UNIVERSITY OF GOTHENBURG

SCHOOL OF BUSINESS, ECONOMICS AND LAW

Consumer Incentives for Participating in a Circular System

～Understanding the Use of Reusable Food and Beverage Packages ～

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Abstract

Human actions are causing a growing negative impact on the environment and measures must be taken to halt this trend. In response, the EU and Sweden have developed new regulations to be implemented, aimed at reducing the environmental impact of disposable food and beverage packaging. This thesis aims to investigate consumers' willingness to participate in a circular supply chain by using reusable packaging for ready-to-eat food and beverage. The research questions focus on consumer incentives and provide suggestions for implementing a circular supply chain. Qualitative methods, including interviews with consumers aged 20-40 years, an observation, and a pilot project workshop, were used to gather data. The findings show that consumers value convenience and an efficient return process. Environmental and economic factors influence their decisions but not at the expense of convenience and time. The design of the packaging was not found to have a significant influence on consumers' decisions, but hygiene was considered an essential feature. Ultimately, a circular supply chain must be tailored to meet consumer needs and preferences to maximize efficiency. The suggested solution involves a simple registration and generous return policies.

Keywords: *Sustainable Food Packaging, Sustainable Beverage Packaging, Circular Economy, Environmental Sustainability, Consumer Incentives, Multi Criteria Decision Analysis, Circular Economy and Logistics, Swedish Packaging Policies, Circular Packaging Solution*

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Hanna Isaksson & Hanna Palmqvist (H2)

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Preface

This thesis has been conducted in collaboration with the forestry company Stora Enso. They work in the packaging industry and, among other things, develop methods to offer renewable material solutions in accordance with new regulations (Stora Enso, n.d.). The history dates back to 1998 when the Finnish company Enso Oyj and the Swedish company Stora Kopparbergs Bergslags Aktiebolag merged and together formed what is today named Stora Enso. Since the start, the organization has expanded and today runs businesses on five continents. As an alternative to traditional materials, Stora Enso offers low carbon alternative solutions which is an important development for a reduced environmental impact (Stora Enso, n.d.). As a major player in the field of renewable materials, the company is constantly working to evaluate the market, which has made this thesis possible. Accordingly, as this thesis has been carried out in collaboration with Stora Enso, information about the company has been provided. In addition, information about the current situation regarding the Swedish market and the challenges that the future brings has been retrieved as well as personal supervision throughout the thesis process.

The topic of reusable packaging in the food industry is in an early development, which means that studies conducted in the field to this date are limited. Various circular solutions have been developed from a theoretical perspective and also implemented to some extent in other countries such as Germany and France. This limitation regarding scientific literature has meant that information about circular solutions in the food industry has been collected through interviews with industry professionals. Accordingly, a decision was made to perform interviews with employees at Stora Enso in order to get support for the theoretical framework due to the novelty of the different circular solutions. Hence, these interviews have given the opportunity to extract knowledge and serve as a map to develop and shape the arguments to be able to answer the research questions of this thesis.

1. Introduction

This chapter provides an introduction to the topic of this thesis. A background is presenting the problematization at large, narrowed down to the specific subject of reusable food and beverage packaging. Further, the chapter includes problem description and thesis contribution, purpose and research questions, and the focus and demarcations of this study.

1.1 Background

The negative environmental impact is growing which increases the demand for human actions to ensure future liveability (IPCC, 2023). This increase is proven to be a direct result of humans (ibid). In a society where consumers demand time efficiency and high delivery speed, companies have adapted and assured this demand of speed and convenience increasing consumer satisfaction (Grondin, 2017). This can be applied to the food and beverage industry and its packaging. Today it is common to buy food and beverage take-away and thus consume on the go. The current take-away packaging solutions can be considered to fulfill all consumer needs on packaging regarding flexibility and convenience. However, since most packaging used for ready-to-eat food or drink is disposable, the only question left is what to do with the packaging after usage. The earth's resources are not infinite and materials that are thrown away have rarely reached their full utilization. This fact leaves concerns regarding the environmental impact which is an aspect that has faced less attention in regulations. As a result, the waste volumes have increased and in turn contributed to the negative environmental impact (Grondin, 2017).

Further, disposable packaging is a problem in today's society and a result of the rising population, which also indicates an increase in waste if not taking action. To stop this trend, the European Union (EU) has developed a proposal of a new regulation which promotes the use of reusable packaging and a creation of a circular supply chain in the ready-to-eat food and beverage industry (European Commission, 2022c). Accordingly, Sweden has developed a regulation stating that restaurants offering ready-to-eat food and beverage must offer a reusable packaging option to their customers from January 1, 2024 (Regulation (2021:996) about disposable packaging). This new regulation also covers the responsibility which is on the restaurants to offer more sustainable packaging and create a circular solution (ibid). To make such a system work, one important aspect is that consumers adapt and choose a reusable option and return the packaging after use, to the place required by the system (Rigamonti, Biganzoli and Grosso, 2018). This means that actions taken by restaurants as well as consumer behavior and purchase decisions become essential in creating an efficient circular supply chain for this purpose (ibid).

According to the United Nations (2019), Sweden has as top priority to develop sustainable urban areas, business models and circular systems and is thus an interesting location to investigate. As a county, Sweden can be characterized as taking action and responsibility regarding sustainability. Still, this is not enough to meet the set goals and to be able to cope with global warming, more action needs to be taken. Further, the second biggest city in Sweden is Gothenburg, located in the south-west with approximately 600 000 inhabitants (Swedish Nomad, 2017). Gothenburg can be characterized as a city facing many changes due to the adoption of a more sustainable living for its inhabitants (Göteborg, n.d.).

1.2 Problem Description and Thesis Contribution

The negative environmental impact is increasing, creating problems with waste management. This has led to the development of the new regulation on packages. As the option to use reusable food or beverage packaging is compulsory for consumers, the motivations of choice are an essential component. Therefore, this thesis aims to investigate factors influencing consumers willingness to choose a reusable option. As the upcoming regulation has not yet been applied in practice, research in the field is limited. Studied literature presented below shows that research has been made on the packaging sector intended for food and beverage but mainly by evaluating different materials and comparing solutions. López-Gálvez et al. (2021) and Camps-Posino et al. (2021) presents studies comparing disposable packages with reusable solutions enabling circular solutions. Bortolini, Galizia, Mora, Botti and Rosano (2018) have conducted research about packaging for fresh fruit and vegetables bought from supermarkets comparing disposable packaging with reusable packaging and elaborates on the benefits of a combination of both systems. This literature shows that research is needed when it comes to reusable packaging running in a circular supply chain in the ready-to-eat food and beverage sector, from a consumer perspective instead of material optimization. Further, a study presented by Nicolau, Stadlthanner, Andreu and Font (2022) examines consumers' willingness to bring their own cup when purchasing coffee. The study by Nicolau et al. (2022) is of a similar nature regarding consumer behavior but this thesis differentiates by studying consumers’ attitude to be part of a reusable packaging system and thus not bring an own packaging. Accordingly, there is limited research on customers' willingness to adapt to such a system. Therefore, this thesis will contribute with research by examining consumers' self-perceived incentives to utilize a reusable packaging option.

Furthermore, this thesis contributes on a theoretical level by providing additional knowledge to the research in the field of reusable food and beverage packaging. Accordingly, the thesis examines the supply chain aspects of consumer behavior related to reusable food and beverage packages, including the factors that influence consumers' decisions to utilize reusable packages, such as convenience and accessibility. The study identifies ways to optimize the supply chain to encourage more consumers to participate in the circulatory system.

This provides an understanding on a practical level as well as extending the theoretical view. Further, the thesis explores the supply chain aspects of packaging design for reusable food and beverage packages, including possible materials, size and shape of the packages, as well as durability. The circular solutions required involve reverse logistics, including the collection, sorting and cleaning of used packages for reuse. The study also identifies ways to optimize these reusable food packaging logistics of the system.

1.3 Purpose and Research Questions

The purpose of this thesis is to investigate the extent to which consumers are willing to change behavior and contribute to a circular supply chain by utilizing reusable packaging for ready-to-eat food and beverage. To investigate this purpose, two research questions (RQ) have been constructed:

> **RQ1** - *What are the incentives for consumers to contribute to the possibility of a circular packaging supply chain?*
>
> **RQ2** - *What could a circular supply chain look like in terms of reusable food and beverage packaging?*

1.4 Focus and Demarcations

The focus of this thesis is to examine consumer behavior in purchasing situations regarding packaging choices. The project is demarcated to the food industry and specifically ready-to-eat food and beverage as this sector is covered by the upcoming regulation. Geographical demarcations have been set to study the city of Gothenburg to enable studying a larger city but within a limited area that could be applied to a similar city with similar conditions. 20 interviews will be conducted, limited to people living in the Gothenburg area with an age range between 20-40 years old. This age range has been included since these people are likely to be affected by the upcoming regulation as consumers of ready-to-eat food and beverage in the upcoming decades. Further, the thesis will be demarcated to focusing solely on consumer behavior and thus exclude the restaurants' contribution in this reusable packaging chain. Finally, when the described regulation or reusable packaging options for ready-to-eat food is mentioned throughout this thesis report, beverage packaging is also included in the expression even if not mentioned.

2. Literature Review

In this chapter, a review of relevant literature in the field of focus is presented. The gathered research material primarily revolves around two central components of this thesis: reusable food packaging and consumer behavior. The intention of the literature review is to gain an understanding in the research field and what has previously been investigated.

2.1 Included Literature

As the focus area is relatively new and unexplored in Sweden, most of the papers included in this literature review include studies conducted in other countries. However, the methods used could potentially be applied to Sweden and more specifically Gothenburg. A total number of 12 articles are included in this review. After conducting the literature search and reading the material, five themes were identified: (1) Reusable Packaging Solutions, (2) Disposable versus Reusable Packaging, (3) Consumer Incentives, (4) Food Packaging Sustainability and (5) Challenges in Reusable Food Packaging. The articles cover between one and three of the different themes and are illustrated in Table 1.

Table 1. *Included Literature and Identified Themes.*

Articles	Themes				
	Reusable Packaging Solutions	Disposable versus Reusable Packaging	Consumer Incentives	Food Packaging Sustainability	Challenges in Reusable Food Packaging
Accorsi, R., Battarra, I., Guidani, B., Manzini, R., Ronzoni, M. and Volpe, L. (2022)	X	X			
Bortolini, M., Galizia, F.G., Mora, C., Botti, L. and Rosano, M. (2018)		X		X	X
Böröcz, P. (2022)		X			
Camps-Posino, L., Batlle-Bayer, L., Bala, A., Song, G., Qian, H., Aldaco, R., Xifré, R. and Fullana-i-Palmer, P. (2021)		X	X	X	
Gu, C., Chen, J., Wei, W., Sun, J., Yang, C., Jiang, L., Hu, J., Lv, B., Lin, S. and Jiang, Q. (2022)			X		
López-Gálvez, F., Rasines, L., Conesa, E., Gómez, P.A., Artés-Hernández, F. and Aguayo, E. (2021)				X	X
Maye, D., Kirwan, J. and Brunori, G. (2019)					X
Nicolau, J.L., Stadlthanner, K.A., Andreu, L. and Font, X. (2022)			X	X	
Otto, S., Strenger, M., Maier-Nöth, A. and Schmid, M. (2021)			X		
Rigamonti, L., Biganzoli, L. and Grosso, M. (2018)	X		X		X
United Nations Environment Programme (2021)			X	X	
Wang, M. and Zhao, L. (2022)	X				

2.2 Reusable Packaging Solutions

The first theme identified in the reviewed literature are reusable packaging solutions. To achieve an efficient system, a circular chain that fits the specific reusable packaging solution that is intended to be used is needed (Rigamonti, Biganzoli and Grosso, 2018). To ensure that a reusable system is beneficial and affects the environment as positively as it aims to, it is important to have some form of control and follow-up. Rigamonti, Biganzoli and Grosso (2018) presents different strategies to enable this control of the regulation compliance and ensure a sufficient number of reuses. Primarily, there must be a way to control the restaurants offering reusable food packages. To be able to track packages and collect data, a type of unique code can be placed on each individual package containing information about the production date and each time the package is refilled. In this way, the number of times a reusable packaging is reused, can be recorded and controlled. Thus, it becomes easier for the government to control that reusable packaging is not only offered by the restaurants, but a part of an ongoing circular system (Rigamonti, Biganzoli and Grosso, 2018).

However, reusable packages require new infrastructure and hence, will result in large investments as it needs a different owning structure of the packages (Rigamonti, Biganzoli and Grosso, 2018); Wang and Zhao, 2022). Wang and Zhao (2022) presents a strategy, beyond the traditional view of purchasing packaging for the purpose of protecting an item, to rent the packages, applicable in a supplier-to-retailer relationship. However, reusable food packages result in cost savings but could bring a negative effect on the quality and shelf life of food and is therefore not recommended to exclusively use over disposable alternatives. For the implementation of a reusable food packaging strategy, both legislation and taxes together with rewards are needed. In addition, the rent versus purchase approach highly depends on the price and type of food product to carry. Renting reusable packages is presented to be better for the preservation of fresh food as the ownership is transferred to experts in the field (Wang and Zhao, 2022). The more vulnerable food to carry, the higher pressure on the packaging protection performance and the higher price of the packages which favors a rental packaging approach. Accorsi et al. (2022) evaluates different strategies for an efficient circular supply chain and explains a new dimension which includes new facilities for washing, repairing and distributing the packages creating a complex reverse supply chain. The authors have made a Life Cycle Assessment (LCA) study on nine different packages used in Italy for fruit and vegetables. The LCA is made both on reusable and disposable packages where volume utilization and weight during the transportation have been taken into account. An additional actor in the supply chain needed when distributing reusable food packages is called pooler responsible for washing, repairing and storing the packaging. These added processes consume, unlike single-use packaging, significantly larger amounts of water. Although, the conclusion of the LCA is that over a ten year span, the reusable food packages generally have less environmental impact but costs can in some cases be higher which can be mitigated by economies of scale (Accorsi et al., 2022).

2.3 Disposable versus Reusable Packaging

The second theme identified in the literature is a comparison between disposable and reusable packaging. As the environmental impact from production as well as operation varies, this comparison is relevant to validate if and when a reusable alternative is more favorable from an environmental point of view. Historically, disposable packaging has dominated, but the choice of alternative strategies is emerging (Böröcz, 2022). A rising trend is the use of reusable packaging in the ready-to-eat sector which has been triggered by new regulations that will enter into force on national levels in the upcoming years (Accorsi et al., 2022). However, there is not one right answer to whether disposable or reusable is the best option due to the fact that both have different benefits and drawbacks that thoroughly needs to be compared and analyzed before deciding on the best choice from a sustainability perspective (ibid). Bortolini et al. (2018) has constructed a study in Italy investigating fresh fruit and vegetables with short life cycles making it crucial to have a fast and efficient supply chain. To be able to utilize reusable food packaging in this sector, the location of distribution centers in relation to farmers and stores are crucial. The authors therefore suggest a model containing a mix of reusable and disposable packages in order to make the supply chain feasible in practice (Bortolini et al., 2018). Furthermore, Camps-Posino et al. (2021) has made a comparison between disposable and reusable packaging showing that the weight of the latter is noticeably higher which also must be considered. The reduction of weight for reusable food packaging is crucial for an efficient implementation and to make them beneficial for the environment (ibid).

Accordingly, deciding on a packaging strategy is dependent on a number of different factors. Böröcz (2022) highlights some of those in a study about solving packaging choice problems for food. As a complement to disposable packaging, a comparison is made with reusable food packages. In this case, the production process is a vital part when talking about energy efficiency, which is a core in implementing reusable packages, to reduce the energy consumption and environmental impact. When deciding on packaging strategy, factors like costs, cleaning process, storage, administration, and emissions are important to evaluate (Böröcz, 2022).

2.4 Food Packaging Sustainability

Reusable food packaging implies a more complex supply chain since reverse logistics implicates increased emissions and costs due to additional transportation (Bortolini et al., 2018). However, the circulatory system also results in a decrease in waste and the use of raw materials (ibid). The third theme identified is thus the sustainability aspect of food packaging, which presents studies on the environmental impact of such a packaging solution.

According to Bortolini et al. (2018), reusable food packaging implies that there is a reduction in CO_2 emissions but an increase in logistics cost and by using disposable food packaging, there is a reduction in logistics cost but an increase in CO_2 emissions. Hence, the aspects to consider while comparing reusable and disposable food packaging are CO_2 emissions, supply chain complexity, costs, social working labor and customer acceptance. Further, Nicolau et al. (2022) presents another aspect of more sustainable packaging; the consumers bringing their own coffee cups for refill pushing on the environmental benefits. According to Nicolau et al. (2022), the reusable coffee cups are more environmentally friendly than disposable cups, even when adding the washing step.

López-Gálvez et al. (2021) and Camps-Posino et al. (2021) have conducted two individual studies, both of which show that reusable packaging contributes to a circular chain and reduces environmental impact. However, different packaging strategies and materials affect the environment to different extents, which must be considered when talking about climate change. Camps-Posino et al. (2021) has made a case study examining the environmental impact of disposable and reusable packaging solutions in China. Due to new legislation, the trend is increasingly moving from incineration and landfilling to recycling. Therefore, reusable food packaging is evaluated as a hypothetical strategy to decrease environmental impact. One important key in using such strategies is the number of reuses required to surpass the environmental impact of disposable packages. To achieve a sustainable circular packaging chain, the importance of efficient distribution and washing is highlighted, which are vital parts as these are creating a negative environmental impact (Camps-Posino et al., 2021). The study by López-Gálvez et al. (2021) also shows that the washing phase for reusable packages is one of the most environmentally damaging processes in the circulatory system, increasing the pressure of an efficient circular supply chain to make this solution environmentally beneficial.

