rynes & Gephart Jr, 2004). Multiple case studies also allow me to examine a phenomenon in depth and from multiple perspectives, which then can provide a more nuanced understanding of the topic. Another reason why I chose the multiple case study approach is to identify commonalities and differences among the cases. It is very useful for identifying common patterns and trends among cases, as well as for identifying differences and variations among cases (Rynes & Gephart Jr, 2004) I conducted a multiple case study to cover a broader spectrum of companies as each company I focused on is inherently different but still rooted in the food & beverage industry. It allows me to gain a deeper understanding of the particular phenomenon of circular economies and more broadly the topic of sustainability inside those companies (Graebner, Martin, & Roundy, 2012).

As such, participants were chosen deliberately, not randomly. When selecting companies and participants for my interviews I focused first on identifying companies of different sizes and backgrounds. I wanted to have a variety of companies from ideally different areas of the food & beverage industry to get a better overview as well as be able to identify differences among them. That is why I chose two larger and two smaller companies to cover a larger spectrum. Other criteria for the selection of the interviewees were the prevalent knowledge of them not only in the food & beverage industry but also on the topic of sustainability to gain substantial information and data. Four experts from food & beverage companies were interviewed with the same guidelines. Finding and contacting suitable people for my expert interviews was the easier part of the process. However, effectively managing to obtain actual interviews was much harder. I mainly used LinkedIn and my personal network to find and message experts in the area of sustainability in food & beverage companies.

Table 1 Interview Participants and Cases

| | **Case 1** | **Case 2** | **Case 3** | **Case 4** |
|---|---|---|---|---|
| **Participant Name** | Yasmine Barbir | Amanda P. | Nuno Costa | Alexis Baliman |
| **Participant Description** | Head of Sustainability MENA | Management Consultant working for Danone | COO and Marketing | CEO & Co-Founder |
| **Company** | Nestlé | Danone | By Foods | Bouteka |
| **Location** | UAE/France | Netherlands/France | Portugal | Switzerland |

### 3.3 Data Collection

The study was conducted by means of semi-structured, one-on-one, recorded interviews that included particular inquiries. Participants were given the opportunity to elaborate on their responses. I developed an interview guide which was formed around three themes related to circular economies in the food and beverage industry. The interviews with the participants were conducted through the online platform ZOOM and recorded with the consent of the participant which enabled the posterior analysis of the data. As for the language spoken during the interviews, three of them were conducted in English and one in German. The interview in German was further translated into English. The first interview was considered being a pilot interview as I did not know exactly what to expect and thus, some small changes were made to the interview guide afterwards.

Each interview guide contained a form for recording background information on the participants, along with details on the interview's date and duration. To prevent any potential bias, interviews were conducted with an open mind and were adaptable if necessary. Furthermore, questions were modified as needed to suit the conditions of each company. The complete interview guide is available in the appendix.

I relied on both primary and secondary sources of data, including semi-structured interviews with people involved in the food & beverage sector. As for the companies represented in my case studies, I chose not only food producing but also retail and food service companies as the

topic of sustainability is relevant at every step of the value chain of food & beverages as highlighted before in the literature review.

The collection of the secondary data was mainly done through the companies' websites and their provided reports and papers. Additionally, news reports and third-party reports were also used. The full list of the secondary data is available in the appendix.

Table 2 Data Source and Use

| **Data Source** | **Type of Data** | **Use in the Analysis** |
|---|---|---|
| Interviews (four expert interviews from different companies) | Guided expert interviews based on an interview guide (Primary Data) | In-depth analysis and expert input regarding the topic of circular economy in food & beverage companies |
| Company Reports and Documents | Annual Reports, Sustainability Reports, Blog Entries, Website, YouTube Channel, Social Media Channels (Secondary Data) | Familiarization with the companies and the organizational context; Analysis of current efforts and trend in the industry |
| Third Party Documents | Reports from outside organizations (Secondary Data) | Unbiased third-party opinion on the organizational context of the companies |
| News Reports | Newspaper reports of trustworthy sources (Secondary Data) | Unbiased third-party opinion on the organizational context of the companies |

Table 3 Primary Data

| **Case** | **Type of data** | **Name of the interviewee** | **Organization** | **Position in the organization** | **Date oft the interview** | **Length of the interview** |
|---|---|---|---|---|---|---|
| **1** | Interview | Nuno Costa | By Foods | COO | 30.11.2022 | 45 min |
| **2** | Interview | Alexis Baliman | Bouteka | Founder & CEO | 04.12.2022 | 30 min |
| **3** | Interview | Amanda P. | Danone | Management Consultant | 09.12.2022 | 30 min |
| **4** | Interview | Yasmine Barbir | Nestle | Head of Sustainability | 22.12.2022 | 35 min |

### 3.4 Data Analysis

Qualitative data analysis is an ongoing analytical process that begins with the research methodology and extends to the collection and analysis of data (Baxter & Jack, 2008). Hence, qualitative data analysis is one of the most suitable analytical approaches to employ when exploring qualitative research. Organizing content effectively by topics and subtopics is crucial for conducting qualitative research. For this reason, the interviews were classified into primary topics, namely Familiarity with CE, CE in a business setting and implementation barriers and benefits.

Following, codes were created to have a better comprehensive overview of the different topics discussed by the interviewees. Generating codes facilitates a methodical reduction of the most significant information. After grouping the data into distinct codes, the analysis progressed by interpreting the transcribed audio recordings. Given that certain participants offered more insightful and comprehensive answers, some interpretations are equally meticulous and astute. Two examples of the coding are shown below.

