



Sustainability in Finland's Fast Food Industry

Challenges and opportunities in eco-friendly packaging solutions

Dayanthani Ekanayake

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Dayanthani, Ekanayake

Sustainability in Finland's Fast-Food Industry: Challenges and Opportunities in Eco-Friendly Packaging Solutions

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Abstract:

This thesis explores the challenges and opportunities related to sustainable packaging within Finland's fast-food industry. With packaging waste accounting for a significant portion of environmental pollution, the fast-food sector faces unique obstacles in balancing sustainability with practical and economic demands. The study investigates the critical challenges fast-food companies face, including high material costs, stringent EU regulations, and consumer expectations prioritizing convenience. The research adopts a qualitative approach, utilizing semi-structured interviews and document analysis to gather comprehensive insights from industry stakeholders, including sustainability managers and packaging suppliers. The findings highlight significant efforts to adopt eco-friendly solutions, such as biodegradable and fibre-based materials, and to integrate circular economy principles. However, challenges related to cost and compliance persist, hindering the broader adoption of sustainable practices. The study underscores the importance of collaborative efforts between fast-food companies and packaging suppliers to bridge the gap between regulatory goals and economic feasibility. While notable progress has been made, the path to fully sustainable packaging solutions requires continuous innovation, consumer education, and policy support.

Keywords:

Sustainable packaging, Fast-food industry, Circular economy, Packaging waste management

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1 Introduction

Packaging waste significantly impacts environmental pollution. In industrialized countries, 30-35% of municipal waste is attributed to packaging, while in developing countries, the figure is 15-20% (Karima Afif, 2021). Packaging waste has been a significant threat to the environment within the EU. Paper, cardboard, and plastic are the primary materials contributing to this waste. 84 million tons of packaging waste were generated in 2021. Of this, 40.3% were paper and cardboard, and 19% were plastics. (Eurostat, 2023)

The introduction of single-use paper with plastics and chemically coated materials in the fast-food packaging industry has significantly increased paper-based packaging waste in the EU. According to the European Environmental Bureau, in 2020, the EU generated 32.7 million tons of paper-based waste. The alarming part is that much of this paper includes plastics or other chemical additives, complicating recycling efforts. Deforestation is another primary concern tied to paper-based packaging, as wood pulp is the primary material used in production. It is estimated that 35% of trees felled globally are for paper manufacturing. (Chleih, 2023)

The fast-food industry accounts for two-thirds of the total packaging waste in the EU. The combination of paper and plastic in packaging makes the recycling process even more complicated. Each EU citizen uses approximately 35.9 kg of plastic packaging annually, of which only 14.2 kg is recycled (Eurostat, 2023).

The increasing environmental challenges have brought sustainable development to the forefront of global priorities. As Rogers, Jalal, and Boyd (2012) describe, sustainable development is fundamentally about meeting the needs of the present without compromising the ability of future generations to meet theirs. This principle is the foundation for the United Nations Sustainable Development Goals, which aim to integrate progress's economic, social, and environmental dimensions. (Rogers et al., 2012)

A key strategy within sustainable development is the circular economy, a concept elaborated by Sillanpää and Ncibi (2020). The circular economy emphasizes extending

the lifecycle of resources through practices such as reuse, recycling, and remanufacturing, minimizing waste, and conserving natural resources. Complementary to this is waste management, which seeks to reduce landfill reliance by enhancing recycling efforts and recovering energy from waste materials. These approaches are critical in addressing global waste issues and fostering a sustainable, resource-efficient future. (Sillanpää & Ncibi, 2020)

This study focuses on the fast-food industry's challenges and solutions implemented related to sustainable packaging, particularly in Finland. Finland is a role model and leading country in the European Union, with strong government support and legislation promoting sustainability.

1.1 Problem statement

The EU has taken action against packaging waste and set clear goals within the region under the Packaging and Packaging Waste Directive (94/62/EC). The recycling directives are outlined as all packaging waste to be achieved by 65% by 2023 and 70% by 2025. The current figure is only 55% (European Commission, 2022). To address these challenges, the EU is preparing to implement the Packaging and Packaging Waste Regulation (PPWR), which will replace the existing PPWD and introduce stricter standards for packaging sustainability.

The PPWR emphasizes minimizing the environmental impact of packaging through a circular economy framework, promoting the use of recyclable, reusable, and sustainable materials. This shift poses significant challenges for industries reliant on single-use packaging, particularly the fast-food sector. Companies must now adapt to regulations prioritizing reusable and recyclable solutions, requiring substantial operational changes and increased costs to comply with the new mandates. (European Commission, 2022).

Finland's national guidelines are aligned with the EU's objectives, targeting a 65% recycling rate for packaging waste by 2025. In 2020, Finland's recycling rate for plastic packaging stood at 26%, with a 2025 target of 50%. To achieve this, the Finnish government is embracing a circular economy approach by encouraging reuse and reducing packaging waste production. As part of this strategy, Finland is actively

pursuing innovative solutions to minimize the environmental impact of packaging. (Helisatuli, 2023)

However, the fast-food industry remains a significant source of packaging waste due to the high volume of single-use packaging it produces. Addressing this sector is critical, as it poses unique challenges in balancing convenience, food safety, and sustainability. This study aims to investigate the issues related to sustainable packaging in Finland's fast-food industry and examine potential solutions to mitigate its environmental impact.

1.2 Aim of the study

This study aims to understand the challenges faced in sustainable packaging within the fast-food industry. It focuses on how companies need help to meet their sustainability goals while adhering to government regulations and collaborating with packaging specialists. The study examines both the challenges and the solutions implemented in the industry.

Research Questions:

RQ1: What challenges does the fast-food industry face regarding sustainable packaging?

RQ2: What solutions have been implemented, or are currently being implemented, to reduce the carbon footprint in packaging?

1.3 Demarcation

This study focuses exclusively on Finland and the companies operating within the region rather than those with global operations. Narrowing the scope to a specific sector and region is essential to address study limitations and time constraints.

Considering the time demarcations, the research concentrates on leading fast-food companies operating in Finland, such as McDonald's, Burger King, and Hesburger. The study primarily focuses on sustainability reports and the data provided by packaging suppliers and sustainable managers in the organization to collect the data to answer the research questions. The study excludes online food delivery services, focusing solely on the packaging used in physical restaurant locations.

This study focuses only on primary packaging and does not address the industry's secondary and tertiary packaging waste or cover packaging associated with online sales and delivery operations.