According to UNEP (2021), the use of disposable beverage cups are forecasted to increase due to their convenience. These cups have a considerable climate footprint and if not recycled in a correct way, the risk increases that these end up in the oceans or in nature causing problems for biodiversity and live animals. UNEP (2021) conducted a literature review with articles using LCA on beverage cups. There are multiple criteria deciding how sustainable the beverage cups are; single or multi use, material, treatment of the material after a lifetime, consumer behavior and environmental measurements used. For a future reusable cup system to be more sustainable, the number of uses for the reusable choice is a key factor (UNEP, 2021). With this key factor as a starting point, the breakeven point of uses for when the reusable choice is more sustainable is in all investigated cases in this literature review well within the lifetime of the reusable cup. Further, for this breakeven point to be reached, consumer behavior is one key factor which will be presented in the next section.

2.5 Consumer Incentives

Consumers have higher expectations on food packaging today than earlier, demanding efficiency, recyclability and packaging resulting in less waste (Otto, Strenger, Maier-Nöth, and Schmid, 2021). In the studied literature, a fourth theme has therefore been identified in consumer incentives. This is hence attributed to the driving forces of consumers, in this case the willingness to buy and more specifically, the desire to utilize a reusable packaging solution. In a study by Camps-Posino et al. (2021), the authors demonstrate how reusable packaging requires a circular supply chain meaning that closer relationships with consumers are needed. The actors affected by these relationships are the companies in contact with consumers and the stakeholders developing regulations creating the conditions (ibid). However, several studies have been made to understand consumer behavior and what factors affect consumer decisions. Nicolau et al. (2022) presents a study about consumers willingness to bring their own reusable cup for take-away coffee. Due to Covid-19, the consumption of disposable food packaging increased because of increased home-deliveries. To reduce the use of disposable packaging, it is important for companies to promote the use of more sustainable choices. However, Nicolau et al. (2022) explains that consumers are not yet willing to use the reusable cups if no payback is received and hence, the sustainability aspect is not enough at this point. Accordingly, to increase the use of reusable coffee cups, a monetary incentive, such as a discount, would help at this stage (ibid).

In the previous section, the UNEP (2021) report was presented stating that consumer behavior is a key factor in reaching the breakeven point for reusable food packaging. Accordingly, consumers need to enable the system to work, otherwise the multi use cups will not be as sustainable as the disposable cups. Policy makers must implement concrete alternatives to increase the use of reusable beverage cups. Both the policy makers, providers of the cups and consumers need to participate in the proposed circular system for increased efficiency (UNEP, 2021). Rigamonti, Biganzoli and Grosso (2018), agrees from a restaurant perspective and highlights the importance of implementing incentives based on the number of reuses by motivating restaurants to develop strategies to increase the return rate from consumers. However, according to Gu et al. (2022), switching from disposable packaging to reusable will bring higher costs to the consumers. The authors aim to investigate the factors behind the willingness for consumers to pay this extra cost and contribute to a circular supply chain. Gu et al. (2022) further investigated a strategy to use environmental propaganda on the packaging design to affect and change consumer behavior. By using such communicative messages on the packaging, consumers seem more willing to use those. Although, the authors mention that changing packaging design might risk reducing the association with a certain brand for consumers which is a drawback of changing the packaging design. Promoting the positive environmental aspects of the packages through environmental propaganda, changes the willingness for consumers to buy those and i.e., increases the purchase motivation (Gu et al., 2022).

In addition, a study conducted by Otto et al. (2021) on the German market shows that consumers have started to care more about what type of packaging that protects the food compared to earlier. As a result, zero-packaging retail stores where consumers bring their private food packages are emerging. It can also be concluded that consumers are not yet willing to pay a higher price for more sustainable food packaging. Further, consumers' perceptions of food packaging is also affected by design, how well it preserves the food and size. This article concludes that when consumers glance around a store with food packages, it is all about how the sustainability of a product is perceived by the consumer and not how sustainable the packaging actually is (Otto et al., 2021).

2.6 Challenges in Reusable Food Packaging

Shifting to reusable packaging solutions is not an easy task (Rigamonti, Biganzoli and Grosso, 2018). Several studies examine the difficulties in this which has led to the fifth theme identified in the challenges in reusable food packaging. This is derived from the challenges in the implementation and operation of such a system. Rigamonti, Biganzoli and Grosso (2018) demonstrates the complexity of completely shifting to reusable packaging solutions. The authors raise the problems with reusable packaging in the lack of measuring tools for the rotation of the packaging. The number of reuses is an important component to make the circulatory system both environmentally and economically beneficial, and tools to measure and control this are essential. Further, López-Gálvez et al. (2021) presents a different angle and problem for the reusable packaging solution in the need of highlighting the health effect and the importance of proper washing. The authors have made a case study on cauliflowers raising the question in terms of costs and environmental aspects regarding the safety issues with hygiene and bacterias. Poor disinfection risks the spread of salmonella increasing the importance of the cleaning process. Utilizing reusable packaging solutions is demonstrated through using plastic crates rotating at least 15 times, showing a lower environmental impact compared to disposable packaging. Hence, this is one of the most important factors when considering a circular system with reusable packaging solutions (López-Gálvez et al., 2021). Further, Bortolini et al. (2018) highlights that identifying challenges in a reusable food packaging system is needed for an efficient reverse supply chain. This increases the complexity of such a system, extending the logistics costs and CO_2 emissions. Another article by Maye, Kirwan and Brunori (2019) demonstrates that the responsibility within sustainability and reusable coffee cups is a challenge. The question of who is responsible for making progress and increasing the use of reusable food packaging is complex. The authors discuss that governments try to make consumers responsible by doing promotions. At the same time, the media opposes and has started a debate raising this ethical dilemma of passing the sustainability responsibility on to the consumers (Maye, Kirwan and Brunori, 2019).

3. Theoretical Framework

This chapter serves as the foundation of the research and outlines the theoretical framework, covering different packaging solutions such as design and material. Further, the chapter explains the concept of circularity including different circular solutions used for ready-to-eat food packaging. Upcoming EU and national regulations are also described, followed by an explanation of different consumer incentives that can impact purchase intention.

3.1 Circular Economy

As a result of the prevailing negative environmental impact, reuse and resource utilization have come into focus. After the industrial revolution in the 17th century, a new theory of moving from the traditional linear economy to circularity was developed (European Parliament, 2015). This enabled utilization of existing material and resources used as a strategy to be both cost-effective and to reduce the negative environmental impact. The goal was to extend the life cycle of products and resources (European Parliament, 2015). Circularity can be a way to be more sustainable and maximize the use of resources resulting in reduced waste and increased efficiency (UNEP, 2019). On average, consumers use 14 tonnes of raw material each year and at the same time generate five tonnes of waste in the EU (European Parliament, 2015). These numbers are the basis for the promotion of a more circular economy from the European Parliament (ibid). European Parliament (2015) further defines the concept of circular economy as the opposite of a linear economy;

> *"A model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended."*

The goal with a circular supply chain is to reduce waste by making it possible for products and materials to continue in a loop and move the end of life stage as far away in the future as possible (European Parliament, 2015). By making the circular supply chain possible, society would put less pressure on the environment and enhance a more sustainable way of living (ibid). In Figure 1, a circular supply chain model is visualized. The chain starts with raw material being refined in the production step into a product. The product is then distributed to a place where it can be sold to customers consuming the product. This is where the circular chain differs from the linear chain and instead of disposing the product, there are three different alternatives; reuse, repair or recycle. If the product is recycled it can reenter the circle from the production stage. According to Jäger and Piscicelli (2021), such a circular economy chain is applicable to reusable food packaging systems.

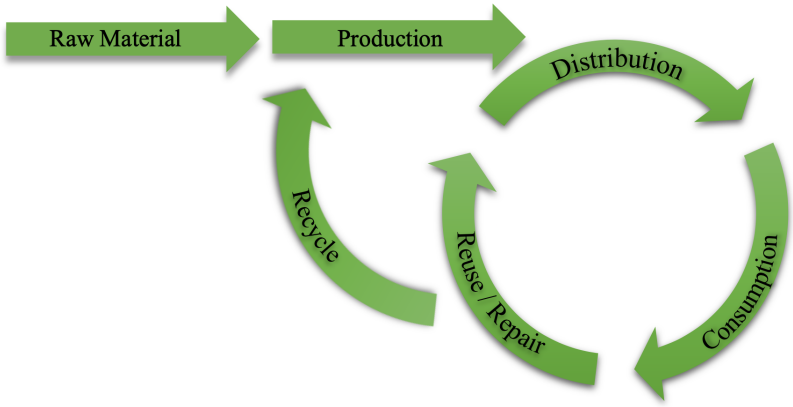


Figure 1. *Circular Supply Chain.*

3.2 Packaging Circularity

In terms of a reusable food packaging circular supply chain, there are many aspects to consider to make the system efficient. As such a system requires some sort of washing between the usages of the packages or cups, it must include either a separate washing center or be handled in-house (Camps-Posino et al., 2021). Regardless of strategy, it is important to evaluate the transport time and distance between all stakeholders involved as well as the location of raw material in relation to production, washing, and usage location. However, a comparison between disposable and reusable packaging should not only be made on the manufacturing cost and environmental impact. Firstly, the material itself must be compared, and secondly, the calculations for reusable packaging must include the effects of the transportation and washing needed between each use (Camps-Posino et al., 2021).

However, as previously pointed out, a circular system does not come without challenges. Even though the changeover from a linear to a circular supply chain is complex for reusable food packaging, such a solution is possible if all necessary stakeholders are involved (Jäger and Piscicelli, 2021). One challenge to handle is to get consumers to return or reuse the packages as this is one of the most crucial factors in an effective circular system – to keep the loop closed with minimal waste (European Commission, 2022c). To achieve such a circular system, it is therefore important to ensure a high return rate. Accordingly, there is a break even point where reusable packages become more sustainable with a lower carbon footprint (Rigamonti, Biganzoli and Grosso, 2018). However, there is a threshold when using more water than disposable alternatives and the break even point varies depending on package material, size, design, as well as transportation and washing requirements. Therefore, it is difficult to set a requirement for a certain number of reuses because the circumstances make the number vary (Rigamonti, Biganzoli and Grosso, 2018). However, there are many opportunities in transition to a circular society. Measuring and reducing waste by reuse of materials could be economically beneficial for companies adapting to this solution as well as for consumers (European Parliament, 2015).

3.2.1 Circular Solutions

There are various ways for restaurants to adapt to the new regulation and introduce reusable food packaging. The key lies in an efficient circular supply chain which makes it important to find effective strategies for consumers to return the packaging to the restaurant in good a condition (Rigamonti, Biganzoli and Grosso, 2018). Restaurants can purchase or subscribe to the food packages or cups from third-party companies and then handle the process of return and washing in-house. Another alternative is to purchase a complete solution from specialist companies managing the entire process from packaging production to distribution, return and washing (Wang and Zhao, 2022). Camps-Posino et al. (2021) describes how a circular supply chain of reusable food packaging can contribute to reduced environmental impact if the number of reuses has reached its break even point. The study further presents a comparison in impact between single-use and reusable alternatives (ibid). Figure 2, inspired by Camps-Posino et al. (2021), shows a circular supply chain, comparing a reusable package with a single-use packaging solution. The "D" corresponds to the decision of either wash or dispose of the packaging after use.

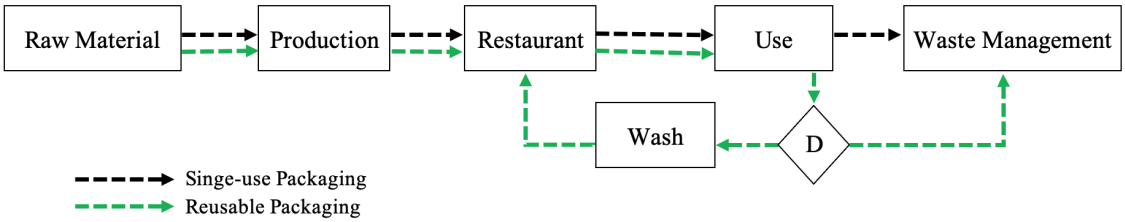


Figure 2. *System boundaries.*

With an increase in demand for circular supply chains, different start-up companies around the world are starting to offer different kinds of methods for consumers and restaurants (Coelho, Corona, Klooster and Worell, 2020). Three methods used by companies in this sector are the library card, deposit scheme and subscription method, each presented in the following sections together with examples of practicing companies. Finally, alternative methods are presented.

Library Card

The library card method can be characterized as similar to how consumers borrow books at a library (Smyth, 2023). The utilization of the reusable food packaging is free as long as the return is performed within a certain period of time. If the reusable packaging is not returned within that time frame, a penalty will be charged. This method requires the consumer to use an app requiring to register to be able to scan a QR code before usage. This library card method requires high involvement due to the need of an app and registration. The library card method is expected to have a higher return rate than the other methods (Smyth, 2023).

An example of a company using the library card method is Panter founded in Gothenburg in 2022 with the business model of lending reusable take-away food packaging and cups to consumers (Panter, n.d.). Restaurants offering take-away food provide reusable packaging from Panter which customers then borrow. Each package or cup has a QR code that consumers must scan when purchasing the food, a free process with no deposit charged. The package must then be returned to the same restaurant or another Panter partner restaurant within one week. The restaurants are responsible for washing the packages before being reused by another consumer. Other established companies pursuing the same library card method for reusable food packaging is Vytal (Vytal, n.d.), ClubZero (ClubZero, n.d.), Turn Systems (Turn Systems, n.d.), Shared Packaging (Shared Packaging, n.d.), and Ozzi (Ozzi, n.d.).

Deposit Scheme

The deposit scheme method could be explained as a deposit fee paid when buying food in a reusable package (Smyth, 2023). This fee varies between different companies and is later repaid to the consumer when returning the reusable package. However, this monetary amount is important due to the fact that it affects the usage and return rate. If the fee is too high, fewer will use the service and if the fee is too low, fewer will return the package. The deposit scheme method implies lower involvement from a consumer perspective which could indicate that the usage rate could be higher (Smyth, 2023).

The collaboration between RECUP and REBOWL offers one of Germany's largest reusable systems using the deposit method (Recup, n.d.). Contracted restaurants subscribe to the service by paying a monthly fee for the reusable packages. This cost is passed on to consumers who pay a deposit fee before usage which is recovered upon return. The consumer orders food from a contracted restaurant and pays a deposit of 1 EUR for a cup and 5 EUR for a reusable food container. After use, the container can be returned to any Recup or Rebowl partner restaurant anywhere in Germany. A similar method is used by the company Recircle offering reusable packaging for a deposit (Recircle, n.d.).

Subscription

The subscription method is characterized by monthly payments giving consumers access to the reusable system, usually to a limited extent. This method requires some commitment from the customers as the method requires an active choice to pay a monthly subscription fee, which means that the service must be used regularly and not occasionally. One problem with this method is that even if consumers pay a monthly fee, there are no guarantees that this type of service will work at the specific restaurant the consumer would like to buy food from (Smyth, 2023).

In 2022, the Swedish company &Repeat bought the company BarePack working with reusable food packaging. &Repeat offers recycling for disposable food packaging but since acquiring BarePack, offered services are both reusable and recyclable circular solutions (&Repeat, 2022). BarePack is currently only available in France with plans to expand to Sweden. The business idea is to replace disposable packaging with reusable packaging within take-away and home delivery food. Consumers subscribe to the service and pay a subscription fee in order to get access to the reusable food packaging. When the packages have been used, the consumers make a return at one of the restaurants using the service (BarePack, n.d.; &Repeat, n.d.). Another company offering the same system is Bold Reuse enabling consumers to subscribe monthly (Bold Reuse, 2022). This strategy works similar to the library card but requires a subscription.

Alternative Methods

Other types of methods can also be found on the market. Some of them are combinations of the mentioned methods and some companies are focusing on finding other innovative solutions (Smyth, 2023). Since this market is still new and relatively unexplored, there is still an uncertainty on what methods will be the most suitable. This will also vary depending on the situation and conditions as well as consumer characteristics. An alternative method that is emerging in practice is consumers bringing an own reusable cups of food boxes which has primarily been promoted by take-away coffee places (Nicolau et al. 2022). This method eliminates the washing step and concerns about food safety for restaurants and cafés in a circular supply chain since the consumers themselves are responsible (Smyth, 2023).

One example of a company offering innovative solutions is Bower, a Swedish company founded in 2015. Their innovation has its foundation in the Swedish traditional deposit system which only concerns bottles and cans. Bower has used this idea and developed to all types of recyclable packages. By using the Bower app, the consumer gets monetary incentives when scanning the barcode of the packaging and recycles in a correct way. As a reward, points are given which are transferred to money to the consumer's bank account (Bower, n.d.). Additionally, there are other types of strategies to reduce the use of disposable food packaging. Some start-up companies are Returnr (Returnr, n.d.), Fresh Bowl (Myfreshbowl, n.d.), and Loop (Exploreloop, n.d.).

3.3 Packaging Solutions

Packaging has historically been effective tools to protect the product from its surroundings but also to protect the surroundings from the product (Rundh, 2016). Packages play an important role to facilitate distribution and transportation throughout the supply chain from packaging of raw material to packaging of final product for consumers (Coelho et al., 2020).

The package development in the food sector has moved from fulfilling its purpose of protecting and transporting goods, to a marketing strategy for companies to add value on the actual product as well as visually attract and inform the consumers (Rundh, 2016). The packaging of recent decades has primarily been disposable, which is beneficial from a business perspective. This could be explained as a result of the companies wanting to offer their own packaging branding with a logo and design and at the same time increase convenience for consumers (Rundh, 2016). Further, packages today are not only a cost for companies, but also contribute with a negative environmental impact which has led to the development of new regulations on packaging materials and solutions (European Commission, 2022c). However, there are some important characteristics of a package. Simplified, it primarily needs to protect the product and facilitate handling, but it does also play an important role visually (Azad and Hamdavipour, 2012). Companies use packaging and develop the design to get the consumers attention and to increase purchase motivation (Rundh, 2016). One important aspect for consumers is that the package is clean and safe for people to eat or drink from (López-Gálvez et al., 2021). Hence, the hygiene aspects connected to both health and visuality are important (ibid).