**Main Theme:** Familiarity with CE

**Theme:** Knowledge

**Code:** FAM-K

*"Circular economy is a very current topic. The concept can be broken down into five main parts: Reducing, Reusing, Redesigning, Recycling and Rethinking behaviors. All these different aspects together comprise the concept of circularity"- Yasmine Barbir, Nestlé.*

*"Circular economy for me is the recycling and reusing of food related products at different stages of the value chain. We are trying to engage in it as much as possible as it as an important topic for us." – Nuno Costa, By Foods.*

**Main Theme:** Implementation benefits and barriers

**Theme:** Technological innovation

**Code:** IMP-TECH

*"Data plays a big role in the improvement and expansion of circular economy processes. I think that with the increasing digitalization it will get easier and easier to run a sustainable business, mainly through the huge importance of data."- Alexis Baliman, Bouteka.*

*"By collecting and analyzing data, organizations can gain valuable insights into their circular economy processes. Also you cannot effectively manage what you cannot measure so I definitely think that IT and data should be the basis of any decision. We are collecting a variety of KPIs across different areas to effectively track and measure the impact we are generating." – Yasmine Barbir, Nestlé.*

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## 4. Empirical Setting

The goal of this chapter is to introduce and analyze the conducted case studies. It will start with a presentation of the analyzed companies, followed by the presentation of the process/the phenomenon under study with the results.

### 4.1 Case Study 1

#### 4.1.1 Company Overview Nestlé

The first case study is on the major food & beverage giant Nestlé. Nestlé is a Swiss multinational food and beverage corporation based in Vevey, Switzerland (Nestlé, 2021). It is the largest food corporation in the world, measured by revenue and other measures (Ibid.). The company's aims are to be acknowledged as the world leader of Nutrition, Health, and Wellness, trusted by all its stakeholders and to be the reference for financial success in its industry (Nestlé Purpose and Values, 2021). Nestlé manufactures infant food, medical food, bottled water, coffee, tea, chocolate, breakfast cereals, frozen food, and other items (Nestlé Annual Review 2021) The corporation operates in 191 countries and sells over 2,000 different brands and types of its products (Ibid.).

Henri Nestlé, a pharmacist and inventor, founded Nestlé in 1866 by developing an infant food product that saved many lives (Nestlé, Creating Shared Value and Sustainability Report 2021). The company has since grown into a wide-ranging producer of food and beverage products (Ibid.). Nestlé is renowned for its dedication to sustainability and has a range of projects aimed at reducing its environmental impact and supporting global communities (Ibid.). In addition to food and beverage production, Nestlé is also involved in healthcare, medical nutrition, and skin health (Ibid.). The company prioritizes innovation and research and development and has numerous partnerships with institutions and organizations worldwide to explore new technologies and products (Interview Yasmine Barbir). Overall, Nestlé is a global leader in the food and beverage industry, with a strong focus on sustainability, innovation, and providing high-quality products to consumers around the world.

### 4.1.2 Sustainability at Nestlé

Nestlé, as the current world's leading company in the food and beverage industry, has been dedicated to improving sustainability for several years. The company has a number of initiatives in place to reduce its environmental impact and support communities around the world. For instance, Nestlé has committed to water stewardship, aiming to enhance water efficiency in its operations by at least 30% by 2025 (Nestlé, 2021). To achieve this, the company has introduced several measures such as water recycling, water footprint assessments, and stakeholder collaboration (Ibid.). Moreover, Nestlé also wants to reduce its greenhouse gas emissions by 50% by 2030 (Ibid.). This involves energy efficiency improvements, renewable energy projects, and the use of low-carbon technologies (Ibid.). Furthermore, they are supporting smallholder farmers and promoting sustainable agriculture (Ibid.). The company has launched various initiatives such as training programs, financial support, and technical assistance (Ibid.).

Furthermore, Nestlé is committed to adopting circular economy principles in its operations. For instance, the company aims to make all of its packaging reusable or recyclable by 2025, reduce single-use packaging, increase the use of recycled materials, and improve packaging recyclability (Interview Yasmine Barbir). Nestlé is also working with suppliers to increase the use of recycled materials in its products and investing in new technologies to facilitate the use of recycled materials in its products (Ibid.). The company is piloting circular water systems in its factories to reuse and treat wastewater (Nestlé, 2021). These efforts demonstrate Nestlé's commitment to minimizing waste and maximizing the use of resources in its operations.

## 4.2 Case Study 2

### 4.2.1 Company Overview Danone

The first case study is about the global food & beverage company Danone. Danone S.A. is a French multinational food-products corporation based in Paris (Danone, Danone Integrated Annual Report 2021, 2021). Currently Danone employs around 98 thousand employees in over 55 countries worldwide (ibid.).

The global food and beverage company produces and sells a variety of products, including dairy products, baby nutrition, medical nutrition, and bottled water. Founded in 1919, the company is headquartered in Paris, France and operates in currently over 120 countries worldwide. Danone is committed to providing healthy, sustainable, and tasty food and beverages to consumers, and to being a leader in the transition to a healthier and more sustainable food system. Some of the company's best-known brands include Danone, Evian, Activia, and Oikos (Danone, Danone Integrated Annual Report 2021, 2021).