1.4 Definitions

Packaging Waste - All materials used for the containment, protection, handling, delivery, and presentation of discarded goods after use. This includes primary, secondary, and tertiary packaging materials for single or multiple uses. The increase in packaging waste is often associated with higher consumption and challenges in achieving effective recycling. (European Commission, 2022)

Primary Packaging - The immediate packaging that contains the product and reaches the end consumer, often serving as a sales tool (Pålsson, 2018).

Sustainable Development - Framework for addressing the needs of the present without compromising the ability of future generations to meet their own needs. (Rogers et al., 2012)

Circular Economy - Economic model aimed at eliminating waste and promoting the continual use of resources. It emphasizes rethinking systems to transition from the traditional linear economy of "take, make, waste" to one where resources are reused, repaired, and recycled to minimize environmental impact. (Sillanpää & Ncibi, 2020)

Single-Use Plastics - Plastic items intended for one-time use, such as straws, plates, and cutlery, are commonly found in fast food services (European Commission, 2019).

Waste Hierarchy - A framework adopted by the EU to prioritize waste management practices, ranking prevention as the most preferred approach, followed by reuse, recycling, recovery, and disposal as a last resort (European Commission, 2020).

2 Theory

This chapter describes the theoretical framework relevant to the problem statement, focusing on the core theories supporting the research questions, particularly the functions and dimensions of packaging. It also provides an in-depth analysis of EU packaging regulations and their specific application within Finland. To align sustainable packaging practices with the proposed Packaging and Packaging Waste Regulation, the chapter examines the role of eco-friendly materials in achieving these objectives. Furthermore, it highlights the importance of sustainable development in mitigating environmental impacts, emphasizing the integral role of circular economy principles and effective waste management.

2.1 Packaging dimensions & functions

Packaging in the fast-food industry is crucial and serves a broader role than merely containing food. It involves a coordinated system for the transportation, distribution, storage, retailing, and end-use of prepared goods. Packaging ensures the safe delivery of products to the end user while minimizing environmental impact and costs. It can be categorized into primary, secondary, and tertiary packaging. Primary packaging is the closest to the product, reaching the end user and often serving as a sales tool (Pålsson, 2018). This study focuses exclusively on primary packaging; hence, the following discussion addresses all factors related to primary packaging.

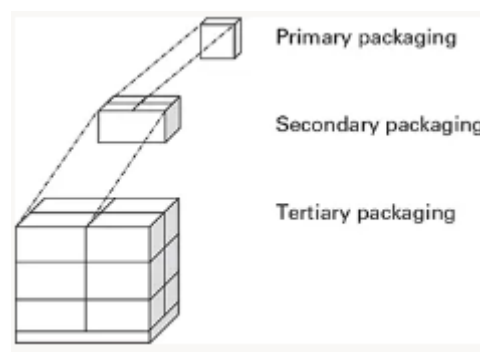


Figure 1. The interrelated levels of a packaging system (Pålsson, 2018)

The primary packaging functions include protection, containment, apportionment, unitization, communication, and convenience (Pålsson, 2018). With the growing demand

for fast food today, addressing the environmental impact of packaging materials is essential. To comply with strict regulations, continuous innovation is needed to use materials that reduce the carbon footprint while protecting the food, such as biodegradable plastics and recycled paper. (Williams, 2011)

2.1.1 Protection and preservation

The primary function of packaging is to protect food and preserve it until it is consumed, safeguarding it from environmental factors such as mechanical damage and barrier functions like preventing exposure to oxygen and moisture, which can degrade product quality (Pålsson, 2018). Packaging must ensure product quality and maintain freshness until the end use. This is crucial in the fast-food industry, as products are often consumed on the go and must retain their temperature throughout handling and transportation. (Nuhija & Lajqi, 2023; Wohner et al.,2019)

Packaging has evolved with innovative solutions such as oxygen barrier materials and modified atmosphere packaging to minimize food waste while adhering to food safety standards. These advancements enhance the shelf life of products in the fast-food industry without compromising product quality. (Li & Li, 2024)

2.1.2 Marketing and communication

Packaging represents the brand and thus acts as a marketing tool. Additionally, it communicates information about the product to the consumer. Nutritional content and ingredients are commonly printed on the packaging. (Wohner et al.,2019) The fast-food industry heavily relies on the visual impact of packaging design in consumer decision-making. This is why companies like McDonald's use logos and colours to reinforce brand identity through packaging (Nuhija & Lajqi, 2023).

2.1.3 Convenience and handling

Convenience is vital in the fast-food industry. Since these products are often consumed on the go, the packaging design must facilitate easy handling, opening, and disposal for consumers. Features that enhance these aspects include portability, re-seal ability, and

consuming food directly from the package. Such design elements improve consumer perceptions and experiences in the fast-food sector (Wohner et al.,2019).

Li and Li (2024) explain that user-friendly designs help enhance customer satisfaction by increasing competitive advantage in the fast-food industry. By improving the eating experience through user-friendly packaging, companies strengthen brand loyalty.

2.1.4 Sustainability and environmental impact

Due to the widespread use of plastics, there is growing concern regarding the sustainability and environmental impact of products, particularly packaging materials. Nuhija and Lajqi (2023) confirm that consumers are increasingly concerned about environmentally friendly packaging in the fast-food industry. This is why leading fast-food companies are switching to more sustainable packaging options.

2.1.5 Cost efficiency

The fast-food industry primarily relies on cost-effective profitability. Therefore, cost efficiency becomes a substantial factor when considering the main product functions and sustainability. Balancing packaging innovations with the need to reduce supply chain costs is crucial. Using fewer materials and lightweight packaging can improve the chances of achieving these goals (Wohner et al., 2019; Pålsson, 2018).

2.2 EU regulation of packaging waste

Directive 94/62/EC, established in 1994, was a fundamental legislative framework for standardizing packaging waste management across EU member states. This Directive addressed the growing concerns over the environmental impact of packaging waste by setting binding recycling targets and encouraging sustainable waste management practices. Its primary objective was to harmonize national measures, ensuring a consistent approach across the EU that supported environmental sustainability without disrupting the internal market (European Union, 2018).

One of Directive 94/62/EC's essential features is the establishment of specific recycling targets for various packaging materials. Table 1 outlines the existing targets and future goals, demonstrating the EU's commitment to progressive increases in recycling rates to promote sustainable practices.