Furthermore, there are several different packaging solutions that are used for different purposes to different extents; disposable packages which are either non-recyclable or recyclable, and reusable packaging alternatives. The reusable solution can be defined as a package reused for the same purpose as the intended (European Commission, 2022c). It can further be defined as being resistant and being able to maintain its quality. The packaging is also repeatedly controlled, repaired, reused and prevented from being disposed of (Reusable Packaging Association, n.d.). Furthermore, recyclable products can be material recycled or incinerated and thus go to energy recovery (Smyth, 2023). However, it can be argued that the situation must decide what type of packaging solution to use. Even though the pressure on a circular supply chain increases and reusable packaging solutions are raised, this is not feasible in all situations at all locations (Smyth, 2023).

"I think there will be situations where things are almost completely reusable and there will be situations where things will remain mostly disposable and I think we will need to think in a way what make sense based on the situation and not just try to force the sort of reuse into situations where it is very difficult to actually make it sustainable. We should not just do circular economy, or we should not just do reuse for the sake of doing reuse. It must have some type of sustainability impact." (Smyth, 2023)

Another important key component in packaging solutions can be attributed to the material of the packaging (Rundh, 2016). The choice of material has a different impact on the environment, economy, solidity, weight, recyclability, and repair possibility.

The packaging can be a combination of several materials to strengthen its quality, but can also be a so-called mono-material, which means that the packaging only consists of one material, such as glass, or fiber-based packaging (Kalivas, 2023). A non-mono-material is more difficult to recycle, but that does not have to be the case. Even mono-materials have difficulties in recycling because there are many exceptions meaning that the packaging is not recyclable, such as if it contains acid or grease, if the material is black, or if for some other reason it is incinerated and thus goes to energy recovery. With the large quantities of mono-material that goes to energy recovery, a non-mono-material containing a combination of wood fibers and plastic could result in lower CO_2 emissions than, for example, plastic as a mono-material, when incinerated. Producing a package with mono-material of carbon also comes with difficulties. Accordingly, serving food or beverage in fully paper-based packages is not possible because the material cannot hold the liquid or food over time without being destroyed. Since reusable packaging requires solidity over time, the material needs to be adapted accordingly. Thus, many packaging solutions for the purpose of reuse are made of some sort of plastic composition, steel, alumina, or glass (Kalivas, 2023).

3.4 Regulations

The EU is a political and economic union with 27 member states, whereof Sweden has been a member since 1995 (European Union, 2022). The union has many different commitments, whereof one of them is to protect the environment and enhance sustainability by bringing recommendations, regulations and decisions (European Union, 2022). Some regulations developed by the EU are mandatory, while others are recommendations in which each member state must make its own decisions about eventual action. As a member, there are some obligations to cope with such as adoption to developed regulations and requirements. In the following two sections, current and future EU regulations about food packaging are presented along with the Swedish national regulation that will enter into force January 1, 2024.

3.4.1 Implemented Regulation

Historically, regulations have been developed to reduce emissions and prevent global warming. In 2017, a national regulation entered into force in Sweden that applied to plastic bags putting the responsibility on the stores that offer plastic bags to inform their customers about its environmental impact (Regulation (2016:1041) about plastic bags). This regulation on plastic bags also included a higher tax, which resulted in a reduction in the use from 83 plastic bags per person in 2017 to 14 per person in 2021 (Naturvårdsverket, 2022). These statistics show that new regulations and directives have a positive impact on countries' reduced environmental impact. However, such regulations aim for a reduced environmental impact, which both the EU and Sweden constantly want to enhance. Accordingly, new regulations have been developed, of which the EU and national regulation on reusable food packaging are presented in the following two sections.

3.4.2 Upcoming EU Regulation

The EU has developed the so-called European Green Deal, which aims for a reduced environmental impact by becoming "the first climate-neutral continent" with a goal of zero net greenhouse gas emissions by 2050 (European Commission, 2022a). To be able to reach these goals, all member states must cooperate and adapt. The role of the EU in this case, is to develop new regulations for countries to adapt to. By November 30, 2022, the EU published a proposal for a new EU regulation concerning packaging and packaging waste (European Commission, 2022c). The last time such was introduced was in 1994. However, the outcome was not as expected and the goal of a reduced environmental impact from packages could not be reached (European Commission, 2022b). Therefore, there is a need for new regulations contributing to positive results. The recently published proposal will follow a strict procedure for future regulation starting with the European Parliament and the Council who will review the proposal (European Commission, 2022a). The content covers guidelines and goals for 2030 and 2040;

Chapter 2,

Article 10 *"The packaging is conceived, designed and placed on the market with the objective to be re-used or refilled a maximum number of times. Reusable packaging must also be part of a system for re-use compliant with the minimum conditions as set out in Annex VI of this Regulation."*

Chapter 3,

Article 11 *"Reusable packaging shall bear a QR code or other type of data carrier giving access to the relevant information facilitating its re-use."*

Chapter IV,

Articles 23 and 24 *"The economic operator who places reusable packaging on the market shall ensure a system for re-use for that packaging is in place. The economic operators that make use of reusable packaging shall also set up or participate in a system for re-use of such packaging."*

Article 26 A final distributor who:

1. Offers sales of packaging containing hot or cold beverages for take-away and immediate consumption must ensure that:

"(a) from 1 January 2030, 20 % of those beverages are made available in reusable packaging within a system for re-use or by enabling refill;
(b) from 1 January 2040, 80 % of those beverages are made available in reusable packaging within a system for re-use or by enabling refill."

2. Offers ready-to-eat food for take-away must ensure that:

> *"(a) from 1 January 2030, 10 % of those products are made available in reusable packaging within a system for re-use or by enabling refill;*
> *(b) from 1 January 2040, 40 % of those products are made available in reusable packaging within a system for re-use or by enabling refill."*

Furthermore, proposals of incentives are presented to encourage new solutions for circular systems (European Commission, 2022c). The most important component in these new regulations on reusable packaging is to ensure that the packages are returned by consumers and reused enough times for the system to achieve a positive environmental effect. Therefore, systems like QR codes or other tracking methods are essential to control and measure those factors. However, the packages must also be safe for both distributors and users in terms of quality and health aspects. This requires proper cleaning and controlling before reuse, a process that the actors offering the packaging are responsible for (European Commission, 2022c).

3.4.3 Upcoming Swedish Regulation

From January 1, 2024, a new regulation (2021:996) about disposable packaging will enter into force in Sweden with the goal of reducing the use of disposable cups and food packaging containing plastic by 50% between 2022 to 2026 (Livsmedelsverket, 2022). The demands that needs to be met in this regulation, as translated from original Swedish text, are;

> ***17-18 §*** *"The one who provides beverages and fast food in a disposable cup or food box in the Swedish market should*
>
> 1. *offer the opportunity to get the beverage and fast food served in a reusable cup or food box and,*
> 2. *take actions so that the reusable cups, food boxes and their lids rotate multiple times."*

> ***19 §*** *"The one who provides a reusable cup or food box should choose a cup or food box that has as little negative effect as possible on human health and the environment."*

> ***20 §*** *"The one who provides beverages in a disposable cup or fast food in a disposable food box should at the place of sales inform the customer about*
>
> 1. *the opportunity to have the beverage or fast food served in a reusable cup or food box*

2. *the environmental impact that the use of disposable cups and food boxes cause, and*
3. *the benefits with a decreased consumption of disposable cups and food boxes."*

Further, some exceptions are that disposable cups and food packages completely made of carton or paper are excluded as well as companies selling less than 150 disposable cups and food packages per day. Further, this regulation only concerns ready-to-eat food bought in a disposable cup or food box intended for immediate consumption from the packaging at the point of sale or nearby. The responsibility of ensuring rotation is up to the actors on the market providing the reusable cups and food boxes (Regulation (2021:996) about disposable packaging).

3.5 Consumer Incentives

When consumers consider purchasing a product or service, there are a number of factors affecting the decision (Koenig-Lewis, Palmer, Dermody, and Urbye, 2014). These factors have changed historically as a result of the increased environmental focus in the last decades. Consumer incentives and influencing factors can be divided into rational and emotional purchase behavior where the rational aspects can be derived to economic and practical factors and emotional to the consumer perception of contributing to the society. Koenig-Lewis et al. (2014) shows that emotions are strongly influencing factors in terms of positive and negative, both of which can therefore be used for marketing purposes to increase the purchase intention.

However, Nilesh (2013) presents four main factors influencing consumer purchase behavior and incentives. First, the *cultural* factors of which are a part of the society and how people live and socialize. This can vary greatly between countries as well as between subgroups within countries and cities, which can give large differences in results on purchase behavior. Second is the *social* factors including the family conditions and status. The professional position in society has an impact as well as the private family situation affecting purchase decisions. The third factor is the *personal* one about age, gender, lifestyle, and economic situation, highly influencing consumption behavior. The probability that a person buys a product of a specific brand increases significantly if a person in the circle of acquaintances has a similar one. The fourth and last factor is the *psychological*, how consumers perceive information, inner motivation and need, as well as consumers attitude. Regardless of how great the degree of influence is, it can be stated that these different factors influence consumer purchase behavior to different extents (Nilesh, 2013).

However, in today's society, the demand from consumers is constantly expanding and the pressure on companies increases (Deloitte, 2014). Processes and deliveries should preferably perform at a high *speed*, with high *quality* at a low *price*. One can question whether this is really possible. The iron triangle is a model including all these parts, but there is a belief that it is only possible to get two of these and the third must be compromised (Digital Genius, 2020). To get a product delivered at a high speed with a high quality, the price will increase. If, on the other hand, the aim is a low price with a fast delivery, the quality will deteriorate. Additionally, the sustainable purchase behavior has been more common and important for consumers in recent years (Joshi and Rahman, 2019). The awareness of environmental impact has increased and the importance of companies having developed sustainability strategies has faced more focus (Koenig-Lewis et al., 2014). Another aspect highly valued by consumers nowadays is convenience (National Retail Federation, 2020). In the connected and rapidly changing society that is experienced today, consumers demand both more time-efficient but also convenient solutions. A study shows that 97% of asked consumers have rejected purchasing a product due to inconvenience (National Retail Federation, 2020).

Furthermore, another factor from a consumer perspective, is the design of the packaging (Rundh, 2016). Consumer choice of reusable packaging will increase if it is aesthetically pleasing. If the cup or food packaging is considered ugly, the use will risk decrease. This does not only apply the first time a package is used, but it must be durable enough to maintain the same quality after multiple uses, which increases the requirements on both materials and construction as well as some kind of quality control (Mckinsey, 2022). All of these mentioned factors are important to varying degrees and vary between different industries as well as consumers. What is important is to know which factors relevant consumers are driven by and how these should be adapted accordingly (Levy, Weitz and Watson, 2019).

4. Methodology

In this chapter, the methodology used throughout the thesis is presented. The chapter consists of five sections; an explanation of the research design, data collection methods, data analysis, ethical principles and finally, how the research quality has been ensured.

4.1 Research Design

Qualitative method was chosen as the basis for this thesis to gain a deeper understanding of consumer behavior and their willingness to contribute to a circular system by utilizing reusable food packaging. According to Bryman (2018), this method is more suitable for complex research problems that require a nuanced insight into the subject matter. As a first step, a review of existing literature has been made to enable a description of necessary background information. Further, the theoretical background was formed. As a second step, based on the literature review and theoretical background, five factors have been subjectively selected, namely, *Design, Economy, Environment, Convenience,* and *Time*. These five factors have then shaped the interview questions for the consumer interviews investigating their willingness to utilize reusable food packaging and be a part of a circular system. Additionally, a Multi Criteria Decision Analysis (MCDA) was partially used to get a concrete understanding of how the different factors are valued by consumers. This was done as a wrap-up at the end of each interview. This evaluation method has not been used in combination with any other way of collecting data. As complementary material, an observation was conducted to understand how consumers react in practice to detect differences and similarities in what consumers say and rank during the interviews, and what they do during the observation. A third step was to conduct an informative workshop with a company running a pilot project in the south of Sweden to see how companies plan to adapt to the upcoming regulation. These multiple data collection methods were used to ensure a nuanced understanding of the research problem from different perspectives.

4.2 Data Collection

This section concerns the data collection made for the literature review, consumer interviews, observation and the pilot project workshop. Since the interviews, observation and pilot project workshop were conducted for the purpose of this thesis, these can be considered as primary data which is in line with the guidelines by Denscombe (2007).

4.2.1 Literature Review

To understand previous research and existing literature within reusable food packaging, a literature review has been conducted (see Chapter 2). Such a review is important to construct in order to investigate previous research existing in the field to emphasize the research need (Blumberg, Cooper and Schindler, 2011).

Additionally, the reviewed literature gives an understanding of research design, concepts and frameworks that are commonly used in research and reality and can therefore be characterized as narrative (ibid). This literature review has been limited to peer-reviewed articles, articles published no more than five years ago (2018-2023) found in the Gothenburg University Library database. This search engine has been used because it includes scientific articles from several databases. In the search process, different keywords have been used in a combination to include articles that are relevant for several aspects in the thesis. The search combination used were “packag*” AND “reus*” AND “food” in the title of the articles. This resulted in 13 articles whose abstract was read. Of these reviewed abstracts, seven articles were considered relevant. The excluded articles did not investigate reusable food packaging systems but rather what type of material used with chemistry as focus. The selected articles were read in its entirety and further provided additional articles by a snowball selection, resulting in five more articles.

4.2.2 Consumer Interviews

According to Blumberg et al. (2011) and Bryman (2018), interviews are the most common way to gather information in a qualitative study. In depth interviews are beneficial to use when empirical data concerns opinions, perceptions, feelings and personal experience (Denscombe, 2007). In order to comprehend consumers' views and perspectives this study has relied on interviews by using a semi-structured method, to gather empirical data. This provided the opportunity to ask follow-up questions and encourage the respondents to expand on their answers.

As a first step, the interview guide for consumers was constructed based on the five subjectively selected factors from the literature review and theoretical background (see Appendix 1). Further, the interview guide is divided into three sections; opening questions, middle questions and finishing questions. According to Bryman (2018), it can be valuable to start with a few simple questions and then move on to questions of a more detailed and reflective nature. Finally, a ranking exercise was made where the respondents got the task to rank the five factors. See chapter 4.3.2 for detailed explanation. As a second step in the interview process, a population must be defined and a sample must be chosen (Blumberg et al., 2011). For this thesis, a sample of 20 consumers between the ages of 20-40 living in Gothenburg was selected using the non-probability convenience sampling method. To ensure heterogeneity, a cluster sampling method has been used, dividing the population into age ranges of five-year intervals, with five individuals in each category, and an equal number of participants from different genders were included. In addition, a snowball selection method has been applied where the respondents were asked, at the end of each interview, about suggestions on additional participants. By including such a snowball selection method, the sample gives a larger diversity representing the population to a greater extent (Denscombe, 2007).

After finding respondents for participation, the date and location for each interview was agreed. According to Göransson (2019), it is important to make the respondents feel safe and comfortable, which is the reason why the respondents get to choose time and location. All participants were given the option to have the interview in person or online via Zoom or Teams. According to Bryman (2018) and Blumberg et al. (2011), there are some weaknesses with having the interviews online due to internet connection difficulties and the risk of interrupting each other as well as misinterpretations. Although, in this case, it was not possible for all participants to meet in person. Further, Bryman (2018) argues that within a qualitative study, it is important to be open minded and not let the interview guide restrain the interviews. This means that the interviewers must be open to letting the interview take any direction within the field of reusable ready-to-eat food packaging to make the interview as dynamic as possible, which was followed. Kvale and Brinkmann (2014) also state the benefits of being encouraging as an interviewer and be sure not to judge anything that is said during the interviews, which also was followed.

When the interviews started, it was communicated that the respondent would be completely anonymous and that only the two thesis authors would know their real name. The interviewers also asked the respondents for consent to record the interview with the terms that it would be deleted directly after finishing transcription, which everyone agreed on. Göransson (2019) points out that it can be valuable to take notes during the interview in case something would happen with the recording. Therefore, keynotes were taken during all interviews. Further, Blumberg et al. (2011) explains that recording the interviews are beneficial due to the fact that the interviewers can focus primarily on the interview and not on taking notes. To get as many valuable answers as possible, the interviews in this thesis have been held both in Swedish and English, depending on which language the respondent felt most comfortable in. At the beginning of the interviews, a brief introduction and explanation to the topic was declared in order for the respondents to understand the subject and to clarify uncertainties. This explanation can be found in Appendix 1. The explanation was dedicated to about five minutes of the interview time, which was considered important because of this relatively new and unexplored phenomena. Thus, knowledge among consumers is low, of which an explanation of the new regulations and the role of consumers in a circular system was considered necessary. The total interview time amounted to about 30 minutes each.

A summary of conducted interviews visualizing the interview objects is illustrated in Table 2. The aid shows the abbreviation of each respondent together with the age, gender, and communication channel. All interviews have been conducted during February and March 2023.

Table 2. *Consumer Respondents.*

Interview Person	Abbreviation	Age	Gender	Communication Channel
Interview Person 1	IP1	24	Female	Online
Interview Person 2	IP2	22	Male	Physical
Interview Person 3	IP3	21	Female	Physical
Interview Person 4	IP4	24	Male	Online
Interview Person 5	IP5	23	Female	Physical
Interview Person 6	IP6	26	Male	Physical
Interview Person 7	IP7	25	Female	Physical
Interview Person 8	IP8	25	Male	Physical
Interview Person 9	IP9	28	Female	Online
Interview Person 10	IP10	28	Male	Physical
Interview Person 11	IP11	32	Female	Online
Interview Person 12	IP12	32	Male	Physical
Interview Person 13	IP13	30	Female	Online
Interview Person 14	IP14	32	Male	Physical
Interview Person 15	IP15	30	Female	Physical
Interview Person 16	IP16	35	Male	Physical
Interview Person 17	IP17	38	Female	Physical
Interview Person 18	IP18	35	Male	Physical
Interview Person 19	IP19	37	Female	Online
Interview Person 20	IP20	35	Male	Physical

4.2.3 Observation

To enable a comparison between the respondents' perception of how they would act with how consumers act in practice, an observation has been conducted as complementary material to the consumer interviews. In addition, this observation has mainly investigated the economic factor as motivation for consumers and hence, enabled comparison of consumers' communicated options about a financial incentive. Further, a participant observation can be characterized as qualitative meaning that the observers try to fully understand the world by conducting the observation (Blumberg et al., 2011). The observation conducted can be characterized as non-verbal behavior, which aims to study human movement and behavior. According to Denscombe (2007), a participating observation refers to observants actively participating in an experiment. An important thing when doing this kind of observation is to maintain the natural habitat and that it does not affect the outcome of the observation. The observation took place on Tuesday, March 28, 2023 and Wednesday, March 29, 2023 between 11.00-17.30, two days randomly selected. On the first observation day, it was sunny weather with a temperature of 3 plus degrees celsius and light wind. On the second day, there were clouds and light rain most of the day and a temperature of 3 plus degrees celsius and light wind. Flyers were distributed during lunchtime, 11:00-14:00, and returns of empty food packages were collected between 11:00 and 17:30 both days. The restaurant had approximately 200 guests per workday.