### 4.2.2 Sustainability at Danone

Danone is strongly committed to sustainability, with a focus on reducing its environmental impact and fostering social and economic development in the communities it serves. To achieve these goals, the company has implemented several initiatives, including reducing greenhouse gas emissions, promoting sustainable agriculture, and investing in renewable energy sources. Danone also collaborates with many of its suppliers, farmers, and other partners to encourage the sustainable practices throughout the supply chain. Moreover, the company has several programs in place to support the communities where it operates, such as providing access to clean water and supporting local economic development. Danone's commitment to sustainability is a key element of its business strategy, reflecting its dedication to being a responsible and sustainable global food and beverage company.

Currently Danone is working very hard on implementing circular economy principles in its operations. One of its main focuses is to reduce packaging waste by using more sustainable materials, designing for recyclability, and increasing the use of recycled materials (Danone, 2018). The company has set ambitious goals, such as ensuring that all its packaging is reusable, recyclable, or fully compostable by the year 2025 (Ibid.). In addition to packaging, Danone is also exploring circular solutions for its agricultural practices, including regenerative agriculture, which involves using farming techniques that promote soil health and biodiversity (Danone, For a Regenerative Future - Regenerative Agriculture, 2021).

Another area where big investments are flowing into are renewable energy sources, such as wind and solar power, to ultimately reduce its carbon footprint (Ibid.). They are very committed to working with its suppliers, customers, and other partners to promote sustainable practices throughout the supply chain (Danone, 2021). Overall, Danone's efforts to adopt circular economy principles demonstrate a big commitment to minimize waste and maximize the use of resources in its operations, while also supporting the communities in its area of operation.

### 4.3 Case Study 3

#### 4.3.1 Company Overview By Foods

The third case study is about the Portuguese food retailer “By Foods”. The company was founded 2016 in Vila Nova de Gaia close to the city of Porto, Portugal. The founder Mabílio de Albuquerque originally had the idea of founding the company back in 2013 but founded it three years later in 2016. Currently they are employing nine people in Portugal. By Foods does not produce the products that they are selling themselves currently. A purchase team produces the materials, and those materials are then sent to a producer to produce their product. However, in the future it is a possibility to also start producing their products inhouse to increase the influence on the supply chain.

ByFood is currently only selling two very similar products. One of them is the renowned Portuguese pastry “Pastel de Nata” and the other one the so called “Queijada”, also a Portuguese pastry. They are sold by the company under two main brands one being “Nata Pura” for the “Pastel de Nata” and the other one being “K-Jada” for the “Queijada”. As previously mentioned despite them only selling two products they are offering a variety of versions of the pastries with different flavors. Flavors for the “Pastel de Nata” include the original version, chocolate, mixed berries, cheese, mango mint, passion fruit, apple, strawberry, salted caramel and macchiato. Besides these different flavors for the “Pastel de Nata” they are also offering different sizes (75g, 60g and 25g) and options for private labels or branded labels based on the customers preference (By Foods). A major goal for the company is also to create more awareness for Pastel de Nata on a global scale. Around 99% of the company’s revenue is through their sales of their products, which was was around 3.5 € million in 2021 (Interview Nuno Costa). Currently they are exporting to 20 countries, with their biggest markets being South Korea, second biggest market being Japan and third biggest

market being Germany (Ibid.). Though it is expected that the US market will take the number one spot in the future (Ibid.).

### 4.3.2 Sustainability at By Foods

The sustainability vision of "By Foods" focuses on three main pillars, namely people, planet, and profits. When it comes to their product, they are trying to use ingredients of the highest level. The products ingredients used in all of the BY Foods are all natural and locally sourced. They are paying special attention to only use the highest grade of ingredients. This also encompasses the no use of HFCS (High Fructose Corn Syrup), but real cane sugar instead. Additionally, they also do not contain GMOs (Genetically Modified Organism). UHT Milk (Ultra-high-temperature processing), Free-Range Eggs and Wheat Flour are used, no powder ingredients, no use of preservatives or additives. The only exception is made with margarine, but also in this case, they offer the highest sustainability standard in the market, which is 100% segregated RSPO palm oil (Roundtable on Sustainable Palm Oil). Also of high importance is their production procedures, where during production all of the ingredient packaging materials are separated for recycling, and all production waste is minimized and disposed of by environmentally tested processes. Probably their biggest contribution towards sustainability and a circular business model is the product packaging where all the cardboard and corrugate packaging materials used on the product are recycled and recyclable. All packaging is designed to minimize material use and optimize transport so that they have the smallest possible carbon footprint on logistics. When it comes to their revenue and profits, they view honesty and integrity as absolutely fundamental values in their relations with all stakeholders. Their aim is to be as transparent as possible in all communications with the market, by being concise, direct, and factual. They are always available to listen to critics and correct whatever they understand to be necessary, in order to achieve further quality steps. Their aim is not to create profits at any cost, but instead provide the best possible products satisfying needs and expectations. They believe that if they are able to do this, profit will arrive easily and naturally. By Foods is continuously looking for new procedures that contribute effectively to their sustainability program on a day-to-day basis with the whole team involved, so a sustainability mindset is always present.