Table 1: Specific targets for recycling (European Commission, 2022)

	Current Targets (%)	By 2025 (%)	By 2030 (%)
All packaging	55	65	70
Plastic	25	50	55
Wood	15	25	30
Paper and cardboard	60	75	85
Aluminium	-	50	60

In addition to recycling targets, the directive introduced the waste hierarchy, which provides a structured approach to managing waste. This hierarchy prioritizes prevention, reuse, recycling, recovery, and disposal as the least preferred option (European Union, 2018). Such a framework is designed to maximize resource efficiency and minimize the environmental impact of packaging waste.

Implementing Directive 94/62/EC posed initial challenges for member states, particularly in aligning existing national legislation with the Directive's requirements and developing the infrastructure for effective waste management. Industries heavily reliant on single-use and mixed-material packaging, such as the fast-food sector, must adapt significantly to comply with these regulations. The Directive underscored the importance of adopting innovative solutions for packaging materials and waste management practices to meet EU targets. (Vuk et al., 2023)

2.2.1 Waste hierarchy

The waste hierarchy is introduced to EU member states to maximize resource efficiency. It is a key component of the PPWD. Waste can be managed according to the hierarchy outlined below, with prevention being the most preferred method.



Figure 2. Waste Hierarchy (European Commission, 2022)

Level 1: Prevention involves using less material, lightweight packaging, and alternative materials that are more resource-efficient.

Level 2: Reuse focuses on reusing packaging or products that can be reused.

Level 3: Recycling involves collecting used materials to manufacture new products. This stage requires sorting processes, which can be challenging when dealing with mixed materials.

Level 4: Recovery refers to generating energy from waste.

Level 5: Disposal, the final level, is landfilling, which should be avoided as much as possible. (European Commission, 2022)

2.2.2 Single-use plastic Directive

The Single-Use Plastics Directive (EU 2019/904), introduced in 2019, directly impacts industries like fast food, which rely heavily on disposable packaging. The Directive aims to reduce the environmental impact of plastic straws, cutlery, plates, and food containers commonly used in fast food services. It mandates banning or reducing single-use plastics,

pushing companies to adopt sustainable alternatives like biodegradable or reusable materials. (European Commission, 2019)

The Directive is closely aligned with the EU's Circular Economy Action Plan, emphasizing the shift towards a sustainable approach where packaging must be recyclable or reusable. This alignment is reinforced by the proposed PPWR, which builds on the existing PPWD. The PPWR seeks to redefine packaging standards by enhancing requirements for recyclability and mandating a specific percentage of recycled content in packaging materials. (European Commission, 2019; European Commission, 2022)

A significant focus of the Directive is on products with thin plastic coatings, such as paper cups and similar packaging used by fast-food restaurants. These items present complex recycling challenges due to their mixed-material construction. Addressing these issues, the Directive outlines specific standards for collecting, sorting, and recycling such items, aiming to integrate them into a circular economy and prevent them from contributing disproportionately to waste streams. (European Commission, 2019; European Commission, 2022)

The Directive also sets ambitious targets, such as a 90% collection rate for plastic bottles by 2029. In addition, it introduces labelling requirements that inform consumers about appropriate disposal and recycling methods, ensuring compliance and public participation in waste reduction efforts (European Commission, 2019). The labelling requirement helps clarify the environmental impact and disposal method of packaging, promoting a broader understanding of sustainability practices (European Commission, 2022).

2.2.3 The Packaging and Packaging Waste Regulation

The PPWR evolves the original PPWD 94/62/EC and aligns it with current sustainability priorities. Introduced as part of the EU's strategic plan to improve waste management, the PPWR builds on previous Directives by setting forth enhanced measures to promote recyclable and reusable packaging. An essential advancement of the PPWR is its comprehensive criteria for recyclable packaging, which expands upon the recycling goals established in earlier frameworks. The regulation requires that packaging be recyclable

and contain a specified proportion of recycled content, underscoring the EU's dedication to a circular economy and reducing environmental impact. (European Commission, 2022)

Unlike the Single-Use Plastics Directive, which focuses on specific disposable products, the PPWR takes a broader approach, applying to various packaging materials, including complex composites. This regulation addresses challenges associated with recycling multi-material items, such as paper cups with thin plastic linings, by mandating collection and processing systems that minimize waste sent to landfills. (European Commission, 2022)

The PPWR also enhances the Extended Producer Responsibility (EPR) framework, assigning more comprehensive duties to producers concerning the life cycle of their packaging. This measure aims to drive innovation by compelling manufacturers to consider sustainability in material choice and design from the outset (European Commission, 2022).

In summary, the PPWR modernizes the PPWD's original goals by integrating strict recycling and reuse mandates, advancing EPR obligations, and leveraging digital tools to support a sustainable packaging system. This regulatory update showcases the EU's commitment to reducing environmental impacts through resource-efficient, circular economy practices.

2.3 Finland implementation and National targets

Finland's recycling efforts, particularly for packaging waste, position it as one of the more environmentally conscious EU nations. In 2019, Finland reported a 70.6% recycling rate for packaging waste, placing it among the leading EU states for sustainable waste management (Vuk et al., 2023). Despite these achievements, Finland has experienced challenges in maintaining consistency across all forms of waste management. While the overall recycling rate for packaging waste meets the EU's current expectations, there is an ongoing need for increased efforts to meet the forthcoming 2025 target of 65% recycling, specifically for plastic packaging and other material-specific quotas. This indicates areas where policy revisions and technological investments may be required to bolster the country's overall recycling efficiency. (Eurostat, 2024)

According to the Eurostat database, Finland generated 159.86 kg of packaging waste per capita in 2022, of which 73.5 kg per capita was recycled (Figure 3). These numbers highlight Finland’s commitment to improving packaging waste management and reducing the environmental impact of waste through effective recycling systems.



Figure 3. Packaging waste recycling in Finland, 2022 (Own editing based on Eurostat database, 2024)

2.3.1 Finnish plastic roadmap

The Finnish Plastic Roadmap, first introduced in 2018, outlines strategies to reduce plastic consumption and boost recycling across various sectors, including food packaging. By 2030, it aims for a 60% recycling rate for plastic packaging and a 30% average use of recycled plastics in new products. The roadmap promotes a shift toward sustainable materials by encouraging recyclable, renewable, and biodegradable alternatives. Aligned with the EU’s goals to recycle 50% of plastic packaging by 2025 and 55% by 2030, this initiative emphasizes circular economy principles: “Reduce, Reuse, Recycle, and Replace”. Collective efforts from manufacturers, local authorities, and consumers are crucial in driving sustainability, fostering innovation, and achieving EU targets for resource efficiency and carbon emission reductions. (Ministry of Environment, 2022)

2.3.2 Extended Producer Responsibility (EPR)

Extended Producer Responsibility (EPR) is another crucial element of Finland's packaging waste management system. Under this system, producers are responsible for

the entire lifecycle of their packaging, from production to disposal. The EPR model ensures that companies bear financial and operational responsibility for collecting, sorting, and recycling the packaging waste they generate. Rinki Oy, a non-profit organization, manages the collection and recycling of packaging waste in Finland, helping to ensure compliance with both national regulations and EU directives (Rinkiin.fi, n.d.)