The observants were standing outside this take-away restaurant, located close to many office buildings in central Gothenburg. The observation started by handing out flyers, found in Appendix 2, to people leaving the restaurant with a disposable food package. At the same time, the observants quickly explained the purpose of the study and pointed at the gifts standing on a cardboard box next to the restaurant entrance. The flyer included a brief explanation of the upcoming regulation about reusable food packaging and instructions that a gift could be received if a return of the empty disposable packaging was performed during the specified time span. The gifts were different kinds of sodas, candies and snacks valued at approximately 10 SEK each. Since reusable food packages are not yet being offered by restaurants, this observation applied the concept of reusable food packaging to disposable food packaging in order to understand consumer behavior and return rates. After the observation, all the returned disposable packaging was recycled by the observants.

During the two days observation, a reflection was made that some customers opted out of the plastic lids, only bringing the unsealed food packaging to the office. In addition, some take-away customers refused to receive a flyer without having understood the purpose, who are not included in the results. This is because the observation aimed to investigate customers' willingness to return the packaging for a compensatory gift and without this knowledge, the inclusion of these customers would have given misleading results. Hence, the starting point was that the recipient of the flyer would understand the expected performance and thus was included in the result. What could also be identified was that people were less willing to accept a flyer if the previous person had refused.

4.2.4 Pilot Project Workshop

To get an understanding about how restaurants and companies offering take-away possibly can adapt to the new regulations, a workshop was held with the company Reitan running a pilot project together with several Pressbyrån stores in the south of Sweden. This workshop intended to get a picture of how the pilot aims to be conducted, under which circumstances and conditions to gain information for the suggested circular solution to be able to answer the second research question of this thesis. Initially, the Reitan representative was asked about an agreement in publishing the company name and pilot description which was approved. Further, the Reitan representative got the task to describe the pilot which was followed by a presentation of the purpose and implementation. After this presentation, an informative workshop followed to enhance the understanding of the intended process and its benefits and difficulties as well as the expected outcome after the finalized pilot. The workshop was recorded to enable analysis and as a complement, notes were taken.

4.3 Data Analysis

After gathering the data from consumer interview, observation, and pilot project workshop, a data analysis has been conducted on the collected material. Both consumer interviews and the pilot project workshop have been transcribed to be able to get as much valuable material as possible and also for the thesis authors to get to know the material. Göransson (2019) explains how the level of detail of the transcription depends on the purpose of the material and how the transcripts are intended to be reviewed. Further, Kvale and Brinkmann (2014) points out that spoken and written language have many differences which makes it challenging to transcribe everything literally. Since this research problem does not focus on language, the transcriptions were made in such a way that the text would be easy to follow. No body language or pauses were added to the transcript since it was considered to not add any value to the thesis.

4.3.1 Content Analysis of Transcripts

After finalizing the transcriptions, the five subjectively selected factors were assigned a unique color. The transcript text was then marked with the different colors depending on what factor was mentioned. Then, text with the same color was transferred to a separate document. According to Bryman (2018) and Blumberg et al. (2011), a content analysis is an important part of the analysis since a big amount of data is narrowed down. To make this easier, Bryman (2018) suggests that theme analysis is a simple method. During the color coding, the thesis students also got to know the material in more detail. After finalizing the color coding, all themes were separately summarized and analyzed to find patterns, similarities and differences between answers and characteristics of the different interview persons characteristics such as age and gender. Citations in the different themes were also tracked and translated to english to fit the findings chapter. Hence, answers to questions presented in Table 3-5 were not asked on the exact phrases presented in the tables but rather about the subject which answers then was subjectively evaluated.

4.3.2 Multi Criteria Decision Analysis

Decisions made in different contexts are rarely based solely on one factor, but rather on multiple angles, aspects, and conditions that all affect the outcome in some way (Belton and Stewart, 2003). Additionally, several decisions require some form of subjective assessment, which must be based on different factors of varying importance, depending on the situation. To evaluate a situation or upcoming decision, an MCDA can be made rating the effect as well as expected outcome of different objectives on an event (Belton and Stewart, 2003). The method is primarily used to aid decision making in situations with conflicting criteria.

To be able to perform an MCDA process, various key parameters are needed; factors to rank, criteria on which the ranking is based, weights within which degree of influence each factor will have, and decision makers evaluating the results and making decisions (1000minds, n.d.). Belton and Stewart (2003) present an overall MCDA consisting of three main steps;

> ***Step 1*** is about identifying and structuring the problem. At this stage, it is important to create a common picture of the situation and clarify objectives.
> ***Step 2*** is about identifying value trade-offs and setting goals for the process.
> ***Step 3*** is about creating a plan to implement decisions and implement the envisaged process in practice.

In this thesis, the MCDA is used to describe decision making and to investigate and evaluate the factors affecting consumer decisions and willingness to utilize reusable food packaging. As the problem of a circular supply chain with reusable food packaging involves multiple criteria to consider and the fact that consumer behavior is both based on various factors, is individual and hence varies, such a process is feasible. However, the objectives, which are to be clarified as a first step, is to build an efficient circular supply chain for reusable food packaging with maximal return rate and number of reuses. For the second step, value trade-offs are the subjectively selected five factors; *design*, *economy*, *environment*, *convenience* and *time*. In addition, at this step, the degree of influence for each criteria is set and factor weight is allocated to then be ranked by each respondent.

Furthermore, this method of analysis has only been used for consumer interviews. However, in the MCDA, each factor has been weighted and as the purpose is to evaluate the factors' importance for consumers, they are weighted with equal importance. The respondents were, during the interviews, given five flashcards with the different factors to rank on each card. The respondents task was then to rank the factors one to five which they considered to be most and least important when choosing food or drink packages at a restaurant. According to Lavrakas (2008), such a ranking method is useful in the evaluation of the impact of factors on subjects before an action. As the factors are to be ranked from most important to least important by each of the 20 respondents, the scores for each ranking are increasing linearly to get a total sum of 1 or 100%. See Figure 3 for an illustration of the MCDA. Under the alternatives, Figure 3 shows the scores per ranking where “Least Important” corresponds to ranking one and “Most Important” to ranking five. For simplification, the scores have been rounded up and the exact scores can be found in Appendix 3.

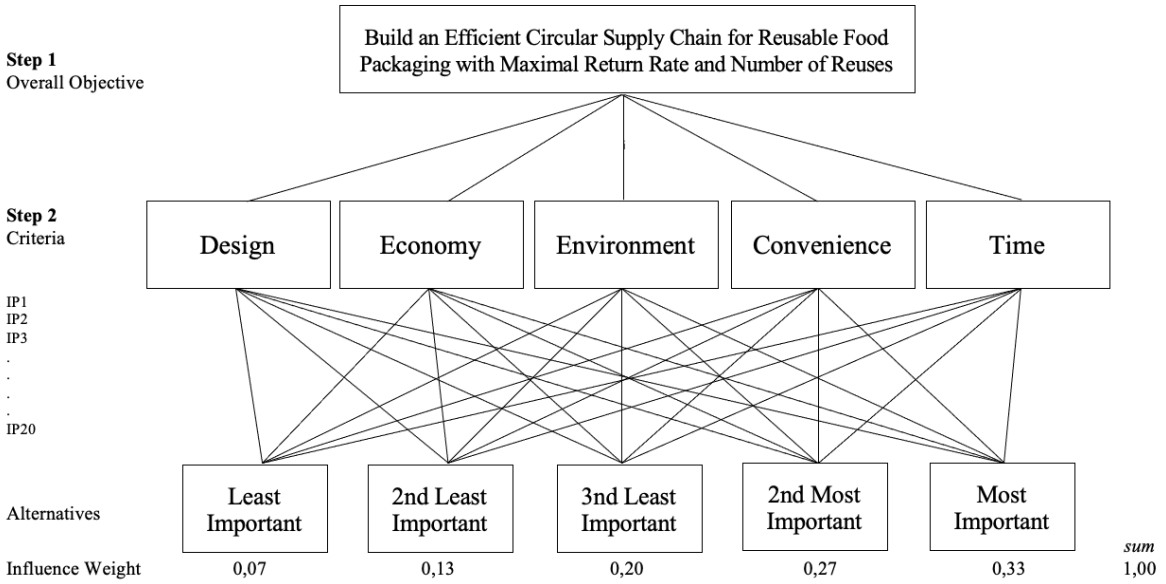


Figure 3. *Multi Criteria Decision Analysis*.

Furthermore, the decision makers evaluating the results of the MCDA could be several but, in this case, these will be the thesis students. After completed interviews, the ranking was compiled and each factor was given the points the ranking position shows. Then, each factor's rating from the 20 respondents was summed up, which became the total ranking sum for each factor. The factor with the highest total ranking score could be considered as the most important and the factor with the lowest total ranking score, the least important based on completed interviews.

4.3.3 Observation Analysis

During the observation, data was collected in the form of counting distributed flyers and returned packages to enable an analysis of return rates. A calculation was then made on the difference between distributed flyers and returned packages, of which the quotient corresponded to the return rate in percent. The time horizon when the packages were returned was also divided into intervals to be able to detect patterns in return behavior. Therefore, the number of returned packages was tracked on both days at 14:00, 16:00 and at the end of the observation at 17:30. There was no time to be able to take further field notes but the two observants had the chance to get a generalized picture of consumers' attitude towards the upcoming regulation and the observation in general.

4.3.4 Pilot Project Workshop Analysis

After finalizing the workshop session, the recording was transcribed. As the purpose of the workshop was to get an understanding of the pilot and its process and how a circular supply chain intends to work, no color coding was made. The transcription was read to enable identification of key aspects and key citations of the pilot in order to present the findings.

The key aspects identified are applied circular solution, app registration requirements, possible use of deposit, compensation, return policy, and buy-out-fee. The results of the workshop are presented over their processes as well as the expected outcome in the findings section.

4.4 Ethical Principles

Since this thesis includes objects in the form of physical persons, the question of ethical aspects should be raised. According to Bryman (2018), ethics in a research context refers to how individuals and companies are treated when participating in a research project. Within the ethics, there are four fundamental principles which have been followed throughout this thesis; voluntariness, confidentiality, anonymity and integrity. Kvale and Brinkmann (2014) discusses the importance of taking both the respondents and the study's interests in mind following those principles. Blumberg et al. (2011) highlights the importance of getting consent from the respondents and communicating the rights. At the beginning of each interview, the respondents have therefore been informed about the purpose of the project, how the data will be analyzed and handled in the form of anonymity and coding as well as their rights to pause or cancel the interview. These formalities can be found in the interview guide in Appendix 1.

Concerning the interviews, the first principle, voluntariness of the empirical gathering, was ensured by having the respondents confirm their participation in an interview. Additionally, all collected material has been accessible by the thesis authors only and not accessible by anyone else during the time period of conducting the interviews and managing transcriptions. This aspect thus ensured the second principle of confidentiality. The third principle, anonymity, was ensured by, during each interview, giving the respondents a code name such as *"IP1"* referring to *"Interview Person 1"*. The connection between this abbreviation and respective respondent was known solely to the thesis authors and the participants names were never written on any documents that were used throughout the thesis process. Kvale and Brinkmann (2014) explains the importance of anonymity but also notes the complexity in that respondents do not have to be held accountable for their statements. According to Göransson (2019), omitting names can also be considered misleading, but since this thesis aimed to evaluate consumers' honest views, anonymity was valued as a necessity. The fourth principle, integrity, was ensured by pointing out the possibility to avoid questions, pause or cancel the interview without further follow-up.

The same ethical aspects were taken into consideration during the observation. The voluntariness was assured by offering the restaurant customers flyers while, at the same time, giving the opportunity to reject the offer. The second and third principle of confidentiality and anonymity was assured by not asking the respondents for any personal information and hence the observants never had access to sensitive information.

Lastly, integrity was assured by making the participants choose if they wanted to participate in the observation or not since there was always a chance to not take action and dispose of the flyer.

4.5 Research Quality

In research, it is important to be critical towards the execution and results of the study (Denscombe, 2007). Reviewing and verifying the methods and data can be done by evaluating the validity and reliability of the measurement tools and values. These valuation factors are further explained in the next two sections along with a description of how these have been handled through this thesis.

4.5.1 Validity

The validity of a study can be derived from whether the way something is measured provides the right data to investigate what it is supposed to (Denscombe, 2007). This is what Blumberg et al. (2011) define as internal validity and can be described as the accuracy of the method or precision of the data. The data collected for this thesis was mainly done via interviews and the analysis through subjective assessment of the collected data and hence, the evaluation of the precision of the measurement is subjective. Thus, it is up to the reader and to some extent the design of the interview questions to determine whether the method measures what it aims for.

To strengthen the validity of this thesis, the data collection has been made through grounded data through interviews and an observation executed by the thesis authors. According to Denscombe (2007), grounded data means that researchers are physically present at the field where the study is conducted which strengthens the validity of the study. It provides better support for the data and higher validity than, for example, a review of literature or existing research as secondary data. Further, the validity of this study is strengthened by conducting interviews with 20 respondents instead of using one single interview source. In addition, the validity is strengthened by a supplementary observation made on the field as well as a workshop of a physical pilot project to enable a comparison between the interview results with actual consumer behavior. This is in line with Blumberg et al. (2011) explaining a strategy to increase validity in getting evidence from other factors than the primary. All gathered material will also be compared with the reviewed literature to increase the validity when answering the research questions.

4.5.2 Reliability

The critical review of a study's results also includes evaluation of reliability (Denscombe, 2007). This means that it must be questioned whether the study can be reproduced and to what extent the results can be repeated.

Blumberg et al. (2011) further describes the reliability of a study as the precision of measures. This type of critical review is difficult in a qualitative study like this thesis, as it is difficult to reconstruct a subjective study with respondents and subjective assessments (Denscombe, 2007). Additionally, the topic of this thesis is relatively new, and the upcoming regulation could have an impact on the results if the study were to be reconstructed when the implementation has been established and hence changed consumer knowledge and potentially attitude towards reusable food packaging. Being involved in the interview process as thesis students, also makes the students a part of the gathered material affecting the reliability. This raises the question of how much the interviewers affect the respondents and if the results would differ if someone else conducted the study. Therefore, it is important that the interviewers take as little action as possible to steer the respondents or observation participants during the interviews and the observation having as little interaction as possible (Denscombe, 2007). However, to be able to obtain similar results in a repetition of this study, a detailed description of used methods has been presented in this chapter.

5. Findings

This chapter provides a presentation of obtained findings. In the first section, findings from identified factors are presented, followed by findings of the MCDA and subsequently conducted observation. Finally, findings from a workshop about a pilot project are presented.

5.1 Consumer Interviews

In Table 3, five general aspects are presented, each discussed during the first phase of the interviews. The first aspect concerns whether the respondents consider themselves to be environmentally engaged and of what dignity, which further goes into aspect number two concerning everyday recycling habits. The third aspect concerns the awareness of the upcoming regulation followed by a fourth aspect in attitude towards the same. The fifth and last aspect covers the willingness to use a reusable package at the point of purchase of ready-to-eat food.

Table 3. *Distribution of General Aspects*.

Aspect	**Respondents Alternatives**		
	Yes	**Sometimes**	**No**
Environmentally Engaged	9	11	0
	Yes	**Sometimes**	**No**
Actively Recycling	19	1	0
	Aware	**Not Aware**	
Awareness of the Upcoming Regulation	2	18	
	Positive	**Neutral**	**Negative**
Attitude Towards the Upcoming Regulation	16	4	0
	Willing	**More Information Needed**	**Not Willing**
Willing to use Reusable Packaging?	10	10	0

The first aspect regarding environmental engagement shows that nine respondents care about the environment and have a positive mindset when it comes to coping with environmental challenges. IP11 states the importance of everyone's contribution;

"Everyone must contribute a little bit and I try to think that I am one of everyone and what I do will make a difference. I try to think that everyone should contribute in their own way."
(IP11)

Further, IP19 believes in a circular economy, especially in the reuse of materials and products. IP13 agrees on the importance of being environmentally aware but states the difficulties in the economic situation the world is now facing. At the same time, IP6 is taking action for the environment to some extent but emphasizes the importance of a flexible system;

"I care about the environment but sometimes I can't bother. It's nice if it's easy to be environmentally conscious. If it's too complicated, I can't take it. I still try to sort my garbage but it's not every time. Sometimes I've done garbage sorting but then I throw everything in the same if I'm in a hurry." (IP6)

Eleven respondents expressed a perception of caring about the environment to some extent, for different reasons. Although, a general theme identified is the importance of a time efficient and convenient system. Regarding recycling, it can be seen that 19 of the 20 respondents actively recycle, which is an indication of people willing to contribute to a reduced environmental impact without compensation but with higher personal effort.