### 4.4 Case Study 4

#### 4.4.1 Company Overview Bouteka

The next case study is about a sustainable food start-up from Switzerland called “Bouteka”. Bouteka is specialized in the resale of local, organic, seasonal and unpackaged food products, in the form of weekly baskets while also offering a delivery system within Switzerland. Sensitive to the protection of the planet and respect for all, Noureddine, Romeo, and Alexis had the idea of creating Bouteka to contribute a practical experience to the sustainable transition of society, both ecologically and socially. It was also the realization of a shared desire to create a company with a goal of positive impact according to their values, which led to the founding of the company in 2020 during the height of the Covid-19 pandemic as a result of an economic innovation course at the Haute Ecole de Gestion de Fribourg. The three friends, Alexis, Romeo and Noureddine founded the company after their business model during the course seemed functional and showed evidence of success. Following the initial conceptualization of the project, a concrete development phase followed with the assistance of Fri Up, an organization for young Friborg start-ups. In the fall of 2020, Bouteka began selling their first baskets to Friborg students on the Pérolles university campus. Since that time, over 1,500 baskets have been ordered and consumed, promoting healthy, responsible, and affordable food. With nearly two years of experience delivering agricultural baskets to students, Bouteka is now embarking on a new venture, offering employees of Friborg companies the opportunity to have a triple positive impact. Their main company mission can be summarized in three aspects namely: Offering Fribourgeois a model of responsible, healthy and affordable food consumption; revalorizing the work of local farmers and craftsmen; and promoting environmental awareness by providing a transparent, engaging and fun customer experience.

#### 4.4.2 Sustainability at Bouteka

Bouteka sees itself not as a simple company respecting only the three key principles (Social, Ecological, Economic) but also many other values that they deem important. It is driven by their purpose at the service of the community. Their socio-enviromental impact is of utmost importance, which is also why respect is at the center of Bouteka's activities. They are extremely close with their partners, which they treat with dignity and trust, and strive to give them as much visibility as possible. Bouteka also aims to limit its ecological footprint as much as possible for the sake of preserving the planet. That is why they are nurturing a close

partnership with many farmers around the Fribourg area. Unlike other large retail companies Bouteka takes everything they can from local farmers. So even fruits and vegetables that would not been suited for sale in a regular grocery store are taken in and used, ultimately reducing food waste. Also, they are not using any packaging in their operations as their products are given out in reusable baskets, where consumers can take out what they want. Another very important aspect for them is their transparency on the origin of their products as well on their business activities. In the long term, Bouteka wishes to become a benchmark alternative to the current mode of food consumption and thus actively contribute on its own scale to the renewal of a social and responsible economy, as well as to the preservation of Swiss natural resources. These efforts are also strengthened and proved by their awards and memberships such as the Sustainable Innovation Prize of the City of Friborg 2021 or by co-organizing the conference "Building short food circuits together" with the artisans of the Transition, 2021.

## 5. Findings

The purpose of this study was to investigate how food and beverage companies can use the principles of circular economies to foster sustainability. To address this research question, a literature review of existing studies on circular economies and their potential applications in the food and beverage industry was conducted. The results of the literature review indicate that there are several potential ways in which food and beverage companies can adopt the principles of circular economies increase sustainability and effectively reduce emissions and waste. In particular, strategies such as using renewable energy sources, promoting waste reduction and recycling, and implementing closed-loop supply chains can help to reduce emissions and waste in the food and beverage industry. Additionally, qualitative research in form of case studies were conducted. For this different companies from the food & beverage sector were chosen and expert interviews with managers were conducted.

In the following sections of this chapter, the findings are presented in greater detail, and their implications for food and beverage companies are discussed.

### 5.1 Implementation of the circular economy in companies

Circular economies have gained a lot attention in the food and beverage industry due to their potential to reduce waste/emissions and increase resource efficiency as I previously stated in the literature review. Many companies in this sector have implemented circular economy initiatives, such as reducing packaging waste, promoting sustainable agriculture practices, and

investing in renewable energy sources. As have the companies that I analyzed Nestlé, Danone, By Foods and Bouteka. All the companies I analyzed know about the concept and are familiar by different degrees on the trends of the current market when it comes to sustainability and circular economy, which is obvious given their position and work in their respective companies. The two multinational companies Nestlé and Danone are engaging in a wide variety of processes and efforts to implement circular economies inside their operations. They are engaging in renewable agriculture, reusable, and recyclable packaging for their products and in new technology for water systems. With being such well known and large companies, they do carry a certain responsibility when it comes to these topics and hence need to lead the way, resulting in their engagement in many different efforts to implement circular business models to reduce waste and emissions. It definitely has a cost of being a first mover but usually the cost of being inactive is a lot higher for these global companies. While the bigger companies can engage at multiple fronts the smaller companies are limited to selected areas given their limitations to financial resources and knowledge. By Foods for example set the focus mainly on their packaging and production procedures and Bouteka is focusing its business model on the use of local, sustainable products with no packaging. It is also hard to determine for the smaller companies how much value they are creating exactly as they do not have the resources to gather a lot of date to support their operations. With their limited access to data, it is still observable that they are definitely creating value through their sustainable efforts. One important that was also gathered through the research is that it is very important is their influence on the culture of company and consumer. Every company directly or indirectly mentioned this as being very important. In order to actually make a change and effectively implement these circular business processes sustainability must be a key pillar of their company vision and mission. Greenwashing is very frowned upon and to inspire the people inside the company and also the consumers to pull in the same direction one actually needs to do it for a good cause. All these companies have put sustainability as their core value to different degrees into their company culture, which allows them to make these sustainable changes easier.

All these efforts by the companies show that they are well aware of the current trends in the market when it comes to sustainability and circular economies. They all are engaging in the matter, even if it is on different levels due to limitations in their company structure and size. These efforts are having a direct impact on reducing waste and emissions and fostering

sustainability on a global level for Nestlé, Danone and By Foods and on a more regional level for Bouteka.