2.4 Circular economy and sustainable packaging

The circular economy is a transformative framework crucial for promoting sustainable packaging practices in the fast-food industry. Unlike the traditional linear economy, which follows a "take-make-dispose" model, the circular economy emphasizes the reduction of waste through strategies such as reuse, recycling, and designing products that enable a closed-loop system. According to Sillanpää and Ncibi (2019), this approach provides a systemic shift away from waste-intensive practices, encouraging resource efficiency and minimizing environmental harm. The adoption of circular economy principles has gained drive due to regulatory pressures such as Directive (EU) 2019/904 (European Commission, 2019).

However, implementing circular economy practices in the fast-food industry poses notable challenges. As Sillanpää and Ncibi (2019) highlighted, one key obstacle lies in managing the complexity of waste streams. Fast-food packaging frequently contains residual food, grease, and liquids, contaminating recycling processes and compromising material recovery efforts. To address this, the EU Directive (2019) emphasizes the importance of designing packaging materials that are resistant to contamination and can be effectively integrated into recycling systems (European Commission, 2019).

Economic feasibility represents another significant hurdle. Transitioning to reusable or compostable packaging often requires substantial upfront investment in materials and infrastructure, which may be prohibitive for smaller enterprises. Sillanpää and Ncibi (2019) advocate for collaborative approaches, involving partnerships between industry stakeholders, waste management providers, and policymakers to share costs and responsibilities. Additionally, the EU Directive (2019) underscores the necessity of public-private partnerships and government incentives to support the establishment of

collection and recycling systems, fostering a broader transition toward a circular economy in the fast-food sector (European Commission, 2019).

2.5 Eco-friendly packaging materials

Eco-friendly packaging refers to materials used in production that align with sustainability principles and aim to reduce environmental impact throughout their life cycle (Hussain et al., 2024). These materials are designed to be biodegradable, recyclable, or derived from renewable resources, thereby minimizing their ecological footprint. Examples include plant-based polymers, recycled components, and naturally derived fibres. Such packaging is a sustainable alternative to traditional plastics, promoting circular economy practices and reducing waste (Hussain et al., 2024).

2.5.1 Biodegradable materials

Biodegradable packaging materials naturally decompose through the action of microorganisms, breaking down into carbon dioxide, water, and biomass under specific conditions. These materials are derived from renewable resources, such as cornstarch or plant-based polymers, and are designed to reduce long-term environmental impacts. Critical factors for packaging include decomposition conditions, where the effectiveness of biodegradation depends on environmental elements like temperature, humidity, and the presence of microorganisms. Maintaining protective qualities like conventional plastics while being biodegradable is crucial for ensuring product quality and safety. (Shaikh et al., 2021)

2.5.2 Fiber-based materials

Fiber-based packaging materials comprise cellulose and other plant-derived fibres, making them renewable and often recyclable. These materials provide a sustainable alternative to plastic packaging and can be tailored for various applications in the food and retail industries. Fibre-based materials are valued for their efficient recyclability and origin from renewable plant sources, contributing to a circular economy (Johansson et al., 2012).

Key performance attributes include durability, barrier properties against moisture, and mechanical strength, ensuring the packaging maintains product integrity. Additionally, the environmental appeal of fibre-based packaging enhances consumer acceptance and supports brand sustainability efforts (Pásztory & Kóczán, 2024).

3 Method

This chapter elaborates on the research methodology implemented to explore sustainable packaging practices in Finland's fast-food industry. The study used a mixed-methods approach, combining qualitative methods to identify comprehensive insights into the industry's challenges and solutions related to sustainable packaging. Primary data was collected through semi-structured interviews, while secondary data were gathered from annual reports, sustainability reports, and relevant websites.

3.1 Choice of method

According to Denzin (2017), a qualitative approach provides a deeper understanding of social and industrial studies. He emphasizes that interviews, observations, and case studies offer researchers a broader perspective on real-world facts within a study. Therefore, this approach is crucial for identifying challenges and solutions in the sustainable packaging industry.

Interviews are a fundamental method in qualitative research, allowing researchers to gather rich, in-depth insights from participants. As Patton (2015) notes, interviews facilitate direct engagement with individuals, allowing for the exploration of their experiences, perspectives, and the contexts in which they operate. In the context of the sustainable packaging industry, interviews with key stakeholders, such as industry experts, uncovered both technical challenges, including material costs and supply chain issues, and broader socio-environmental concerns, like regulatory pressures and consumer demands, that influenced the industry's sustainability efforts.

Denzin (2017) distinguishes between three types of interviews: structured, semi-structured, and unstructured, each providing varying degrees of flexibility. Semi-structured interviews were especially valuable in industrial studies and were deemed the

most suitable approach for this study on sustainable packaging. Their flexibility was crucial for capturing the industry's complex nature.

In addition to interviews, document analysis was a valuable data collection method in qualitative research. As Creswell (2013) highlights, documents such as policy reports, industry guidelines, and corporate reports provide a rich source of secondary data that complements interview findings. These documents offer a formalized and often historical perspective on industry practices, enabling an understanding of how issues have been addressed over time and within specific regulatory frameworks. Analysing documents allowed to investigate how sustainability was framed and promoted within the packaging industry. This analysis provided valuable insights into the influence of public perceptions and regulatory actions on sustainable packaging.

The integration of interviews and document analysis enhances the reliability and validity of qualitative research through the process of data triangulation (Creswell, 2013). Triangulation involved cross-verifying information obtained from multiple sources to ensure consistency and provide a comprehensive understanding of the research problem. By combining interviews with document analysis, the researcher investigated both personal experiences and institutional practices, capturing a more complete picture of the challenges and solutions within the sustainable packaging industry.