Furthermore, the awareness of the upcoming regulation is low. Two respondents have previous knowledge from Swedish media whereof 18 respondents were not aware. Despite this, none showed a negative attitude. 16 respondents felt positive about the initiative and four acted neutral. One reason for the skepticism was mentioned by IP6 and IP14 in an imagination of a complicated system. IP13 communicated a concern about the system structure and the risk of being charged a penalty if the package would be damaged or returned late. Further, IP12 raises the aspect of the regulation being a political symbol that does not have as much impact as communicated. Despite the general positive attitude, the findings show that 50% are willing to use the reusable option while 50% need more information. The respondents that expressed a willingness to utilize reusable food packaging generally said they would use the solution in some cases and not always. However, IP18 shows a positive attitude and strong willingness to be part of a circular system;

"Spontaneously, I think that every step in the right direction is good. No matter if it succeeds or not, because the main thing is that we take action towards the goal, to become more sustainable. Rome was not built in a day or whatever you say, it takes time and we have to fail in order to know how to be successful next time." (IP18)

To further detect patterns and find key elements, findings about the attitude towards the new regulation and the willingness to utilize reusable packaging have been distributed by age span in Table 4, and by gender, in Table 5.

Table 4. *Distribution of Age Spans.*

Age	Attitude Towards the Upcoming Regulation			Willing to use Reusable Packaging?		
	Positive	Neutral	Negative	Yes	More Information Needed	No
20-24	5	0	0	1	4	0
25-29	4	1	0	3	2	0
30-34	2	3	0	3	2	0
35-40	5	0	0	3	2	0
Total	**16**	**4**	**0**	**10**	**10**	**0**

In the age span 20-24 years, shown in Table 4, all five respondents had a positive attitude towards the regulation. Of these five, one respondent was willing to use the reusable food packaging option, while the other four needed more information before making a decision. In the age span 25-29, four respondents showed a positive attitude while 1 acted neutral. Of these, three were willing to use the reusable option and two needed more information. This 25-29 distribution regarding willingness is also consistent both for the age span 30-34, and 35-40. Although, respondents aged 30-34 showed a lower frequency in positive attitude with two respondents and the other three acted neutral. In the age span 35-40, all respondents acted positive towards the regulation.

Table 5. *Distribution of Gender.*

Gender	Attitude Towards the Upcoming Regulation			Willing to use Reusable Packaging?		
	Positive	Neutral	Negative	Yes	More Information Needed	No
Male	7	3	0	4	6	0
Female	9	1	0	6	4	0
Total	**16**	**4**	**0**	**10**	**10**	**0**

Based on gender, Table 5 shows that seven male respondents have a positive mindset toward the upcoming regulation while three have a neutral attitude. Nine females expressed a positive mindset while one female acted neutral. None of the respondents showed a negative attitude. According to Table 5, participating females have a positive attitude more times compared to the males. Further, four male and six female respondents indicated a willingness toward using reusable food packaging while six male and four female respondents argued about the need for more information. Accordingly, no respondents showed a negative mindset toward using reusable food packages.

5.1.1 Design

Factors that can affect people's decision in choosing a reusable packaging option for ready-to-eat food can be deducted to the design of the packaging. In this section, the findings made based on the packaging's appearance in terms of color, shape, functionality, and material are presented, including the hygiene and safety aspects.

Regarding the visual design of the package, opinions differ. Fourteen respondents put no value in how the reusable package looks in terms of color and shape. For six of the respondents, design plays its role to different extent. IP4 explains how an appealing design can trigger peer pressure;

"You are a bad person if you don't do it and I believe there will be a social pressure in choosing reusable packaging. It might not be appreciated by the people surrounding you if you don't follow the trend." (IP4)

An attractive design also appeals to IP1, 5, 17, and 11 whereof the latter reflects on the willingness to answer no to the question if design is important, but still points out how an pleasing packaging would be attracting;

"I want to say no, buy for sure, it's aesthetically pleasing or that it's something getting my eyes, can probably have a positive impact on the use. So, I would probably say both yes and no, but it's a bonus more than it's important. The function is more important to me." (IP11)

The packaging function is another important aspect highlighted by the majority of the respondents. There are a variety of functionalities that are considered as important for the respondents and in some cases even as an obvious criteria. Nine respondents highlighted that the packaging needs to hold tight and not leak since the packages are often carried in a bag. Further, eight respondents argued that the package needs to be of light weight and easy to carry, and hence not too clumsy or impractical. IP9 describes the desired function of the reusable packaging;

"I presume that it won't leak in my bag and that it will be resealable, lightweight and easy. The packaging must be well-functioning." (IP9)

In addition to the above demands, three respondents do not have any opinions regarding the function and assume it will work in a way that can be expected of a reusable food packaging. Other demands that have been highlighted by the respondents are that IP17 suggests that the packages should be stackable thinking of the transports and storing facilities.

Furthermore, IP5 and IP20 suggest that there should be different compartments in the package for salad or dressing. IP1 and IP19 wished that the package had the function of keeping the food warm for as long as possible.

The material of the packaging has a part in both consumers' perception as well as in the possibility of creating a circular system with sufficient number of circulations. A consistent theme for the respondents is that glass or metal packages are to be preferred. The main arguments are based on the strength of the material and that these options feel most hygienic. Consumers show a low tolerance for visual differences when it comes to knife cuts or signs of previous usage. IP15 and IP20 alone agree that plastic is preferable, referring to the risk of using glass and the fragility of the material. Although, plastic is mentioned as unhygienic by several respondents raising the importance of the washing process. IP8 highlights a concern about how the washing process will be handled by the restaurants and is skeptical about whether the packaging is washed in a sink in the kitchen or whether there is a developed washing and decontamination process. IP15 further compares the dishwashing process to a regular restaurant visit;

"It's the same way as eating in a restaurant. All plates and cutlery have been used multiple times over and over again so usually I don't reflect very much whether it would be gross to eat from a packaging that is reused. I trust the cleaning process." (IP15)

Consequently, the most important factors in the design are the functionality in that the package must hold tight and not leak as well as feeling fresh. The hygiene aspect is seen as a fundamental part of the use and something that is assumed to function faultlessly. As a result of this obviousness among the respondents, this aspect has not been highlighted as primary.

5.1.2 Economy

The price of a product can affect how consumers behave and in particular the willingness to purchase. Accordingly, the factor economy refers to consumers' private financial assets and the willingness to spend or expand these. As the regulation describes, the reusable food packaging will be a voluntary choice without any obligations for the consumers to choose it. Hence, in this section, findings regarding consumer behavior in terms of pricing are presented. In the initial part of the interviews, the respondents explained their concerns about the environment and to what extent it is a part of their everyday lives. Six respondents referred to the inflation and financial instability in the world which have resulted in changed purchasing behavior. IP13 describes how cheaper options are chosen over environmentally sustainable ones due to the economic situation;

"I do not put as much effort today as I did earlier due to the financial situation we live in right now. Considering that, I am trying to make more economical decisions at the moment." (IP13)

Four of the respondents answered that the economy is a strong incentive in the environmental issue. The same four try to make more sustainable choices if it is not more expensive than a less sustainable choice. If the price is equivalent or lower, the willingness to buy increases to choose a more sustainable alternative. IP7 exemplifies that, from a personal perspective, buying second hand is done thanks to the lower price and although it is more environmentally sustainable, this is not the primary incentive but described as a bonus. In addition, six respondents made a parallel to the regulation of plastic bags in Sweden. This plastic regulation has resulted in a higher price on the bags and therefore led to a changed habit of bringing an own reusable bag to the store. IP16 describes a mindset of transferring the effort put in any activity into money when talking about using reusable packaging;

"I transform time into money. If it's going to take me more money than time and effort, maybe no. You know time is money. Of course, it depends on the price. If it's too high, maybe not. But yeah, I would prefer the multi use, if it's worth it" (IP16)

Additionally, 17 respondents answered that there would be a higher chance of choosing the reusable packaging option if it was cheaper. Four of these 17 respondents highlighted the difficulties in the implementation, describing how the new reusable solution is unknown and would require a financial incentive to be willing to try. One respondent argued that there would be a higher chance of choosing the reusable option if there was a discount but at the same time states that it would not be worth making a higher effort than earlier. On the contrary, five respondents argued that it would be worth making a higher effort if the reusable option was cheaper. Further, IP8 explains the relationship between pricing, environment and effort;

"Yes, that would be very positive. Maybe I wouldn't have even considered the environmental benefits, sometimes you just want food and then the environment does not really matter, but the price still matters and then I am also willing to take a longer walk to hand it back later." (IP8)

In general, a pattern can be identified in that respondents are not willing to choose a reusable packaging in all situations. Even if a discount is given, the decision is made depending on the circumstances. One respondent would not be affected by the pricing and two respondents would only be affected if the price was considerably lower. Although, both of these respondents would be more likely to choose the reusable option more often if there was some kind of discount.

However, the same 17 respondents who were more willing to choose a reusable food package at a discounted price, also insinuated an unwillingness to choose a reusable option if this would be more expensive. Three respondents were willing to consider the reusable option if it were more expensive, but that it also depends on how big the difference would be. The same three respondents argued that they would choose the reusable option considerably more rarely if there was a higher price. One respondent questioned why the price of the disposable option is not increased by introducing taxation in the same way that has been done for plastic bags.

Finally, after gaining an understanding of the various circular systems that may be implemented, one respondent indicated the reluctance to use such systems due to the risk of receiving a penalty fee for late returns or for accidentally breaking the packaging. In addition, aspects are highlighted that when using the library card model, consumers give out their bank details solely with the aim of possibly being charged a penalty, which increases skepticism towards giving out such details.

5.1.3 Environment

Concerned regulation on reusable food packaging options has been developed for the reason of reducing the environmental impact and slow down global warming. This fact combined with consumers' awareness and demand of environmentally friendly solutions in everyday life, makes the environmental aspect a factor to evaluate. In this section, consumers' attitude towards the environment is investigated based on conducted interviews. Hence, the section presents a review of actions taken, the reasons behind them as well as reasons why not taking action.

Several of the respondents have an imagination of caring a lot about the environment and more often choose environmentally friendly solutions if possible. IP1, IP8 and IP16-19 are in accordance with this perception and talk about actions taken in everyday life. Actions are described about sorting, recycling, bringing own bags to the supermarket and choosing more environmentally friendly food alternatives such as organic and locally produced. Furthermore, IP1 and IP11 give a positive picture of their environmental awareness but emphasize that they take less account of environmental aspects when it comes to transportation and especially flying. IP5, on the other hand, prefers trains over flying if possible and usually evaluates the more environmentally friendly transport alternative. IP16 highlights the system in Sweden making a comparison with experiences from other countries. The respondent explains that Sweden has a well-developed sorting system, which increases the credibility that a circular packaging system will work effectively. IP8 further explains benefits a reusable system could bring;

"I know that the volumes we throw away today are completely crazy, so I could absolutely imagine using a system where I know that this is reused. It's not something I buy and throw away and then it will just burn up or something. So, I can certainly imagine using reusable packages, for environmental reasons." (IP8)

Further, IP3, IP5, IP7, IP17, and IP18 explains about a habit of shopping second hand and like the idea of contributing to a reduced environmental impact. Although, IP17 points out that it is not only from the environmental point of view but also from a financial perspective. This is agreed by IP18 adding that it is also a matter of trends. Other actions taken by the respondents are to bring their own coffee cup, which IP7 believes is an advantage because it both keeps the heat, it is reusable and is not used by others. However, IP5, IP10 and IP13 claims not to think about the environment or actively taking action for the environment but still explains about everyday tasks including recycling, buying locally produced and bringing an own bag when shopping.

A reason mentioned by IP11, IP17 and IP20 why the environmental aspect is important is the future of the children. IP17 describes how the children learn about the importance of reducing their environmental impact at school and how their education created an interest in environmental issues. IP20 believes that the personal environmental adaptations are made primarily with regard to what the children eat, but also toys and other products that have a negative impact on both the environment and human health. IP11 agrees with the fact that environmental adaptations are made with health in mind and is more willing to use a reusable packaging as a statement rather than follow the stream if many people would be skeptical. Accordingly, 14 respondents are willing to change their habits if it contributes to reduced environmental impact. Six respondents also point out that they already contribute to the environment by eating vegetarian food, sorting, or choosing environmentally friendly solutions in everyday life. However, it is not only the environmental aspect that is raised. IP2 tells about the willingness to contribute but has noticed a pattern in the self-behavior;

"At the end of the day, it's a lot about what I find most comfortable for myself. Like if I'm going to take a taxi or a scooter. I might take the scooter, but then it's probably just because I think it's nicer and maybe cheaper and goes faster, not because it is more environmentally friendly even if that's the result." (IP2)

IP2 is not alone in the opinion that flexibility and convenience are two important factors. 10 of the respondents say immediately that they are willing to utilize reusable packaging but reserve the right to say that it must be a convenient and flexible system. IP10 says that the packaging must maintain the same quality regardless of the number of reuses. Furthermore, communicated information is an important component that influences the willingness to choose a circular alternative.

According to IP6, the benefits and a comparison of the environmental impact between disposable and reusable should be explained when using the packaging;

"It would be nice to know how good I am doing if I make this choice. That you get feedback on what you do. If it only differs, now I don't know anything about emissions or such, but if it differs by a gram of carbon dioxide between the regular and the environmentally friendly, then maybe it doesn't matter that much. But if you see that you make the choice consistently for a month or a year, then you have saved this much on the environment. Still, it would have been an incentive for me to use it. Some kind of feedback." (IP6)

IP10 and IP14 agree in wanting more information about how much better the reusable option is for the environment. IP10 believes that a clearly communicated message with concrete facts on the degree of impact would provide a strong incentive to choose a reusable food package. Furthermore, IP15 is on the same path and assumes that there is research support behind the development of the regulation that demonstrates positive effects.

5.1.4 Convenience

One part of a circular packaging system involves somehow identifying the user of the package. In the solutions presented in section 3.2.1, it appears that the circulatory system may include some form of registration. A factor to consider in increasing consumer willingness to utilize reusable packaging has therefore been identified as convenience. This factor is derived to the pre-purchase process, in other words, whether the convenience aspect regarding any app registration or system enabling tracking plays into consumers' decision.

11 of the respondents do not see any problems with this kind of app registration while IP7 states the importance of developing a simple app. IP7 further points out how the decision on putting extra effort in the registration process would be dependent on the situation, time aspect and possible compensation. IP4 is willing to make this effort if the system seems convenient enough;

"Yes, absolutely! But I also think that convenience has an important role. I think it can be difficult if the restaurants still offer disposable packaging at the same time as offering reusable packaging. There, I think many people will choose disposable only due to the convenience aspect." (IP4)

The importance of convenience is also highlighted by IP1 who think it sounds complicated and want some kind of financial compensation. Similar opinions were raised by IP2, IP14, IP15, and IP20 who further develop concerns about how the solutions will be arranged in practical terms.

IP5 points out the number of apps and aims that every company today has its own app and registration process, which has resulted in too many apps from a personal perspective referring to an *"application society"*. IP8 agrees to this statement and believes that choosing reusable packaging only will be an alternative at the restaurants visited regularly;

"In those places, it would have been perfect! There, I buy every day and the process of signing is only one time right? That doesn't matter. But if I, every time I go to a new restaurant, buying a drink or eating once, have to register, it's not really worth it. So, I believe that the first step should be shorter than the time you save in the next 5-10 times." (IP8)

Accordingly, IP12 addresses another aspect that has increased skepticism. Due to own experiences of developing such a system required, the uncertainty in the use of collected data by the company is raised. IP12 further refers to a similar service that only required BankID without disclosure of other personal data, which was perceived as more acceptable than providing email addresses and other personal information. In contrast, IP10 is more skeptical about register a credit card when these are only intended to be used if a penalty is to be changed referring to the library card model;

"Not the credit card information itself, it wouldn't have played a major role, I trust the security. On the other hand, you can be a bit skeptical. You hand out a credit card before you have even incurred a penalty. Then I would perhaps have preferred to see that you receive an invoice and that you have to pay that one instead of handing it out directly." (IP10)

Further, seven of the respondents saw no problem with registering a credit card, while another three were on the same path but emphasized that it feels circumstantial. Another aspect discussed was the number of apps that would be required if each restaurant created their own circular system. Seven respondents highlighted the advantages of a unified system and that as few apps as possible had facilitated the use and positively influenced the attitude. Three respondents did not put any value in how many apps there would be, referring to the already large amount of apps on their phones. At the same time, another five respondents believed that too many apps had been unacceptable and meant that they never would choose a reusable option in that case. IP6 agrees and highlights that one or two apps is a maximum;

"I think it's a bit like everyone using electric scooters. It's a bit tough to have lots of different apps and then there's a scooter that you think you can take, then you don't have the app and then you have to register. So, again, it should be smooth. One, max two apps. I don't think it's nice when you have to park in Gothenburg, lots of different parking apps – stupid -you just have to make one common. It's just to find a common system, if it's different apps, you have to have someone who controls everything." (IP6)

Finally, IP12 raises how different systems risk result in sub optimization and refer to the fact that if all actors develop an own system with registration and return processes, the environmental impact would increase negatively. Further, IP12 describes how this regulation then would feel more like a political symbol instead of from a sustainable environmental perspective.