### 5.2 Barriers of implementation

Barriers of implementation are faced by every company I analyzed to some degree. These Barriers need to be overcome by the companies in order to effectively implement circular economies to increase their sustainability. Barriers I could identify through my interviews were regulatory barriers, financial barriers, operational barriers and cultural barriers on the company and consumer side.

Regulatory Barriers:

The regulatory and policy barriers can also hinder the implementation of circular economy practices. The interviews revealed that three of the four analyzed companies felt that regulations and policies were a significant barrier to implementing their own personal circular economy practices. Some possible solutions to overcome this barrier would include advocating for policy and regulatory changes that support circular economy practices, engaging with policymakers and regulators to promote circular economy practices, and participating in industry associations that advocate for circular economy practices.

Financial Barriers:

Financial barriers can also disrupt the implementation of circular economy practices. My interviews revealed that for two companies (By Foods, Bouteka) the respondents felt that financial barriers were a significant barrier to implementing circular economy practices. This is mainly due to their small size and therefore limited access to funding. They are operating with much smaller margins and therefore have to be more cautious where they want to allocate their funds into.

Operational Barriers:

Operational barriers were actively named by only one of the interviewees (Nestlé). However, I would say that this barrier might be applicable to all the companies. The bigger the company the more operations and processes one needs to monitor. This can cause unclearness inside the company as logically not every goal can be pursued with the same effort. There are simply to many factors that might be influencing processes to effectively manage. Hence, why it is in most cases smarter to focus on a few selected areas instead of trying to do everything at the same time.

Cultural Barriers:

There are two sides to the cultural barriers, one side being the company culture and the other being the culture of the consumers. This barrier is probably relevant for every company I observed even if it was not mentioned directly by some. While you have a direct influence on the culture inside your company it is hard to change the culture of a country for example. These changes come gradually and can only be achieved by collaborative work of all participants. Companies must work together with other companies, government, organizations and be in constant exchange with the consumers to achieve this effectively.

From the findings we can observe that while there are similar barriers all companies face, there are still some differences between them. This is mainly due to their size, access to resources and knowledge.

## 6. Conclusion

Concluding the research on CE in food & beverage companies has as objective to understand if the matter is being applied in the industry mentioned. Firstly, a wide-ranging literature review was made to gain more insight into the topic as well as to know about potential benefits and barriers of the concept. The current state of the food & beverage industry was also analyzed more in depth to gain a solid understanding of current trends, problems and opportunities. It is being very clear that in today's world the topic of sustainability and more recently circular economies cannot be ignored and must be part of any companies' agenda or even culture in the food & beverage industry. The advantages and benefits of these sustainable and circular measures are definitely overweighing the disadvantages and barriers to implement them. It is in every companies' responsibility to pursue these efforts further not only for their own advantage but to push the development and improvement in these areas for the general public. Every company carries a certain responsibility, some more than the others of course due to their bigger impact on the global stage and reach. Finally, it can be concluded that it is crucial for food and beverage companies to prioritize the implementation of circular economy principles and to collaborate with stakeholders to overcome the barriers they face. By doing so, they can contribute to a more sustainable future and address the challenges of climate change and reap the benefits of their increased sustainability economically and also socially. Ultimately, the success of the circular economy in this industry will depend on the

commitment and leadership of companies, policymakers, and consumers in driving a sustainable food system.

### 6.1 Limitations & Potential for further research

While this thesis was conducted in a disciplined manner, certain limitations should be considered. First of all, while the topic of circular economies, also broader the topic of sustainability, has been around for several decades it is still an ever-evolving area of concern for not only companies but also governments and private people alike. New aspects are discovered every year and companies need to adapt to changing policies, regulations, and consumer preferences. This thesis is only a depiction of the current standpoint and therefore subject to change at any time.

Additionally, it should be noted that a small sample size of cases might not be representative of the wider population of businesses or organizations studied, rendering it challenging to generalize the findings of the study or draw broader conclusions regarding the phenomena examined. Moreover, a limited number of case studies could also impede conducting an in-depth analysis or identifying patterns or trends, making it arduous to derive meaningful conclusions or develop theory or knowledge on the matter under study. All in all, a small pool of case studies could restrict the ability to conduct high-quality qualitative research and draw reliable conclusions from the findings.

Furthermore, while the circular economy concept has numerous potential benefits, such as waste reduction, resource conservation, and economic growth promotion, there are also various limitations and possibilities for further research associated with its implementation. Some of these limitations entail challenges in measuring the effectiveness of circular economy initiatives, given the absence of established metrics or standards to measure the concept's impact. In addition, there is limited information and data on circular economy practices, which is necessary to have access to for effectively implementing a circular economy. Furthermore, established industries and businesses might resist the shift towards a circular economy. Moreover, inadequate infrastructure and support systems might hinder the realization of a circular economy's benefits, such as new waste management systems, education and training programs, and financing mechanisms. Finally, political support and funding are crucial to the transition to a circular economy, yet political leaders and decision-makers might not fully commit to the concept, and funding for related initiatives might be limited, making it challenging to achieve the desired outcomes.

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**Appendix**

Appendix 1 – Interview Guide

| | |
|---|---|
| Date | |
| Interview Time | |

Presentation of myself and explain my research goal. Ask for permission to record the interview and if I can mention the hotel's name in my research. The anonymity of the participants will be respected if desired.