This study employed a qualitative approach to identify the challenges and solutions to sustainable packaging implemented in Finland's fast-food industry. Conducting interviews allowed for an in-depth exploration of industry challenges, the steps taken to reduce carbon footprints, and future innovation strategies. Given the busy schedules of industry professionals, document analysis complemented the interviews by providing insights from published materials, such as annual reports, sustainability reports, and official websites.

3.2 Respondents

Selecting the most suitable respondent is crucial for obtaining credible and reliable data in qualitative research. As Creswell (2013) emphasizes, choosing participants involves identifying individuals with direct experience with the studied phenomenon and can

provide in-depth insights. This purposeful selection ensures that the data is rich and contextually relevant. Furthermore, establishing trust and rapport with respondents is essential to elicit authentic responses, which are critical for the study's validity. Researchers must also consider factors such as accessibility, willingness to participate, and diversity in perspectives to enhance the comprehensiveness of the findings (Creswell, 2013). This part was crucial, as reaching out to the selected respondents posed challenges; some declined to participate officially due to confidentiality constraints. Despite these hurdles, it was a success in securing engagement from three respondents, two from the fast-food industry and one from packaging material suppliers. Their contributions provided comprehensive and valuable data for the study, aligning with the research objectives.

In qualitative research, several sampling techniques can help ensure that respondents are well-suited to the research questions. Purposeful sampling is a commonly used approach in which participants are intentionally selected based on their expertise relevant to the study (Creswell, 2013). In sustainable packaging research, this method allowed researchers to focus on industry professionals, such as sustainability managers and packaging suppliers, who provided valuable insights into sustainability practices.

Another effective technique is snowball sampling, particularly useful for accessing hard-to-reach experts. In this approach, initial respondents recommend additional participants from their professional networks, expanding the pool of knowledgeable individuals (Patton, 2015). For example, interviewing a sustainability expert might lead to referrals for other key stakeholders in the sustainable packaging industry, such as supply chain managers. Even though this did not significantly impact the study, some respondents suggested contacting other companies, citing their busy schedules as a reason for being unable to participate in the interview.

Additionally, maximum variation sampling captures diverse perspectives by selecting participants from various roles and experiences within the industry (Creswell, 2013). This approach played a pivotal role in encouraging interviews with packaging material suppliers, broadening the scope of the study. Initially, the research plan focused solely on interviewing sustainability professionals from fast-food companies. However, incorporating packaging material suppliers provided a richer and more diverse dataset,

aligning with the study's aim to comprehensively explore sustainability challenges and solutions across the industry.

In this study, purposeful sampling was used to focus on respondents involved in sustainable practices within the fast-food industry, such as sustainability managers, officers, and manufacturers of sustainable packaging. Including packaging suppliers as key players in providing sustainable solutions broadened the research scope and offered additional insights into sustainability efforts within the sector. These experts provided direct insights into innovations related to sustainable packaging and the current challenges faced by the industry.

3.3 Questionnaire

In preparing the interview guide, crafting questions that align with the study's objectives and elicit insightful responses is essential. Bryman (2016) emphasizes the importance of ensuring clarity and relevance in interview questions, particularly in qualitative research, where the goal is to gather rich, detailed data. Open-ended questions are especially valuable as they allow respondents to express their perspectives freely, reducing the risk of overly constrained answers. This approach fosters a conversational dynamic that encourages participants to share in-depth insights, which was crucial for exploring the complexities of sustainable packaging in the fast-food industry. The flexibility inherent in qualitative interviewing also allowed for questioning and exploring unexpected themes during the discussion, enriching the collected data.

In crafting an interview guide for sustainable packaging in the fast-food industry, the questions were aligned with the research objectives while allowing room for flexibility. For instance, the question, "Can you describe specific functionality-related issues, such as food preservation or convenience?", encouraged respondents to provide detailed insights into the practical aspects of sustainable packaging.

Follow-up or probing questions to encourage further elaboration on key points. For example, the question "What are your company's most significant challenges in transitioning to more sustainable packaging?" provided an entry for details discussion.

This ensures that the themes identified in the thematic analysis are well-supported by detailed participant data.

The study focused on conducting interviews with sustainability professionals in the fast-food industry and packaging material suppliers, using open-ended and follow-up questions. Two separate interview guides, tailored to each group, ensured that the questions accurately aligned with each respondent's expertise and role (Appendix 1 & 2).

3.3.1 Questionnaire guide

Packaging Dimensions and Functions – The questionnaire included questions about packaging challenges, focusing on preservation, functionality, and convenience. These aspects were directly tied to the theory discussed by Pålsson (2018) regarding protection and preservation, marketing and communication, and convenience. For instance, questions explored how companies balanced packaging innovation with maintaining functional aspects, aligning with the theory that packaging should serve practical purposes while being sustainable.

Circular Economy – Sections of the questionnaire addressed circular economy implementation and reusability, aiming to identify how companies worked to close the material loop and reduce packaging waste, essential for sustainable development in the fast-food industry. This was particularly relevant considering EU regulations, such as the Single-Use Plastic Directive, which influenced how companies met circular economy requirements.

EU Regulations and Compliance – The questionnaire captured companies' compliance with EU sustainability regulations. It provided insights into how they approached challenges and took necessary steps to align industry practices with regulatory demands.

Cost Efficiency and Economic Feasibility – The questionnaire examined cost considerations and collaboration between suppliers and fast-food companies, seeking to identify how businesses balanced innovation and profitability while using resources efficiently.

Consumer Behaviour and Marketing Influence – Questions about consumer expectations and perceptions emphasized the crucial role of consumer actions in the fast-food industry. These insights helped determine how companies adapted innovations based on consumer needs to achieve sustainability goals.

3.4 Document review

For document analysis, literature on qualitative research methods emphasizes the importance of secondary sources like company websites, annual reports, and sustainability reports to complement primary data collection. According to Bowen (2009), document review is an efficient and valuable method for gathering supplementary information that can validate or expand upon interview findings. These documents often provide detailed insights into corporate strategies, practices, and regulation compliance. Analysing reports published on official websites, such as annual and sustainability reports, can uncover trends, challenges, and progress related to sustainable practices within an industry. Additionally, they offer a publicly available and credible source of data that is typically aligned with corporate accountability and transparency (Bryman, 2016).

In addition to interviews, data were gathered from publicly available sources, such as company websites, annual reports, and sustainability reports. This secondary data complemented and validated the information collected from interviews. It also helped prepare for the interviews by providing detailed background knowledge, allowing them to be more focused and efficient, thereby minimizing the time required from busy professionals.