5.1.5 Time

An intended circular system implies that the package somehow needs to be returned to continue its circulation. The factor of time investigates consumers' willingness or unwillingness to return the reusable packaging after usage. Hence, it concerns the time and effort needed from the consumer for the package to be a part of a circular supply chain. Generally, the respondents argued that if choosing the reusable option, the packaging would also be returned. If the return procedure would be considered too complicated or time consuming, there would be a big chance of changing to the disposable packaging again the next time. 18 respondents explained that the time and effort it takes to return the package is crucial when choosing this option at the point of purchase. It is important to be informed about the conditions in advance. IP1 states that queuing for return is not an option, and IP4 further states that a time-consuming return process would rather increase the likelihood to pay the penalty fee a failed return would entail. However, two respondents discussed that time and effort are not crucial factors when returning. This is because the initial choice to choose the reusable option includes the obligation to make a return. These two respondents also argued that they would choose the reusable packaging option more rarely if the return process was considered time consuming. IP19 highlights that making it a habit is important;

> *"Yes, it is just like when you bring the "pant" when going to the supermarket. It is a natural part of the errand. You go and buy your food and return your plastic bottles. If the return process would be as easy as the "pantsystem" I would definitely do it more often."* (IP19)

Further, fifteen respondents argued that a maximum of five minutes extra would be acceptable concerning how much to spend on returning the reusable package. Two respondents argued that they would not be willing to take any extra time and the remaining 13 respondents were willing to spend a few minutes. Two respondents indicated a time span of between five and ten minutes, while three respondents would be willing to spend ten minutes or more. The respondents willing to spend more than five minutes all highlighted how rarely they buy take-away and that, on those few occasions, it would be acceptable to spend some extra time. Further, two of the respondents willing to spend ten minutes extra or more, said that this time span would decrease if the number of take-away purchases increased. However, IP10 would not be willing to spend any extra time;

"I would not be willing to spend any extra time really, if I would use this, I want to be able to return it almost anywhere. In many different places, it could be restaurants, supermarkets, gas stations and other places I visit often. I don't want to go to specific places to return it, then you would lose all the lazy people out there." (IP10)

In addition, the time span of when the package must be returned is of value for the respondents in general. All respondents want a time span as long as possible to ensure the ability to come back to the same restaurant before having to pay a penalty fee, at least one week, but preferably one month or no time limit at all. Two respondents are afraid of getting a penalty fee due to a short time span and therefore the chance of choosing the reusable option decreases. Two respondents often eating at the same restaurant every day argued that 48 hours would be an acceptable time frame. Lastly, the respondents expressed their opinions on return locations and IP4 emphasizes the importance of an efficient system and proposes drop-off points;

"It depends on how the return is designed, but absolutely it is a good idea and if they can manage to create an efficient way of returning them, I think it would be good. Not that it is returned to the same place, I believe there needs to be some kind of local drop-off point so that you can run errands and return it on the go." (IP4)

10 of the 15 respondents who were willing to spend five minutes extra or less on the return process also pointed out the importance of being able to complete the return on the go without any detours. Five respondents gave the suggestion to have some kind of drop-off point, as IP4 proposed in the citation. One respondent was concerned about a scenario of having to take the car to the place of return and pointed out the environmental impact such a return process would entail. Another respondent suggested a solution to return the packaging in vending machines at workplaces and thus be able to return all packages in the same vending machine without having to spend extra time. However, all 20 respondents agreed that a standardized, unified system would be easier and less time consuming as the return procedure would be simplified.

5.1.6 Multi Criteria Decision Analysis

At the end of the consumer interviews, each respondent got the task to rank the five factors; *design*, *economy*, *environment*, *convenience* and *time* in the order in which they found these least and most important respectively, on a scale from one to five. In Figure 4, a radar diagram presents the result of each respondents ranking. Each line corresponds to one respondent and how the factors have been ranked. The black dashed line corresponds to the average of the data and equals to the numbers in Table 6, of the MCDA results. All respondents ranking can be found in an extended version in Appendix 3.

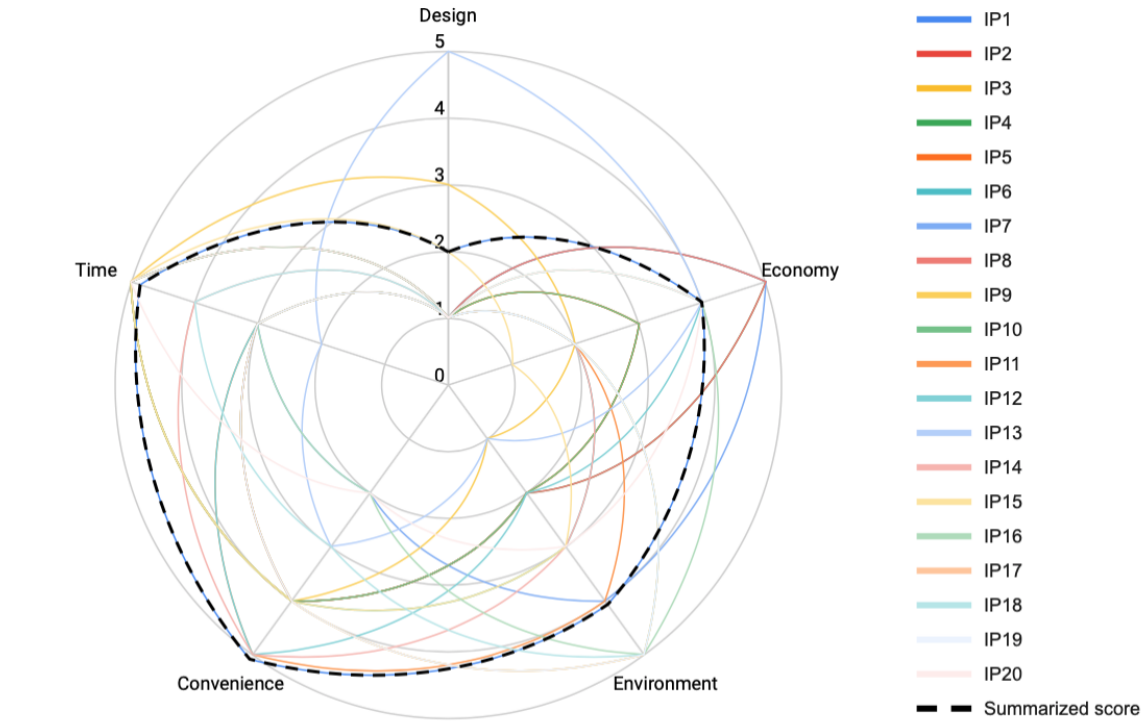


Figure 4. *Consumer Ranking.*

As can be deduced from the radar diagram as well as in Table 6, the four factors *economy*, *environment*, *convenience* and *time* are relatively equivalent. The highest score is *convenience* with 5.07, followed by *time* with 4.87 points. Next, *environment* with 4.07 points and then *economy* at 4.00 points. The ranking of *design* shows a lower priority by the majority of the respondents with a total score of 2.00.

Table 6. *MCDA Results.*

Design	Economy	Environment	Convenience	Time
2.00	4.00	4.07	5.07	4.87

Since the scores for the five factors were obtained by summarizing all respondents' ranking of each factor, the relationship between the factors' total scores may be affected by the order in which the respondents ranked them. Therefore, Table 7 is presenting a ranking distribution in the number of times each factor got the respective rankings.

Table 7. *Ranking Distribution.*

Ranking	Design	Economy	Environment	Convenience	Time
5	1	3	5	4	7
4	1	4	2	11	2
3	1	4	4	2	9
2	1	8	7	3	1
1	16	1	2	0	1

As can be seen in the first row, *design* was ranked as most important (5) one time compared to *economy* ranked as most important three times, *environment* five times, *time* most frequent with seven times and *convenience* four times. What could also be detected is not only the distribution between the factors but also the ranking within each factor. *Design* shows a high homogeneity with 16 respondents ranking this factor as least important (1) whereof the ranking of the other factors are more spread out. In Table 6, *convenience* is presented with the highest score which could be assumed to be the most important factor for the respondents. Although, in Table 7, *convenience* is ranked as most important (5) four times compared to *time* with a higher frequency with seven respondents ranking this factor as the most important.

5.2 Observation

The general attitude towards the reception of flyers varied from positivity and encouragement to skepticism and some resistance. Some customers pointed out that they did not plan to return to this location during the required time period and thus were not able to return the packaging. When receiving returns of food packages, the attitude was only positive with curiosity and hope. In Table 8, the results of the return rates are illustrated and as can be seen, number of distributed flyers are tracked as well as the number of returned packages per day and in total. The return rate corresponds to the extent in percentage in which the packaging was returned.

Table 8. *Return Rate.*

	Number of Distributed Flyers	Returned Packages	Return Rate
Day 1	150	68	45%
Day 2	150	65	43%
Total	**300**	**133**	**44%**

Both days, the observants handed out 150 flyers. During day 1, 68 of the 150 participants returned the packaging which gives a return rate of 45 %. During day 2, 65 of the participants returned the packaging resulting in a return rate of 43 %. Of these 65, 3 participants returned a package from the day before, and hence those are included in the 150 participants from day 1 but to the 65 participants making a return on day 2. However, the total number of distributed flyers was 300 and the total number of returned packages 133, giving a total return rate of 44 % for the two days of observation. Furthermore, the return counting was divided into three different time spans, illustrated in Table 9. To investigate the consumer return behavior, spans of approximately two hours were tracked.

Table 9. *Return Distribution.*

	Number of Distributed Flyers	**Returned Packages**			
		11:00-14:00	14:00-16:00	16:00-17:30	Total
Day 1	150	47	11	10	68
Day 2	150	54	3	8	65
Total	**300**	**101**	**14**	**18**	**133**

As can be detected in Table 9, most of the returns were made in direct connection with finished lunch, between 11:00 and 14:00, both days. Subsequent hours differ between the days. On the first day, the number of returns between 14:00-16:00 and 16:00-17:30 are similar whereas the second day shows a higher differentiation with 3 returns between 14:00-16:00 and 8 returns between 16:00-17:30.

5.3 Pilot Project Workshop

During the spring of 2023, a pilot project on reusable packaging is running. The project is runned by the company Reitan at the Swedish convenience store Pressbyrån and is limited to reusable beverage cups. Pressbyrån have, in collaboration with Stora Enso and &Repeat, planned the pilot to understand and evaluate the phenomenon of reusable packaging to be prepared for the new regulation that enters into force January 1, 2024. The project will be conducted in 19 Pressbyrån stores in the south of Sweden, specifically in stores located in the cities Malmö, Helsingborg, Lund and Landskrona. The responsibilities are divided so that Pressbyrån is responsible for the point of sales and to educate and involve employees in the stores. Stora Enso is responsible for the washing process and the logistics between the washer and the convenience stores and &Repeat is tasked with providing the software needed to track cups and customers. This is possible by the unique QR codes on all cups scanned before each use and return. The cups will be provided by &Repeat and then Stora Enso will further make sure that the cups are available at all Pressbyrån stores participating in the pilot. The key aspects identified during the workshop are presented in Table 10.

Table 10. *Key Aspects for Pilot Project Process.*

Key Aspects	Applied Solution
Circular Solution	Library Card
App Registration	Required
Deposit	No
Compensation	3 SEK Discount at Purchase
Return Policy	14 days
Buy-out-fee	50 SEK

The project is using the library card method as a circular solution. The Reitan representative further describes the difficulties in making the system effective and the risk of sub optimization if there are too many different systems running;

"If all restaurants go for the library card method, there is a larger risk for the consumers to get a penalty fee. If you have four different apps, it is difficult to remember if you have made the return within the time frame, and then you got an invoice on 150 SEK without knowing. I think there must be a solution from a consumer perspective, but also from a logistics perspective. Otherwise there will not be any environmental benefits if there would be eight different systems." (Reitan representative, 2023)

Furthermore, the pilot project process includes an app registration to enable scanning a QR code before usage. As the solution uses the library card method, no deposit is required. During the project, the reusable beverage cup will be 3 SEK cheaper compared to a disposable cup which also applies to customers bringing an own reusable cup. This discount is considered necessary to get the customer engaged and choose the reusable alternative even though the Reitan Representative points out the increased cost for the company;

"But now we have to take this cost, we will have to pay for the circular cups and also put discounts on the circular cups in order for consumers to use it. It is not an easy task, and if we do not see the financial benefits in the long-term it will be very challenging to carry through the behavioral change." (Reitan representative, 2023)

The return policy for the reusable cups includes a time frame of 14 days when the cups must be returned to any Pressbyrån store included in the pilot project. If the customer declines to return within this time frame, a "buy out fee" of 50 SEK will be charged. During the implementation of the pilot, Pressbyrån has communicated an expected return rate of 2-3 %. This is based both on the characteristics of the customers which is a group of people that are usually on the go and experience from the German and French markets that have already implemented similar systems.

6. Discussion

In this chapter, obtained findings from all methods of data collection are compared and critically discussed. The chapter is divided into the two research questions this thesis aims to investigate. Hence, the incentives for consumers to contribute to the possibility of a circular packaging supply chain is examined in the first section, followed by a section examining possible circular supply chain solutions.

6.1 Consumer Incentives

In a purchase situation, there are various factors influencing buying intention. As stated by Koenig-Lewis et al. (2014), consumers are affected by both rational and emotional aspects. However, after collecting the data, several aspects have been identified as important as well as various influencing factors affecting consumers' attitude and behavior. Levy, Weitz and Watson (2019) states the importance of knowing the customers and factors affecting the purchase motivation. This fact is essential in fulfilling the purpose of this thesis and to reach the overall objective of the MCDA which has been to build an efficient circular supply chain for reusable food packaging with maximal return rate and number of reuses. As explained by Levy, Weitz and Watson (2019), it is important to take the consumer incentives into consideration when adapting to the new regulation on reusable food packages. The interviews show that the convenience aspect is an important factor together with the need for time and environmental efficiency as well as the economical aspects and the design of the package both in terms of aesthetic and hygiene. According to the completed MCDA, the convenience aspect is considered as the most important. This, though, leaves questions when studying the ranking distribution with the time and environmental factors ranked as the most important factor more times than convenience. Additionally, what can be detected from the interviews when examining the respondents' environmental engagement and recycling habits, is that the self perception differs. 11 respondents consider themselves more environmentally conscious, while nine did not consider themselves engaged. When asking further questions about recycling habits, the majority of the respondents - considering themselves as not aware - answered that they actively recycle which indicates some form of engagement. Thus, opinions and perception can differ from real actions which indicates that obtained results must be reviewed critically to be able to answer the research questions in a nuanced way.

A general attitude from the consumer interviews shows that people are willing to utilize reusable food packages and have a positive mindset about the upcoming regulation. As discussed by Otto et al. (2021) consumers show a changed behavior in the awareness of food packaging solutions. From this, parallels can be drawn to the interviews which demonstrate a general positive attitude. As can be detected in Table 3 over the distribution of general aspects in the findings, 10 respondents are said to be willing to utilize a reusable alternative.

10 respondents, though, need more information putting pressure on the restaurants to educate consumers on the solutions as well as on the environmental impacts such a choice results in. According to Gu et al. (2022), informing customers by using environmental propaganda on the design of the packaging increases the willingness to use those alternatives. Accordingly, communication is an important aspect and an essential component highlighted by 50 % of the interview respondents. During the workshop about the pilot project at Pressbyrån, the communicator explained how the project will include an education of the employees. By this strategy, the employees are able to inform the customers about the reusable solution and their contribution to the environmental impact and economical benefits of their choice. Another aspect highlighted is the traceability of the personal impact or the impact of the specific food package used. Information in an app about the number of circulations for the certain package, number of reuses to reach the break even point or other environmental impact information would increase the chance of choosing the reusable alternative. In addition, Camps-Posino et al. (2021) highlights the importance of developing relationships with consumers in order to increase return rates which is applied when educating and involving employees at the restaurants.

Convenience is the factor with the highest ranking score in MCDA indicating the importance for consumers when making a decision of using disposable or reusable food packaging. This is in line with the National Retail Federation (2020) stating the importance of an efficient and convenient system. During the interviews, 11 respondents answered that they see no problem with app registration when choosing a reusable food packaging, which contradicts the MCDA ranking. Although, generally the respondents highlighted the need of a simple app, which could explain the high ranking. If the app would be complicated and time consuming, the usage would decrease and hence also the choice of a reusable food package. However, since Sweden has only adopted a recommendation, there is a risk of a slower transition where only a limited number of consumers will choose reusable packaging. One could argue that the majority will choose the solution only if it is convenient enough, which is in line with Smyth (2023) who argues that an app requires high involvement during the purchase which can be a drawback. In addition, the use of a reusable package will undoubtedly lead to reduced convenience requiring a change in consumer behavior for an effective system. A parallel that can be drawn is the use of cars versus using public transportation. One could argue that using a car is more flexible and convenient for people but at a higher cost. This can indicate that people are willing to spend extra money on solutions to increase efficiency and convenience. Further, the economic factor plays an important role for the convenience factor. If consumers would get monetary compensation for choosing the reusable option, the willingness to compromise with convenience is higher. This is also in accordance with the time factor which is an important factor which possibly can be compromised in case of compensation. However, the time factor makes an important component to add in consumers effort as a circular system requires some kind of return process.

As stated by Rigamonti, Biganzoli and Grosso (2018) ensuring the returns from consumers is essential in the creation of an efficient circular supply chain. Positively, there are situations in today's society showing that people are willing to spend extra time taking actions that benefit the environment without compensation. Sorting waste and recycling is more time consuming than not taking action, but gives nothing more than a feeling of doing the right thing for the environment, which several respondents meant is enough. This shows an established behavior in society which has required a change since the implementation of sorting and recycling. However, to get this engagement applied to a food packaging system, the respondents highlight the benefits a unified system would result in making it more convenient as well as less time consuming. In addition to a unified system, high levels of communication and clarification of obligations are needed for consumers to fully understand their responsibilities to comply with set requirements. If the conditions would be unclear or too complicated, the consumers would risk going for the familiar disposable option since understanding the system might be too time consuming.

Regarding the time required for the return process, the respondents are willing to offer a maximum of five minutes extra to return the empty packaging. However, this time span could be compromised in case of compensation. Accordingly, the less time to put in the return process, the more often the reusable solution would be chosen. To further increase the return rate, a time period of at least one week, but advantageously one month before getting a penalty or no time limit at all is preferred. Even though no time limit would be beneficial for any consumer, this would risk a decreased return rate and hence risk of sub optimization. Then, the reusable option might be commonly chosen for take-away but without securing the returns, the circularity efficiency is endangered. Another aspect to highlight regarding sub optimization in the return process is the distance to travel for the return. A food package that must be returned to a specific location might travel by car both ways causing emissions and a higher environmental impact for its circulation than a disposable packaging and hence, lead to sub optimization.

As detected from both interviews and conducted observation, people are positive towards the regulations, willing to use reusable food packages and take actions to reduce the personal environmental impact despite an increased requirement of effort. This goes in line with Joshi and Rahman (2019) discussing that the environmental consciousness of consumers in purchase situations has increased. This indicates that some interview respondents and observation participants are willing to change behavior for a reduced environmental impact. During the observation, it was noticed that consumers avoided taking a lid to the food packaging as these were made entirely of plastic. This action was taken despite the risk of leakage and decreased convenience and indicates that people are willing to contribute to the environment even though no compensation.