This research is part of my Master thesis at the Católica Lisbon School of Business & Economics. The objective of this research is to gain expert knowledge on the topic of sustainability, more specifically the topic of circular economy inside food & beverage companies and if they apply practices related to that approach and to what extent. The participant's experience and insight on this issue are valuable for the research.

The interview is divided into three parts and is roughly going to take about 20-30 minutes. It is structured as an open interview and the questions will not be in any particular order. The questions can be used as a guideline for the conversation. New questions can be added as the interview evolves.

Thank you for being part of this research!

**Part 1 – Introduction:**

Q1.1: Could you briefly introduce yourself and explain what your current role is at your company?

Q1.2: Can you give some background information on your company (background (founding year, history, number of employees, products)?

Q1.3: Is the concept of circular economies a current topic at your business?

**Part 2 - General Questions:**

Q2.1: Are you familiar with the 'circular economy' concept?

Q2.2: What is your current understanding of the circular economy and the extent to which your company engages in it?

Q2.3: Is the 'circular economy' concept being discussed in your organization? If yes, why is it a key priority?

Q2.4: What are the most important components of a circular economy in your company?

**Part 3 – Specific Questions**

Q3.1: Who within your business, partner network and external stakeholder community should play a role in defining, engaging, and implementing your circular strategies?

Q3.2: Is the 'circular economy' concept being discussed with/by other organizations you work with?

Q3.3: Does a company that decides to go in this direction require new staff positions or new kinds of managers?

Q3.4: Can the Internet and other forms of IT promote the circular economy?

Q3.5: Will moving toward a circular economy require changes in consumer behavior? Are those happening?

Q3.6: How much value will be created if circular strategies are implemented?

Q3.7: What are likely to be the most significant barriers to implementing circular approaches in development contexts?

Appendix 2 – Secondary Data

| Case | Type of data | Title oft he doucment | Name oft he author | Name of his/her organization | Date of publication |
|---|---|---|---|---|---|
| **1** | Blog Entries | | By Foods | By Foods | N/A |
| **1** | Website | | By Foods | By Foods | N/A |
| **1** | YouTube Channel | | By Foods | By Foods | N/A |
| **1** | LinkedIn | | By Foods | By Foods | N/A |
| **1** | Instagram | | By Foods | By Foods | N/A |
| **1** | News Article | The Unlikely Rise of the Pastel de Nata, and Why It's Suddenly Everywhere | Bloomberg | Bloomberg | 15.04.2019 |
| **1** | News Article | Storia e successo dei pastéis de nata | Il Post | Il Post | 30.06.2019 |
| **1** | News Article | Le pastel de nata à la conquête du monde | Les echos | Les echos | 19.07.2019 |
| **1** | News Article | Así es Nata Pura, el McDonald's de los pasteles de Belém que triunfa en el mundo | El Economista | El Economista | 16.04.2019 |
| **2** | Website | | Bouteka | Bouteka | 2022 |
| **2** | LinkedIn | | Bouteka | Bouteka | 2022 |
| **2** | Instagram | | Bouteka | Bouteka | 2022 |
| **2** | News Article | Un panier pour attirer les étudiant | La Liberte | | 30.12.2020 |
| **3** | Internal Document | DANONE INTEGRATED ANNUAL REPORT | Danone | Danone | 2021 |
| **3** | Internal Document | Danone Regenerative Agriculture-2021 | Danone | Danone | 2021 |
| **3** | Internal Document | DANONE Water Policy | Danone | Danone | 2021 |
| **3** | Internal Document | Danone Company Dashboard | Danone | Danone | 2019 |
| **3** | Internal Document | DANONE'S CONTRIBUTION TO UN'S SUSTAINABLE DEVELOPMENT GOALS | Danone | Danone | 2019 |
| **3** | Internal Document | Sustainability Performance Data | Danone | Danone | 2021 |
| **3** | Rating agency | Climate Change 2022 | CDP | CDP | 2022 |
| **3** | News Article | Food and beverage makers | Foodbusiness News | Foodbusiness News | 2023 |

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| | | poised to miss plastic sustainability goals | | | |
| **3** | News Article | Are the top five FMCG companies leading the way on circularity? | Packaging Gateway | Packaging Gateway | 2022 |
| **3** | News Article | Legal warnings issued to Nestlé, Danone and others over plastic | Circular Online | Circular Online | 2022 |
| **3** | News Article | Nestle, Danone, Unilever and PepsiCo agree on plastic chemical recycling principles | Greenbiz | Greenbiz | 2022 |
| **4** | Internal Document | Annual Review 2021 | Nestle | Nestle | 2021 |
| **4** | Internal Document | Creating Shared Value and Sustainability Report 2021 | Nestle | Nestle | 2021 |
| **4** | Internal Document | Nestlé Responsible Sourcing Standard | Nestle | Nestle | 2021 |
| **4** | Rating agency | Climate Change 2022 | CDP | CDP | 2022 |
| **4** | News Article | Industry investments in sustainable packaging accelerating | Foodbusiness News | Foodbusiness News | 2022 |
| **4** | News Article | Are the top five FMCG companies leading the way on circularity? | Packaging Gateway | Packaging Gateway | 2022 |
| **4** | News Article | Legal warnings issued to Nestlé, Danone and others over plastic | Circular Online | Circular Online | 2022 |
| **4** | News Article | The circular economy: A €4.1 trillion opportunity? | Euronews | Euronews | 2022 |
| **4** | News Article | Nestle to stop sourcing from Indonesian palm oil producer AAL | Reuters | Reuters | 2022 |
| **4** | News Article | Nestle, Danone, Unilever and PepsiCo agree on plastic chemical | Greenbiz | Greenbiz | 2022 |