3.5 Data sources

The documentation relevant to this research consisted of sustainable reports issued by fast-food companies and packaging material-supplying companies operating in Finland, accessible through their official websites. This information was analysed to identify critical challenges and solutions for sustainable packaging. The focus was on how these companies disclosed their compliance with sustainability regulations and their strategies for reducing the environmental impact of packaging.

The author upheld the integrity of the gathered data by implementing four criteria Scott (2014) proposed for assessing sources:

Authenticity: The document must be confirmed as legitimate and sourced from a trustworthy origin.

Credibility: It should be reliable, precise, and free from alterations or biases stemming from personal interests.

Representativeness: The data must correspond with the research topic, demonstrate consistency with analogous information in the field, and accurately depict the broader research context.

Meaning: The document's content should be explicit, easily interpretable, and significant, facilitating straightforward understanding and analysis.

Table 2 summarizes the documents used and their relevance to the research topic.

Table 2: Data Sources

No	Document Name	Type of Document	Author, Year	Relevance	Obtained From
1	Tradeka annual and corporate responsible report 2023	Annual corporate responsible report	Tradeka Group 2023	The leading corporate group in the food industry has several fields, including the fast-food industry.	https://www.tradeka.fi/sites/default/files/2024-05/2405-Tradeka-Annual%20and%20corporate%20responsibility%20report-2023-v2.pdf
2	McDonald's impact report	Purpose impact progress report 2023/24	McDonald's Corporation 2023-2024	Leading fast food brand globally	https://corporate.mcdonalds.com/content/dam/sites/corp/nfl/pdf/McDonalds_PurposeImpact_ProgressReport_2023_2024.pdf
3	McDonald's climate resilience summary	Corporation Climate Resiliency Summary 2023–2024	McDonald's Corporation 2023-2024	Leading fast food brand globally	https://corporate.mcdonalds.com/content/dam/sites/corp/nfl/pdf/McDonalds-2023-Climate-Resiliency-Summary.pdf
4	Hesburger website	Official website	Burger-In Oy 2024	Leading local fast food brand in Finland	https://www.hesburger.com/
5	Huhtamaki annual report 2023	Annual report 2023	Huhtamaki 2023	Leading packing material supplier in Finland	https://www.huhtamaki.com/globalassets/global/sustainability/reports/en/2023/huhtamaki-oj-annual-report-2023.pdf
6	Sulapac website	Official website	Sulapac Oy 2024	Leading packing material supplier in Finland	https://www.sulapac.com/

3.6 Research approach

Upon completing the interviews and recording the responses, an analysis was conducted based on the keywords and topics identified in the document analysis. Reviewing frequently mentioned challenges in the interviews revealed various approaches to addressing issues related to sustainable packaging in the fast-food industry. This analysis provided perspectives from multiple stakeholders and facilitated a comparison of viewpoints regarding sustainability efforts in packaging.

The data highlighted recurring challenges and proposed solutions through consistent narratives and keywords, enabling specific conclusions about the fast-food industry's environmental impact. The analysis allowed for an understanding of how businesses responded to the growing demand for sustainable packaging and the obstacles they faced in implementing more eco-friendly options.

The insights collected were organized into a table, providing a structured framework for analysis. For each identified packaging issue, conclusions were drawn regarding the actions taken by fast-food companies to mitigate or address the challenge and the barriers preventing the widespread adoption of sustainable practices. This approach offered a clear view of the progress and ongoing difficulties in transitioning to sustainable packaging solutions within the industry.

3.7 Analysis of the data

Analysing qualitative data involves organizing and identifying themes and patterns that address the research questions (Bryman, 2016). Thematic analysis is a systematic approach that helps extract meaningful insights from qualitative data by categorizing them into relevant themes.

The initial step in accurately analysing qualitative data involved transcribing interviews conducted with sustainability managers in the fast-food industry and packaging material suppliers. This process ensured that all verbal interactions were converted into a written format, providing a comprehensive record for subsequent coding and analysis. Transcription allows for a detailed examination of responses, enabling the researcher to

capture not only the explicit information but also the nuanced expressions and contextual details that may contribute to developing themes and patterns (Braun & Clarke, 2006).

Braun and Clarke (2006) outline thematic analysis as a flexible yet accurate method for identifying, analysing, and reporting patterns or themes within qualitative data. It provides researchers with a structured process for making sense of complex datasets, making them accessible across various theoretical frameworks. He describes six distinct phases that guide researchers through thematic analysis. Coding is central to thematic analysis. It involves labelling relevant data segments with a word or phrase that captures their essence. According to Braun and Clarke (2006), coding requires careful attention to both the explicit content of the data and the deeper, underlying meanings. It is an active process that involves understanding. Through coding, it helped organize and categorize the data to highlight significant patterns related to the research questions.

The literature on thematic analysis highlights the flexibility of coding. Depending on the research goals, coding can be approached inductively, which means data-driven, or deductively, which means theory-driven. The inductive approach allows themes to emerge from the data without predetermined notions, while the deductive approach applies preexisting theoretical frameworks to guide the analysis (Braun & Clarke, 2006). This study was conducted using a deductive approach that followed existing theoretical frameworks.

After the initial coding, these codes are grouped into broader themes that capture significant patterns or meanings within the dataset. This thematic grouping is not a one-step process; it requires an iterative style to ensure the themes accurately reflect the data and contribute to answering the research questions. Braun and Clarke (2006) stress that each theme should be internally coherent and distinct, ensuring clarity in the final analysis.

In summary, coding is an essential part of thematic analysis that requires careful and reflective engagement with the data. Braun and Clarke (2006) emphasize that this process is through which researchers can effectively develop themes that offer deeper insights into the research questions. This systematic approach allows for flexibility and adaptability, making it a widely used method for analysing qualitative data.

By following these steps, the thematic analysis ensured that the data was methodically organized and provided clear insights into the challenges and solutions related to sustainable packaging in the fast-food industry.

Tables 3 and 4 present the thematic analysis of the challenges and the insights into solutions from the data. Due to confidential reasons, the tables presented in this chapter are common without segregating according to the company names but segregated to fast food companies and packing material suppliers separately.