However, this contradicts National Retail Federation (2020) discussing the importance of convenience and the fact that many consumers have rejected purchasing due to inconvenience. Although, it must be emphasized that the situation and the circumstances are important, which could be the result of this difference. The choice to not take a lid may have to do with the fact that the restaurant was located in direct connection to the office building, which did not result in a major compromise with convenience.

Further, environmental actions could be discussed against economic incentives. Several respondents discussed how they buy clothes second hand referring to the environmental benefits whereas some argued that this action was mainly due to the economical benefits. This indicates that not only the situation matters but also the personal preferences and opinions. This parallel can also be made to buying ecological food but in this case, the action taken for the environment but also human health comes with a higher cost. Both situations are not at the expense of convenience but include aspects of the economical factor. Reviewing the findings from MCDA, the environmental factor have a higher total score than economy. This contradicts the respondents' verbal communication during the respective interview, where economics was emphasized as a strong driving factor. Many respondents seem to be motivated to put effort into reducing the environmental impact if the alternative does not result in higher personal cost, and is convenient enough using a time efficient system.

The economic factor is a strong motivation for the respondents, even if this factor was not given the highest score. In this case, the communicated message contradicts how one chose to rank the economic aspect in relation to the others. The majority of the respondents answered that a financial incentive in the form of a discount or other compensation had increased the likelihood of choosing a reusable packaging option. Despite this attitude, the majority value both convenience and time higher. According to Digital Genius (2020), it is difficult to maintain all components in the iron triangle including high speed and high quality at a low price. The theory says that one of these must be compromised to achieve an effective result. In relation to reusable food packaging, it can be argued that quality cannot be compromised. The product, which in this case is the packaging, must maintain a high quality. If the aesthetic as well as the hygienic aspect does not meet the consumer's requirements of a fresh packaging, the use risks decreasing and, in the worst case, leading to human infection. The speed could be deduced to the difference in how quickly a reusable package can be received at the time of purchase and how much extra time the process around application registration and scanning QR codes takes. According to conducted interviews, convenience and a fast process are crucial for the respondents, and speed is therefore important to keep high. This raises the question of the financial aspect and how the price may increase to maintain the other two components. Many respondents are not willing to choose a reusable package if it means a higher cost. Accordingly, the cost must be distributed in some way.

However, the economic incentive was also tested during the observation which offered returning consumers a compensatory gift.

The findings show a return rate of 44 %, indicating that almost half of the participants were triggered by the compensatory incentive. Although, primary reasons for returns were not tracked which leaves the question open whether the gift was decisive for return or whether other aspects such as environmental engagement or pure curiosity played a role. During the workshop around the pilot project, it emerged that the expected return rate was 2-3 % based on data from similar projects in Germany and France. As a result of the large difference between the obtained result from the completed observation and the expected pilot result, the question can be raised about the margins of error and influencing factors for each result and assumption. The observation offered compensation upon return in the form of a gift worth 10 SEK. This can be put in relation to Pressbyrån's financial compensation of 3 SEK in cost reduction at the point of purchase. This means a difference of 7 SEK, which could be crucial for the willingness to return. The pilot project's cost reduction thus means a lower cost for a reusable option, which can trigger purchases. However, as a result of the low return rate, customers can be considered as willing to pay the buyout fee of 50 SEK, which indicates that the cost aspect and a compensation is not a strong incentive. Another difference between the pilot and the observation lies in the point in time when the compensation is received. To get the gift on the observation, the return had to be performed, unlike the pilot project, which offered financial compensation in direct connection with the purchase. Although, being triggered by getting compensation in direct connection is counterintuitive as the return rate is low and leads to a buyout fee which, in the end, leads to a higher cost for the consumer. However, a bought out cup can be reused by the same consumer, which can be considered favorable both for the consumer preferring an own cup and for the circularity.

As highlighted in the previous section, the aesthetic and hygienic aspect is a component to evaluate. Hence, design is a factor which includes aesthetics in the form of color, shape, function and material but also hygiene and cleanliness which can be derived from the washing process. Generally, the MCDA findings show that design is the least important of the five factors. Although, during the interviews it was highlighted by most respondents that hygiene is the most important feature. One explanation to this could be the fact that hygiene is seen as an obvious feature that is expected to always be functioning. As a customer, there should not be a need to double-check or worry about cleanliness. Further, Rundh (2016) argues that design of a packaging affects the consumer's purchase decisions. If the packaging is aesthetically pleasing, the chance of a purchase will increase which contradicts the findings in MCDA. In addition, Mckinsey (2022) highlights that quality is important for customers which is in line with the interviews. Although, quality is as hygiene, seen as an obvious feature that consumers expect to be in place.

If quality and hygiene would be compromised, there is a risk that consumers are discouraged and would go back to using a disposable alternative. Hence, the design factor must be maintained every reuse regardless of the number of circulations. The hygiene feature cannot be compromised because the respondents will not be attracted by a cheaper price or an efficient return procedure if hygiene is not assured. One could argue that hygiene and quality is one the most important features of reusable food packaging since without this aspect, consumers would not consider choosing the reusable option. Further, the aesthetic design of the packaging is not as crucial and preferences differ between people meaning that it is challenging to create a unified and aesthetically pleasing package for everyone. On the other hand, the appearance of the reusable packaging is ranked as the least important in MCDA meaning that as long as the package performs as intended, it will not be a crucial factor in the purchase decision. The total score in the MCDA for each factor presented in Table 6, illustrates a summary of the ranking score for each factor which means that the distribution within every factor cannot be read out. Therefore, the total score must be compared with the ranking distribution as presented in Table 7. The factors economy and environment shows a wider intra factor distribution which indicates a misleading total score in Table 6 to a greater extent. Design and convenience, on the other hand, shows a more homogeneous distribution which indicates more reliable total score results. Regarding the time factor, the intra distribution is between the above mentioned factors showing some homogeneity in the upper ranking points but a spread between the rankings three to five. Consequently, it can be confirmed from the MCDA with total score and distribution as well as from consumer interviews that convenience and time are the two most important factors and design least important in the choice of food packaging. This is also confirmed by the observation conducted in an accessible location in connection with a business-dense area. The general attitude was that people working in direct connection with this location were more willing to return their packages.

In addition to the five factors analyzed during the interviews, other factors and incentives have been identified to play a role for consumers' decisions. It is also worth noting that depending on the situation, the consumer will make different choices. Nilesh (2013) discusses the four factors *cultural, social, personal*, and *psychological*, influencing consumer behavior. The *cultural* factor in society affects consumers' purchase motivation which is in line with conducted interviews. Some respondents described how the cultural aspect has an impact and highlighted what a potential impact would look like if friends or colleagues were to choose reusable food packaging. Then the pressure to make the same decision would increase, not just for the environment, but rather to follow the group and fit in. This indicates that consumers might choose to take action for other reasons than for the environment or economy and thus, consumers can be affected by both internal and external factors. The same pattern could also be identified during the observation. Some customers denied upon receiving a flyer if the previous person did reject.

The *social* factor regarding family conditions and status can be derived from the design aspect and whether peer pressure to utilize or not utilize reusable food packaging is decisive. The third factor about *personal* includes demographic aspects. In Table 4 and Table 5, the age and gender differences are presented showing no correlation based on these demographic factors in the selected sample. However, since restaurants will adapt to the regulation covering all consumers, how people in different age or gender are more or less willing will not affect how restaurants offer or not offer reusable options. The fourth factor is the *psychological* effects regarding consumer perception. The consumer interviews showed a low awareness, which resulted in a 50 % willingness to use the reusable alternative. The other 50 % requested more information and thus it can be argued that the customer perception is to some extent a lack of information. Another perspective highlighted during the interviews is that some consumers seem more willing to bring their own reusable food packaging. This is due to the increased control over the hygiene and quality aspects and the advantage of not having to return the package which is a solution in line with Nicolau et al. (2022) suggestions. Although, a circular system would require ensuring an as high return rate as possible, which would be difficult if all customers kept the food package or did not have a time limit for the return. However, such a system with a personal food package would still result in continued circulation, which contributes to reducing the use of disposable packaging as is the purpose of the new regulation.

As previously presented, 50 % of the respondents are willing to use a reusable package, while 50 % need more information. It can thus be concluded that informative communication is important. The findings also show a low awareness of the regulation, which further indicated low communication from government to society. Maye, Kirwan and Brunori (2019) discuss the division of responsibility between the government and consumers and how complex the process is in creating an efficient circular system. One could question who carries the responsibility. Regarding this new regulation, the consumers have the opportunity to choose packaging solution which shifts the responsibility to the consumer to use the system and thereby reduce the use of disposable packaging. However, it can be argued that it is a benefit to have the choice because it has been shown that the choice is highly dependent on the situation. If there was no choice, the regulation would probably face more resistance. Other situations that work well today, despite customers' own choice are in the case of recycling and waste sorting. In those cases, both have become an established behavior in society both with and without financial incentives.

6.2 Circular Supply Chain

In order for the new regulation to have as much impact as possible and fulfill its purpose of reduced use of disposable packaging, it is crucial to create effective circular solutions. The consumer incentives are many and differ between individuals as well as circumstances.

Hence, a circular system must be adapted to the situation referring to location, type of food offered, and customer characteristics.

Koenig-Lewis et al. (2014) discuss how consumer awareness of environmental issues has increased, which has led to companies having stronger pressure to develop environmentally adapted solutions for their operations. Such environmental work not only leads to a reduced environmental impact but also an opportunity to use these adaptations for marketing purposes and to gain consumer engagement. This can also be derived to restaurants in the process of developing a circular chain for reusable packaging. One solution is to develop a simple system at a minimal cost and operational complexity. This would mean operating in accordance with the regulation but not necessarily optimizing the process from an environmental point of view. Another approach is to create a system optimal for its purpose, to be as circular efficient as possible with a maximal number of reuses. This strategy brings the opportunities for restaurants to profile as highly adapted which could gain high consumer engagement. Such environmental commitment is something that was mentioned as positive during the consumer interviews. Several respondents were said to perform environmentally friendly actions and would rather buy an alternative with less environmental impact if the choice exists. Conducted observation also showed an environmental awareness as customers chose no to use plastic lids despite reduced convenience and increased risk of spillage which is purely from an environmental point of view. Both these factors indicate that companies with a communicated environmental strategy can win trust. However, as a consumer, it can be difficult to determine how much the environment is taken into account in reality and how much is just a developed marketing strategy.

Creating a circular system for reusable food packaging in addition to having a linear system for disposable packaging adds complexity to the process which is agreed by Bortolini et al. (2018). Added complexity can be negative which can be derived from the consumer interviews showing that convenience and the time aspect in the return process are the most essential factors. Hence, simplifying the circular system is crucial for consumers to increase the willingness to utilize reusable alternatives regardless of financial incentive. Further, Accorsi et al. (2022) elaborates on different circular strategies and highlights the added steps in the process referring to washing, repairing and distributing packages requiring efficient reverse logistics. In the pilot project, a higher complexity in the purchasing process as well as in the circulatory system can be identified. The system requires app usage and a return process for consumers and for the circulatory system, it requires distributing and washing as well as cooperation between all parties involved. The complexity is not only a challenge within each system but also in society at large. For restaurants to create individual systems would add to this complexity and build on the challenges via this heterogeneity of circular systems. If all restaurants were to create their own solution, the logistics would be enormous and lead to inefficiency, which would have an opposite effect to the intended.

It must also be questioned how far a package can be transported before it no longer makes sense. However, there are many opportunities if all actors use the same system; the same packaging, material, and return stations. Higher volumes results in increased efficiency in logistics and washing of the packages. On the other hand, if restaurants choose to create their own system with return location at the place of purchase, the customers would be limited to return to the same restaurant and hence the probability for buying another lunch increases. This strategy means that the restaurants adapt to the new regulation to benefit from a financial perspective and not solely for environmental reasons. Another aspect risened by Rundh (2016) is the fact that creating an own circular system and reusable packages would enable restaurants to develop a package with an own logo and design enabling branding. The consumer interviews, though, show that the design of the packaging is secondary.

Since creating a circular system comes with complex logistics operations, a unified system could be beneficial. Restaurants joining such a unified system could lead to higher convenience for consumers as the system could use the same registration process. It could also result in time efficiency in the return process if the unified system enables returning packages at any restaurant involved. As can be derived from the interviews, those two factors are the most important in the choice of using a reusable food package. Furthermore, a unified system could be argued to generate less costs due to economies of scale meaning that the costs of distribution and washing facilities are distributed over a higher volume. These cost advantages could then be passed on to the consumers spinning on the consumer incentives of the positive attitude towards financial incentives at the time of purchase. Additionally, the unified system would also benefit the environmental aspects and contribute to lower total emissions than if each restaurant would operate its own washing. Böröcz (2022) argues that the production of the reusable packaging is important in terms of facilitating the transport, cleaning process, storing and administration which would also bring cost efficiency. This is in line with both the purpose of the regulation, to reduce the environmental impact of packaging, and what consumers communicated during the interviews regarding packaging function such as stackability. Further, as stated by López-Gálvez et al. (2021), the washing accounts for the most environmentally damaging process which increases the importance of developing efficient circular solutions. Hence, adapting to a unified system reduces this negative impact and fulfills the requirements for the environmental factor which is highlighted as important by several respondents.

Developing an efficient washing process is not only essential for achieving minimal emission levels but also for the hygienic aspect. Being able to offer a clean and quality-assured packaging also adds some form of control, adding another step in the process. During the consumer interviews, design, which includes the hygiene aspect, was ranked as the least important of the factors, both in terms of total score and ranking distribution.

However, the respondents pointed out that lack of quality in materials, visual defects, or contamination are strong contributors to avoiding reusable packaging. Thus, it could be assumed that visual or functional defects would lead to direct resistance, which in turn would lead to fewer choosing the reusable option. For the restaurants, this would not mean direct negativity as a disposable option is often available to the customers. So, the restaurants are responsible for the quality, washing and control of the packaging and are not directly affected by the consumer's choice. However, a lack of quality and hygiene could lead to a deteriorated reputation, which, on the other hand, affects the restaurant negatively. Accordingly, it is in the restaurant's interest to create an efficient circular system to gain consumer engagement as well as time and cost efficiency.

By comparing Pressbyrån´s expected return rate of 2-3 % and the return rate of the observation of 44 %, the considerable difference can be questioned. The majority of Pressbyrån´s customers are often on the go and in a rush. This means that many customers do not have the time to understand and use a new circular system, and also for consumers to find the time to make the return. The observation took place in an area isolated by office buildings with many customers working in the area and hence faced less time consumption during the return. Another reason for the difference in the return rates might be that no purchase decision or involvement was needed when buying the disposable packaging during the observation. The consumers only took a flyer and had the choice not to come back and still not receive any buy out fee as would be the case in the Pressbyrån pilot. Theoretically, one could argue that the observation then would result in a lower return rate than Pressbyrån pilot because of no obligations. However, as the return rate for the pilot project only is an expected outcome, the final result is yet unknown and therefore might change. However, as can be seen in the findings in Table 10, the majority of the customers in the observation made the return during the lunch break whereas some chose to return after work. This indicates that the return beneficially should be possible regardless of time to increase the number of returns.

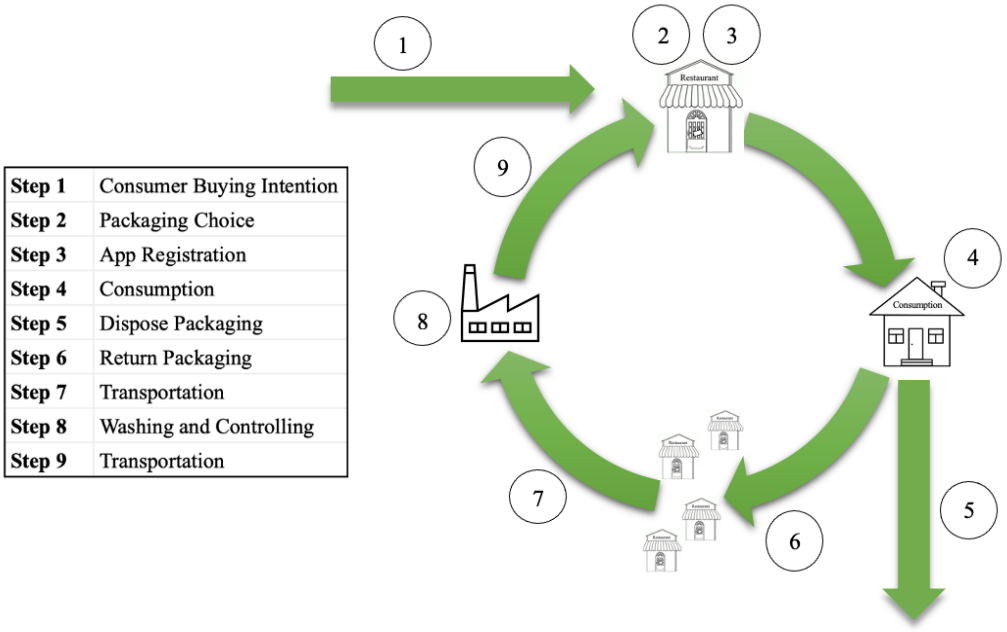
Some methods to use in a circular system are the library card approach, subscription method or deposit scheme. During the interviews, the majority of respondents highlighted that if the reusable option would be more expensive, it would more often not be an option. This indicates that the subscription alternative is not as efficient as the other two options since it depends on consumers paying monthly fees making it more expensive than a disposable option. In addition, the deposit scheme solution requires a deposit fee that consumers need to pay before getting access to the reusable food packaging. The respondents are less willing to pay a higher cost and as a deposit solution would increase the cost temporarily, this could be a contributor to increased resistance although the deposit is recovered upon return. However, restaurants using a deposit scheme could give the ability to add a financial compensation in addition to the recovered deposit which is a system similar to the observation where the compensation were given in connection to the return but without a deposit.

In a library card solution, used by Pressbyrån, the compensation is given at the time of purchase. This approach could possibly be combined with the deposit solution with a compensation received at the point of return but at the same time the avoid deposit. Thereby, the purchase does not result in a higher cost but result in a cost reduction at the end due to a compensation received upon return.