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| | | recycling principles | | | |
| **4** | News Article | Nestlé shares key packaging sustainability metrics | Packaging Europe | Packaging Europe | 2022 |
| **4** | News Article | Nestlé Develops Alliance For Small Plastics Recycling | ESM Magazine | ESM Magazine | 2022 |

Appendix 3 - Coding Table

| **Main Themes** | **Sub-Theme** | **Code** | **Description** |
|---|---|---|---|
| Familiarity with CE | Knowledge | FAM-K | Knowledge of circular economy principles |
| Familiarity with CE | Awareness | FAM-A | Awareness of circular economy practices in the food & beverage industry |
| CE in a business setting | Business case | BUS-C | The potential business benefits of implementing circular economy practices |
| CE in a business setting | Market demand | BUS-M | The growing market demand for sustainable products and practices |
| CE in a business setting | Competitive advantage | BUS-COMP | The competitive advantage gained by being a circular economy leader in the industry |
| Implementation benefits and barriers | Resource efficiency | IMP-RES | Improved resource efficiency through circular economy practices |
| Implementation benefits and barriers | Technological innovation | IMP-TECH | The role of technological innovation in enabling circular economy practices |
| Implementation benefits and barriers | Cultural change | IMP-CULT | The need for a cultural shift towards a circular economy mindset |
| Implementation benefits and barriers | Collaboration | IMP-COL | The importance of collaboration between stakeholders in implementing circular economy practices |
| Implementation benefits and barriers | Policy and regulation | IMP-POL | The role of policy and regulation in supporting or hindering circular economy practices |

Appendix 3 - Themes

Theme 1

Presents the familiarity with CE of each of the participants in the interview. Here, the respondents were asked if they know the concept of CE and to which degree their company is engaging in it.

| Theme 1 – Familiarity with CE | | | | |
|---|---|---|---|---|
| | Case 1 | Case 2 | Case 3 | Case 4 |
| Q2.1: Are you familiar with the circular economy' concept? | Yes, I am familiar with the concept. | Yes, I am familiar. | Yes. | Yes, I am familiar with the concept of circular economies. |
| Q2.2: What is your current understanding of the circular economy and the extent to which your company engages in it? | Circular economy is a very current topic. The concept can be broken down into five main parts: Reducing, Reusing, Redesigning, Recycling and Rethinking behaviors. All these different aspects together comprise the concept of circularity. It is a big part of the current sustainability measures we pursue at Nestlé and highlighted in the Creating Shared Value and Sustainability Report. | I would describe it as an economic system aimed at minimizing waste and preserving resources, by keeping products, materials, and resources in use for as long as possible through recycling and regenerating them. Danone actively engages in the matter of circular economies in number of different ways. Most of it is highlighted in the sustainability report and in our vision "One Planet One Health". | Circular economy for me is the recycling and reusing of food related products at different stages of the value chain. We are trying to engage in it as much as possible as it as an important topic for us. | In my understanding circular economy means closing the product cycle loop and trying to recycle and reuse as much as possible. With Bouteka being a start-up that is build on sustainability we are proactively engaging in it. Meaning that before anything else in the company comes sustainability. |

Theme 2

Present the concept of circular economy in a business setting

| Theme 2 – CE in a business setting | | | | |
|---|---|---|---|---|
| | Case 1 | Case 2 | Case 3 | Case 4 |
| Q2.3: Is the 'circular economy' concept being discussed in your organization? If yes, | Yes, as previously mentioned it a big part of the sustainability efforts at Nestlé. We at Nestlé as a multinational company carry a big responsibility to be one | Yes, the concept of circular economy is being discussed greatly at Danone. Sustainability and more specifically circular economy has been a big part of | I would say yes even if we do not mention it namely it is a big part. Especially in our packaging and production it plays a big role. | Yes, since we have sustainability as our main core identity at Bouteka it is very important to us. We try to limit our ecological footprint as much as possible for the |

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| why is it a key priority? | of the leaders in the field of sustainability and CE. | Danone for a long time now. | | sake of preserving the planet. |
| Q2.4: What are the most important components of a circular economy in your company? | The are many important aspects that Nestlé is pursuing like for example Helping to protect, renew and restore natural resources by going for net-zero emissions in all of our operations, endorsing regenerative agriculture or to improve the current packaging standards in the industry and foster more sustainable and recyclable options to name a few. | Important aspects for me would be the development of circular supply chains that focus on minimizing waste, optimizing resource use, and promote sustainability not only inside of the company but in every area, it is connected with. | At By Foods the most important aspects are the use of good product ingredients and production procedures, as well as the use of recyclable product packaging. | At Bouteka the most important aspects for us are the use of local products we source from a specifically picked farmers around Fribourg and the |
| Q3.1: Who within your business, partner network and external stakeholder community should play a role in defining, engaging, and implementing your circular strategies? | I think that the responsibility lays not only with us as a global company but also with organizations and governments. Cooperation is key when it comes to the implementation. | Multinational companies like Danone definitely carry a lot of responsibility when it comes to this because of their abundancy of resources they should lead the movement. Besides that, the governments also should play a bigger defining role in this. | The government and regulators should play a defining role since the food industry is highly regulated and we cannot just implement any idea. It needs to be approved first. Especially as a smaller company we can not afford to lose money on ideas that might not get approved. | I think that everyone plays an important role. Big companies as well as smaller companies like us but also the consumers and governments. It takes effort from everyone. |
| Q3.2: Is the 'circular economy' concept being discussed with/by other organizations you work with? | Yes, we are in constant exchange with other companies, organizations, customers and producers. Advocating together with other industry leaders and governments we are ensuring the steady development of the circular economy and sustainability topic. It needs private and public partnerships to effectively tackle the issue/opportunity of sustainability. | Yes, Danone a big multinational company is constantly working together with organizations and governments. | No, we are currently not exchanging any information with other organizations, but we are keeping an eye on the market and current trends. | Currently, we are not exchanging any information with other organizations. |