Table 3: Thematic analysis of challenges – Fast food companies/packing material suppliers

	Theory Base	Challenges
Fast food companies	Cost challenges	The high costs of using sustainable materials make prioritization difficult in the fast-food sector.
	Regulatory compliance	Meeting EU directives, such as the Single-Use Plastics Directive, poses compliance challenges.
	Consumer expectation	Consumer preference for convenience over sustainability impacts the adoption of eco-friendly packaging.
	Economic feasibility	The financial burden of adopting and maintaining sustainable practices impacts profitability.
Packing material suppliers	Cost challenges	High production costs of sustainable materials compared to traditional ones.
	Regulatory compliance	Adhering to regulations for biodegradable and fibre-based products is challenging due to stringent EU laws.
	Waste management challenges	Managing contamination and ensuring materials are easily recyclable pose technical difficulties.

Table 4: Thematic analysis of solutions – Fast food companies/packing material suppliers

	Theory Base	Solutions
Fast food companies	Sustainable material use	Adoption of biodegradable and fibre-based materials to align with sustainability goals.
	Circular economy integration	Implementing recycling programs and reusable packaging practices.
	Technological advancements	Incorporation of new technologies for more efficient waste tracking and recycling.
	Consumer education	Efforts to inform consumers about sustainable practices to shift behaviour towards eco-friendly options.
Packing material suppliers	Sustainable material development	Innovations in biodegradable and compostable materials that support circular economy practices.
	Collaboration with clients	Working closely with fast-food companies to implement tailored sustainable solutions.
	Technological integration	Using advanced technologies to enhance product recyclability and compatibility with existing systems.

3.8 Validity and reliability

Validity and reliability are essential in qualitative research to establish the trustworthiness of findings. According to Golafshani (2003), these concepts should reflect the diverse ways of establishing truth, aligning with a realistic approach to qualitative inquiry. In this context, validity emphasizes the accuracy and truthfulness of findings in capturing the multiple realities and perspectives inherent in qualitative research. Golafshani (2003) further argues that validity must be redefined to reflect this emphasis on diverse perspectives.

In qualitative research, reliability pertains to the consistency of the researcher's approach across different studies and contexts. Golafshani (2003) suggests that triangulation can enhance reliability, which involves using multiple data sources, methods, or investigators to cross-verify findings. This approach helps ensure that the research findings are not solely dependent on a single source or method, increasing their dependability.

To align with Golafshani's (2003), this study used triangulation to ensure validity and reliability by gathering data from multiple sources, such as interviews, company websites,

and sustainability reports, to cross-verify findings and reduce bias. A consistent interview guide with open-ended questions was used to enhance the reliability of this qualitative study. While this approach aimed to maintain a degree of uniformity, it also allowed for flexibility in responses, acknowledging that qualitative research cannot be replicated in the same way as quantitative studies.

The author has adopted a transparent approach in handling all data received from respondents and analysed through document reviews. The analysis was conducted within the bounds of the established theoretical framework, ensuring an objective interpretation of the information. This method avoids premature or subjective conclusions, thereby upholding the validity and reliability of the study.

3.9 Ethics

Ethical considerations include maintaining respondent confidentiality and obtaining informed consent. The researcher must address the potential ethical concerns of industry participants by clearly explaining how the data will be used (Iphofen & Tolich, 2018). To address these concerns, all interviews were conducted anonymously to ensure confidentiality. Company names were not revealed when discussing the research results.

Ethical considerations were paramount in this research project. All interview participants received a consent form before the interview, explaining the study's purpose, how the data would be used, and where the research would be published. Participants also had the right to withdraw from the study at any time.

To ensure confidentiality, participant identities were anonymized. Audio recordings were used exclusively by the researcher and were not shared with third parties. Maintaining objectivity was deemed essential to ensure no bias or favoritism influenced the findings. Additional precautions were taken to exclude any information that could reveal the personnel's identities. The chapter on challenges is based entirely on primary data; therefore, the entire subchapter is anonymized, with the company name and respondent details omitted to prevent potential conflicts.

4 Results

This chapter includes insights on sustainable challenges and solutions within Finland's fast-food industry, focusing on McDonalds, Burger King (managed by Restel), and Hesburger. These data were collected using interviews with sustainable managers and suppliers through mail or online meetings, corporate sustainability reports, and official websites.

Findings are organized using two main topics related to the research questions. The first is the challenges of sustainable packaging. This chapter's results are mainly based on primary data, as the secondary data does not contain insights related to the topic. Due to confidentiality, the data is presented anonymously.

The second topic is based on the solutions companies implemented. This chapter's result is based on the insights received from primary and secondary data.

4.1 Challenges in sustainable packaging

Nearly all fast-food companies encounter challenges related to sustainable packaging in their efforts to adopt more environmentally responsible practices. Despite growing pressure for sustainable solutions, secondary data sources, including company sustainability reports and annual reports, lack specific in-depth information addressing these challenges. Consequently, primary data collection methods were employed, including structured interviews and email correspondence with representatives from fast-food companies and packaging material suppliers, to identify and analyse the primary barriers to implementing sustainable packaging.

Insights from these interactions revealed that the primary obstacles are the high costs associated with sustainable materials, stringent EU regulatory requirements, and complex consumer preferences.

The table below summarizes the data collected, highlighting the challenges faced by different companies and their material suppliers as they work toward more sustainable packaging solutions.

Table 5: Challenges in sustainable packaging in the fast-food industry

Company/ Supplier	Cost Challenges	Regulatory Challenges	Consumer Challenges
Fast Food Company 1	High cost of fiber-based and biodegradable materials that are impacting the industry's profitability	Difficulties in compiling EU single-use plastic Directives	Difficult to convenience consumer expectations in line with traditional packaging
Fast Food Company 2	Eco-friendly products, such as reusable products, are more costly than traditional products	Difficulties in lining up with the Green Deal circular economy goals	Consumer preference for single-use packaging makes practical difficulties in implication
Material Supplier Company 1	High cost of biobased and compostable materials compared to traditional material	Difficulty in complying with single-use plastic Directives in the EU.	Gain market acceptance towards compostable materials with consumer convenience

Cost challenge

Initially, representatives from fast-food companies indicated that packaging is considered a secondary factor in their industry, receiving a comparatively smaller budget allocation than core product-related items. As a result, it is challenging to prioritize sustainable options such as biodegradable, fibre-based, or other eco-friendly materials, which typically come at a higher cost. Although many companies have made significant strides toward sustainable packaging solutions, convincing top management to commit to these options remains difficult. This hesitation is primarily due to the industry's generally lower profit margins, which create pressure to maintain cost efficiency in all areas, including packaging.