The fact that a circular process results in more complexity and higher cost for production and distribution at the same time as consumers are unwilling to pay a higher cost, raises the uncertainties of cost distribution. Somehow, those extra costs must be covered by someone and the questions are by who and how. However, to get a similar financial incentive as for the recycling system, but at the same time distribute the cost, one suggestion would be to introduce a taxation on the disposable package, so as done with the plastic bags. Then, this extra cost could be charged to the customers when choosing a disposable package to motivate the choice of a reusable option. As discussed by Wang and Zhao (2022), a strategy of using regulations together with taxation and some kind of rewards would benefit the implementation of a reusable food packaging system.

6.2.1 Suggested Circular System

To implement a successful system for reusable food packages and meet the purpose of the new regulation, UNEP (2021) explains how ensuring sufficient number of reuses is a crucial factor. Based on the results obtained from the consumer interviews, completed observation and the pilot project workshop, a suggestion on a circular supply chain for reusable food packages is therefore illustrated in Figure 5 followed by an explanation of each step.



Step 1	Consumer Buying Intention
Step 2	Packaging Choice
Step 3	App Registration
Step 4	Consumption
Step 5	Dispose Packaging
Step 6	Return Packaging
Step 7	Transportation
Step 8	Washing and Controlling
Step 9	Transportation

Figure 5. *Suggestion of Circular Supply Chain Process*.

The first step in any circular chain for reusable food packages, regardless of the solution, is derived from a consumer's willingness to buy take-away, for example at a physical restaurant. This step is illustrated by number one (1) in Figure 5 as *consumer buying intention*. As a second step (2), the customer enters the restaurant, and the purchase occasion occurs. Here, the customer has *packaging choice*, either using a disposable or reusable package. The employees are educated to inform the customers about the circumstances and responsibilities which also take place at this step. The suggested system uses a library card solution with a return limit of 14 days. If the return is absent after this period, a buy out fee is charged and the package is in the customer's ownership. Furthermore, if the package is returned within the time limit, a financial compensation is received. Another alternative to this financial compensation is to increase the cost of the disposable package. This alternative would also affect the economic factor which is a strong incentive for the consumers and hence could encourage the choice of a reusable option. In order to enable some kind of control of the number of circulations, an *app registration* is required, which comes in during the third (3) step in the process. As the consumer interviews demonstrated a high priority of convenience and hence a simple registration as well as the importance of a unified system, the registration process is made simple through Bank ID enabling access to a unified application. The packaging's QR code is then scanned in the app and hence connected to that specific consumer. After this, the packaging is ready for *consumption* in any geographical area except within the restaurant as the situation is intended for take-away. This is illustrated in the fourth (4) step.

After finishing the meal, the customer can choose to *dispose packaging* in step five (5), and thereby pay a buy out fee and end the circle or continue the circulation in isolation. To avoid consumers making this step, the previously mentioned financial compensation is given upon return. Step six (6) describes another alternative, to *return packaging* which in this system can be done in any restaurant in the center of Gothenburg thanks to the unified system. An optimal solution from a consumer point of view would be to implement drop off points around the city. This can be done with commitment from the municipalities or external companies specializing in these circular processes. Such drop off points would also open up opportunities to return the packaging at any time of the day and thus not be tied to specific opening hours at the restaurants. However, as this requires installation and increased costs, a system enabling return to any restaurant is to be preferred as a first step. The return procedure in the restaurants or at drop off points would be cylindrical bins where consumers can put the packaging. The bin itself scans the QR code, connected to the last user, inside the bin and the return is registered. This enables return by another person than the consumer which gives the possibility of one person in the office building leaving several food packages. In addition, consumers would have no obligation to wash or rinse the consumed packaging before return. In the seventh (7) step, the returned packages are picked up for *transportation* to a central station where the *washing and controlling* takes place as an eights (8) step.

Finally, the packages are *transported* back to each restaurant in the ninths (9) and last step and the circle is closed. The last three steps are not directly affecting the consumers or affected by consumer behavior but are expected to operate efficiently to reach the goal of the regulation and minimize costs as well as logistics processes. This is important also to optimize for the environment and to reach the goal of the regulation.

From a circular efficiency perspective, the two main critical steps will be step 2 in the *packaging choice* and the choice between step 5, *dispose packaging* and step 6, *return packaging*. Accordingly, the starting point is the goal of maximizing the choice of using a reusable packaging and further to maximize the choice going for step 6 beyond step 5. To further increase the willingness to use a reusable food package, the consumer interviews have shown that information regarding carbon footprint as well as number of circulations for the specific package would be preferred. Therefore, this suggested solution includes a possibility of receiving data both about the specific package used and the personal impact the user has contributed to. Finally, every system in each restaurant or in each city respectively, must be adapted to the specific area, consumer characteristics as well as situation to gain an efficient system with maximal number of circulations.

7. Conclusion

This chapter summarizes this study with a conclusion of the obtained findings and presented discussion. To meet the purpose of this thesis, to understand consumers' willingness to contribute to a circular supply chain for reusable food packages, the two research questions have been investigated whose answers are presented in this chapter. Further, suggestions on future research are presented together with limitations of this study.

7.1 Concluding Remarks

Based on the knowledge gained from past research in the area, this thesis increases the understanding of consumers' willingness to use a reusable packaging alternative for food or beverage. The analysis conducted in this thesis confirms that consumers are not solely driven by one incentive, neither on a personal level nor between individuals. However, generally, a positive attitude has been identified towards the new regulation and to utilize reusable food packaging. The convenience factor is the most important incentive followed by time and an efficient return process. The design of the packaging is the least important factor. Although, the hygiene aspect is seen as an obvious prerequisite. Economic incentives are contributing to the choice of utilizing reusable food packaging and by a potential compensation, the respondents are willing to compromise with convenience and time to some extent. The thesis also shows that the environmental factor shows a higher total ranking than economy and the respondents are willing to adapt. However, environmental adaptations are not made at the expense of convenience and time. In addition, consumers are affected by social and cultural aspects as well as attitudes. A correlation in demographic characteristics has not been identified. Generally, the respondents are affected by actions taken by the surroundings and flow of information. Lastly, all investigated factors affect the motivation for consumers to participate in a circular system to different extent.

This research supports the idea that reusable food and beverage packaging requires all parties to contribute. To create an effective circular supply chain, it is therefore important to know consumer behavior and incentives. Therefore, consumer incentives are crucial to create an ideal circular supply chain. Hence, a circular system must be adapted with these incentives in mind. The suggested circular solution in 6.2.1 is to use the library card method with a return time of 14 days and financial incentives upon return. With convenience and the time aspect as the most important factors, the registration offers an easy procedure and efficient return process enabling customers to return the package at any restaurant connected to the same system. Finally, policy makers, packaging providers, distributors, restaurants, consumers and other parties involved in the process must engage and collaborate to get an as efficient circular supply chain as possible.

7.2 Future Research and Limitations

In the evaluation of obtained findings, the methods used must be critically analyzed to find potential margins of error and factors influencing the results in a biased way. This thesis has used several ways of collecting data to be able to answer the research questions in a nuanced way.

The data collection started by searching for existing studies for the literature review which has been done by using Gothenburg University Library database. Only using one search engine may question whether the scope was sufficient or whether valuable studies were missed by excluding other search engines. However, the used database includes literature from several publishers and journals which was considered as sufficient gathering of data. Furthermore, the consumer interviews provided the main material using a convenience sample selection followed by a semi-structured interview technique. The sampling method using a convenience strategy and a sample size of 20 respondents can question to what extent the sample represents the population. Another strategy would be to get closer to a random sample selection method by asking people on the street to participate or search for participants in consumer databases. However, due to time constraints and the proposed resistance in participating in a 30 minutes long interview on the street, the convenience sampling together with snowball selection to reduce bias, was considered as acceptably enough for this thesis. In addition, it can also be questioned if the sample size of 20 respondents was big enough.

A larger sample size may have identified other parameters such as geographical or demographical differences affecting the choice of using reusable packaging for take-away. An alternative to the interviews would be to form focus groups and discuss the questions and may get deeper and more nuanced answers. Although, some of the questions covered personal habits and could be considered as sensitive and hence, focus groups could risk people not answering truthfully. Further, the communication channel could preferably have been done with only physical interviews. Having a few online made it more difficult to transcribe due to connection issues and made the interview answers less deep and in some cases provided less perspectives. However, due to last minute changes, poor weather conditions and sickness, holding six interviews online was necessary.

Data collection was also made by an observation conducted during two days. This short time span could question the validity and how well the results mirror reality and the accuracy of measures. Conducting the observation faced much attention on the field creating a hype which may have triggered a higher positive response and not reflecting reality. Extending the observation to weeks or months may have resulted in more reliable results and increased validity. However, due to time constraints and the fact that the observation was only supplementary material, the time span was limited.

In addition, the observation mainly studied the compensatory factor which weakens the validity of measuring all factors covered during the consumer interviews. A strategy that could have been used would be to ask a few questions regarding reasons for return which would have given more data to analyze. A reusable system would also include more parameters and higher responsibility on consumers with app registration than the observation covered which might have affected the results.

The analysis of the data has primarily been done by content analysis of interview transcripts. This has been done by a subjectively selection of content and citations which could leave concerns regarding validity and reliability. However, in a study of consumer behavior, some form of subjective assessment is necessary as it aims to study multidimensional perspectives. During the ranking for the MCDA, an aspect to develop would have been to specify the design factor and communicate that this includes not only visuality but also the hygiene aspect, alternatively add hygiene as an additional factor leaving the design to only aesthetics. In addition, the thesis students could have summarized an own ranking table based on the transcripts to enable comparison with the consumers' own rankings. This would have enabled a more visual comparison instead of contrasting the ranking data with written text as has been done in this case. Furthermore, if this thesis were to be repeated, it would have been challenging to ensure the same conditions, which can question the reliability of the thesis. Conducting interviews with a limited sample is always risky in terms of reliability, which is difficult to avoid. In addition, the thesis has been conducted in a situation where the regulation is just about to be implemented which are circumstances difficult to reconstruct.
However, the observation location and conditions showed that a repeated study on two occasions have similar results despite changing weather conditions with sun versus rain.

Lastly, it can be questioned whether the findings can be applicable to all reusable food and beverage packaging. The interviews were mainly focused on food boxes discussing scenarios regarding lunch habits and attitude. No direct questions were asked concerning beverage cups even if it were discussed during some of the interviews. In accordance with the interview questions and scenarios, the observation also concerned food packaging during lunch. On the contrary, the pilot project covers reusable beverage cups. This means that the results of this thesis might not be applicable to reusable beverage cups or that it might not be feasible to compare the result to the pilot project. To ensure that the results are applicable to reusable beverage cups, more detailed questions during the interviews would have been necessary as well as additional observation regarding beverage cups. In addition, interviewing restaurants have been excluded in this thesis. This means that there is a risk of misperception in regulation perception and how they plan to adapt. Although, since the focus of the report has been to understand how to create a circular solution from a consumer perspective, the restaurants were left out.

The new regulation covered in this thesis is about to be implemented in six months and thus has not yet worked in practice. It would therefore be interesting to do additional research in the field after implementation when consumers have been exposed to different solutions and are more aware of the circumstances. As discussed in the report, there are many factors affecting both consumer decisions and feasibility of circular solutions. Hence, future research can be done on an extended number of factors which would add more perspectives. Regarding the observation, it would be interesting to do an expanded version covering several locations over a longer period of time. However, the result from such a project can be retrieved from studies on the actual result of a restaurant's adaptations in a real scenario. As an alternative, future research could therefore be done on the pilot project reviewed in this report. An evaluation of the results and possible reasons behind would have been interesting to study to be able to optimize the process further.

This thesis has mainly covered the consumers' perspectives and incentives on a circular food packaging chain. Another central part in this chain is the restaurants whose responsibility is to provide the packaging and create the circular chain. Therefore, future research can be made on these actors' perspective on the regulation and how they intend to adapt as well as the restaurant incentives in the implementation of a circular solution. Furthermore, additional research could be done by investigating a larger sample to detect differences between possible geographical and demographical factors. Future research can also be done on the distribution of costs and profitability model. Discussions can be made about how responsibility should be distributed, who should drive the development forward; government, society, private actors or a combination. Finally, this thesis has been conducted in a time where the world was facing an uncertain situation both politically and economically. Thus, the findings may be misleading and potentially result in different conclusions if the study were to be reconstructed later.

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Appendix

Appendix 1

Interview Guide for Consumers

Background Clarification and Information

Thank you for participating and contributing to our study. This interview is for research purposes and will only be heard by us. The recording and transcription will be deleted when we are done with the material. During the thesis compilation and defense, your ID will remain completely anonymous and only the thesis students will know your identity. Do you mind being recorded? If we ask a question that you do not want to answer or if at some point during the interview you want to interrupt or take a break, just say so.

The interview will be used for our data collection of our master thesis, which we write in collaboration with Stora Enso on reusable packaging. On January 1, 2024, there will be a new law that states that restaurants that sell take-away must offer reusable packaging options (such as sushi places, Picadeli, Jos, and McDonalds). When you order and pick up food, you will have the option to choose between a traditional disposable packaging or a packaging that can be reused. For example, it can function as a library card, you receive the package with food in, scan a QR code and borrow the lunch box. You must then return it at the same restaurant or other return location within a certain time to avoid being charged a penalty. Another solution is that you can be charged a deposit of, for example, SEK 50 when you pick up the food, which you get back when you return the packaging. This system also applies to drinks, for example when you buy coffee, you will have the option to choose between a disposable or multi use package. For this study, we will investigate how the will of consumers is to choose a reusable option and how such a circular system could look where customers return the food packaging after use. In light of this, we would like to interview you about your perspective on being part of such a system. You are not valued for your answers, so please answer honestly. It is of course possible for you to share the essay once it has been completed. The interview contains questions about the new laws that are coming and which incentives are important to you as a consumer. Are there any questions you would like to ask before we begin?

Introduction and General Questions

- Name:
- Gender:
- How long have you lived in Gothenburg?
- Where is your current daily activity location?

Environmental Sustainability and New Regulation

1. Do you think a lot about the environment or an environmentally sustainable society in your everyday activities and especially your consumption? For instance, do you recycle? Do you choose environmental ethical solutions?
2. What do you think about a new regulation in Sweden in 2024 requiring restaurants to offer reusable packaging?
3. Would you be willing to use reusable packaging? Please elaborate.

Take-Away and Habits

4. What do your lunch habits look like? How often do you visit the same restaurant and how often do you take-away?
5. Can you imagine changing habits if it contributes to increased environmental sustainability?
6. Imagine a scenario where you are asked at checkout whether you want a disposable or multi use package. How would you approach that and why? If you choose the multi use package, would you mind spending a few extra minutes to return the package?
7. How do you feel about registering in a new app and registering a payment card?

Packaging and Design

8. Imagine that you are standing in the food queue and are going to buy lunch or coffee for take-away to the office or home. How would you rate the importance of the following factors? Design, Economy, Sustainability, Convenience, and Time.

Additional Questions

9. Could you please rank the five factors *Design, Environment, Economy, Convenience and Time* from most important to least important according to what you think?
10. Do you know someone who might be willing to participate in this thesis and agree to an interview?
11. Is there something else you would like to end before we are finished?

Appendix 2

Distributed Flyer During Observation

Below text has been translated from the original Swedish text, flyers were handed out in Swedish.

UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

HELLO!

January 1, 2024, a new law enters into force in Sweden saying that restaurants who sell food for take-away need to offer a reusable packaging instead of the traditional disposable packaging. Hence, we are testing consumers' willingness to participate in a circular chain for a reduced environmental impact.

If you return your empty food packaging to us at the same location during below time spans you get to pick a gift.

Tuesday, March 28, 2023	11:00-17:30
Wednesday, March 29, 2023	11:00-17:30

Thank you for helping us with our master thesis!

Thank you!
Hanna Palmqvist
Hanna Isaksson

Appendix 3

Clarification of Multi Criteria Decision Analysis and Respondent Ranking

Importance	Least important				Most important	
	1	**2**	**3**	**4**	**5**	*sum*
Weight	0,06666666667	0,1333333333	0,20	0,2666666667	0,3333333333	1,00

	Design		**Economy**		**Environment**		**Convenience**		**Time**	
	Ranking	Score	Ranking	Score	Ranking	Score	Ranking	Score	Ranking	Score
IP1	4	0,27	3	0,20	2	0,13	5	0,33	1	0,07
IP2	1	0,07	3	0,20	2	0,13	4	0,27	5	0,33
IP3	1	0,07	2	0,13	5	0,33	4	0,27	3	0,20
IP4	1	0,07	5	0,33	2	0,13	4	0,27	3	0,20
IP5	1	0,07	3	0,20	2	0,13	4	0,27	5	0,33
IP6	1	0,07	2	0,13	3	0,20	4	0,27	5	0,33
IP7	1	0,07	5	0,33	4	0,27	2	0,13	3	0,20
IP8	1	0,07	5	0,33	2	0,13	4	0,27	3	0,20
IP9	3	0,20	2	0,13	1	0,07	4	0,27	5	0,33
IP10	1	0,07	3	0,20	2	0,13	4	0,27	5	0,33
IP11	1	0,07	2	0,13	4	0,27	5	0,33	3	0,20
IP12	1	0,07	4	0,27	2	0,13	5	0,33	3	0,20
IP13	5	0,33	4	0,27	1	0,07	3	0,20	2	0,13
IP14	1	0,07	2	0,13	3	0,20	5	0,33	4	0,27
IP15	2	0,13	1	0,07	3	0,20	4	0,27	5	0,33
IP16	1	0,07	4	0,27	5	0,33	2	0,13	3	0,20
IP17	1	0,07	2	0,13	5	0,33	4	0,27	3	0,20
IP18	1	0,07	2	0,13	5	0,33	3	0,20	4	0,27
IP19	1	0,07	2	0,13	5	0,33	4	0,27	3	0,20
IP20	1	0,07	4	0,27	3	0,20	2	0,13	5	0,33
Total Score	2,00		4,00		4,07		5,07		4,87	