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| Q3.3: Does a company that decides to go in this direction require new staff positions or new kinds of managers? | It depends on the company I would say. You cannot really generalize this. We have allocated a lot of resources and workforce into this and now we are profiting from it as we can use the journey on different markets to make decisions based on prior knowledge. | I would say it depends on the size of the company. For a small company that might not be financially viable but for big cooperation it is a must. | Currently we do not have one single person assigned for the sustainability measures. Since we are just nine employees, we share this part. If someone has a good idea, it is discussed in the group and then decisions are made together. | In our case as a relatively small company with just three people working in it, I do not think it is necessary yet. However, I think that bigger companies should allocate more resources towards as they have it more abundantly. |

Theme 3

Presents the enablers and barriers for implementation of the circular economy

| Theme 3 – Implementation benefits and barriers | | | | |
|---|---|---|---|---|
| | Case 1 | Case 2 | Case 3 | Case 4 |
| Q3.4: Can the Internet and other forms of IT promote the circular economy? | By collecting and analyzing data, organizations can gain valuable insights into their circular economy processes. Also you can not effectively manage what you can not measure so I definitely think that IT and data should be the basis of any decision. We are collecting a variety of KPIs across different areas to effectively track and measure the impact we are generating. | New IT advancement and especially data plays a critical role in driving the growth and advancement of circular economy processes.<br>It helps to efficiently manage resources, monitor waste and emissions to achieve sustainability goals. So yes, I definitely think that the internet and IT is very important for the promotion of circular economy. | Yes, I think it can help if used correctly. You need to know what data you are using and what it gives you to gain benefits from it. | Data plays a big role in the improvement and expansion of circular economy processes. I think that with the increasing digitalization it will get easier and easier to run a sustainable business, mainly through the huge importance of data. |
| Q3.5: Will moving toward a circular economy require changes in consumer behavior? Are those happening? | Yes, I do think so. We are on a good way currently, but more awareness definitely needs to be created. Not only big companies but also the media and governments play a crucial role in creating awareness. We are currently advocating | As previously mentioned, I think that companies and governments are carrying most of the responsibility for leading change but nonetheless I think that consumers should incentivize. There is a change from the consumer side already | Yes, although people nowadays are much more aware about current trends and sustainability than for example 20 years ago. We are trying to engage more with our customers through our social media channels. | I think that it definitely will require a change in consumer behavior. People would be much more open and positive towards those changes if more companies would make it their priority to advertise these things. |

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| | through all our channels to increase not only brand awareness but also activation to change consumers mindset. | happening which will further push the companies to do good. | | |
| Q3.7: How much value will be created if circular strategies are implemented? | In our previously mentioned creating shared value report we are meticulously tracking many different KPIs throughout our roadmap. To answer this question, it depends on what factors exactly are considered. If we are talking about savings in for example GHG or the amount of plastic saved. To give a number our current level of sustainable packaging throughout our whole operations is currently at 92% globally. | Creating value not only financially but also ecologically and socially is part of the circular economy concept. While I think that it is hard to exactly quantify it in a big total number, we have a good understanding about general numbers. We are tracking a variety of numbers and based on this we can see our value created. | This is very hard to measure in my opinion. We do not have the data to effectively answer this question. | I think that this is a very good question as it is hard to quantify this in numbers. We currently cannot break it down to numbers other than the number of baskets sold and the number of local farmers we are working with. But in the future, we are planning on collecting more data to not only increase transparency for customers but also our operations. Globally, I think that the big companies have the data available to more effectively measure their impact and also should do so transparently. |
| Q3.8: What are likely to be the most significant barriers to implementing circular approaches in development contexts? | One big barrier for us would be to wisely pick the battles that you want to fight. Obviously, trying to solve every problem at once is not a possibility so it important to know what can be done at which stage effectively to not waste resources. Another big barrier for us in my opinion is the cooperation with other entities. We can not lead the change all by ourselves. It needs effort from other companies and governments as well. | In my opinion one of the biggest barriers to the implementation is the company culture. If sustainability is already a part of the company culture the implementation is usually much easier as opposed to when it is not. Also, I think that capitalism is a big barrier as a lot of companies are just doing greenwashing just to appear "green", which is not effective. There is a big difference between just acting good and actually doing good. | I think the biggest barriers for us currently are the high cost for investments to achieve higher levels of sustainability. We are operating with very small margins and it is hard to implement many changes as these would also mean to increase the prices for our customers. Regulations are another very big barrier as the food & beverage industry is highly regulated in every market. | I think the biggest barriers for us currently would be in the form of financial barriers. We do know in what direction we want to go but this takes time as well financial investments. Since we are a relatively small and young company these might be biggest barriers. Also regulations are something we still need to watch out for. |