Meanwhile, packaging material suppliers have emphasized that biodegradable, compostable, and fibre-based materials are more expensive than traditional ones. Despite this, suppliers continue to innovate, developing more cost-effective sustainable solutions by combining materials and improving production methods that align with the EU regulations. However, even with these innovations, sustainable options are costly.

Suppliers recognize that fast-food companies are aware of these costs and that, although they are often reluctant to absorb these additional expenses, those willing to invest in sustainable packaging can make a far more significant impact.

Regulatory Challenge

Concerning EU regulatory challenges, the Fast-Food Company 1 representative noted that the EU's Single-Use Plastics Directive significantly impacts their ability to implement specific packaging solutions. This Directive, aimed at reducing plastic waste, restricts single-use plastic items, pushing companies to find alternative materials that often come with higher costs and practical limitations. The packaging material supplier echoed this sentiment, highlighting one of their successful specific projects related to supplying straws to Middle Eastern country restaurants as one of their most successful projects. Still, these straws cannot be used within the EU due to the stringent requirements of the Single-Use Plastics Directive.

Meanwhile, the representative from the second fast-food company mentioned facing challenges in complying with the EU's Green Deal and its circular economy goals, encouraging companies to adopt practices that reduce waste and promote recycling and reuse. Although this company has met some key performance indicators related to these goals, several areas remain below the desired level of compliance. The representative noted that achieving complete alignment with the Green Deal goals is an ongoing effort, as it requires continuous adaptation in packaging materials, production processes, and waste management practices to meet the EU's high standards for environmental sustainability.

Consumer Challenges

All respondents agree that consumers in Finland are generally well-informed about the environmental impact of sustainable options. However, they noted that consumers are often confused by "greenwashing" practices, where companies may misleadingly promote products as environmentally friendly without substantial evidence. This confusion can undermine consumer trust in genuinely sustainable efforts and create uncertainty about packaging solutions marketed as "green."

Additionally, while Finnish consumers are aware of the environmental impact of packaging in the fast-food industry, they tend to prioritize convenience over sustainability when making purchasing decisions. This preference for convenience presents a significant challenge for fast-food companies attempting to transition to sustainable packaging, as consumers may only partially support options that compromise ease of use, even if they are better for the environment. Ultimately, this preference impacts companies' efforts to shift towards sustainable packaging solutions, as they must carefully balance environmental goals with consumer expectations for convenience.

4.2 Solutions implemented

When analysing the data, both primary and secondary sources were considered. Due to the use of secondary data, some implementations have a global perspective, making it challenging to find precise figures specific to Finland. However, primary data was used to separate and focus on Finland-specific details as much as possible.

The tables below summarize the solutions implemented or are currently in progress.

Table 6: Solutions implemented by fast food companies for sustainable packaging

Fast-food company	Key solutions implemented/Ongoing projects
<i>McDonald's – Global Approach</i>	<ul style="list-style-type: none"> • Guest Packaging Sourcing Progress: By 2023, McDonald's achieved 86.7% of its goal to source 100% of primary guest packaging from renewable, recycled, or certified materials, with 97.9% of fibre-based guest packaging globally sourced from these materials. Non-structural packaging components remain outside the scope. • Recycling and Composting Initiatives: Approximately 88.3% of McDonald's restaurants in markets with advanced waste infrastructure offered guests recycling and composting opportunities. In these locations, guest packaging is collected in customer-facing bins and sorted for recycling or composting, either on-site or at external facilities, leveraging local waste management systems. • Material Transition Efforts: Most European, Union markets have transitioned from plastic to fibre-based packaging. Paper straws and wooden cutlery have been implemented across 50 markets, including parts of the EU. Paper cups have replaced plastic in the Czech Republic, Denmark, Finland, and Norway. • Sustainable Policies in Nordic Markets: Denmark, Finland, Norway, and Sweden have adopted a "no lids on cold drink cups" policy for dine-in customers to reduce plastic waste. • Innovative Packaging Solutions: McDonald's continues to develop renewable coating alternatives for fibre-based salad boxes in Europe and is working to integrate recycled materials into various fibre-based packaging items, including carryout bags, cups, carriers, napkins, and hot cup sleeves.
<i>Burger King (Restel)</i>	<ul style="list-style-type: none"> • Participation in Package-Heroes Project: In 2023, Restel participated in the Package-Heroes project, which aimed to investigate environmentally friendly, consumer-approved, and commercially profitable food packaging solutions. • Commitment to Material Efficiency and SUP Green Deal: Restel joined Motiva's initiative for material efficiency and the SUP Green Deal, focusing on reducing plastic use in food packaging and testing and implementing sustainable packaging solutions. • Introduction of Biobased Reusable Cups: Restel introduced reusable cups made of biobased and recyclable Sulapac material in selected restaurants, including two Burger King outlets.
<i>Hesburger</i>	<ul style="list-style-type: none"> • Reduction of Packaging Materials: Hesburger continually enhances its packaging to be more eco-friendly. Over time, the size and thickness of hamburger wrappers have been reduced to minimize material use. • Biodegradable Wrappers: All Hesburger hamburgers are served in wrappers with an environmentally friendly, biodegradable coating for moisture resistance. • PEFC-Certified Beverage Cups: The cold and hot beverage cups used in Hesburger are certified by the Programme for the Endorsement of Forest Certification (PEFC), ensuring sustainable sourcing. • Collaboration with Suppliers: Hesburger collaborates with its suppliers to identify and implement strategies for reducing waste. • Transition to Wooden Cutlery: In 2021, Hesburger introduced wooden cutlery in its restaurants to adopt more sustainable practices.

Table 7: Solutions implemented by packaging material suppliers for sustainable packaging

Packing material suppliers	Key solutions implemented/Ongoing projects
<i>HuhtamAki</i>	<ul style="list-style-type: none"> • Circular Economy Initiatives: In 2022, Huhtamaki collaborated on projects like The Cup Collective to enhance paper cup recycling across Europe and promote consistent recycling practices. • Mono-Material Solutions: Huhtamaki introduced recyclable mono-material packaging using high-barrier paper, PE, and PP, balancing essential protective qualities with reduced material usage.
<i>Sulapac</i>	<ul style="list-style-type: none"> • Bio-Based Materials: Sulapac supplies packaging solutions from 78% to 100% certified bio-based components, promoting renewable and eco-friendly resources. • Biodegradable Products: Sulapac's materials are sustainably sourced and designed to biodegrade completely, leaving no lasting microplastics, which is crucial for environmental sustainability. • Compatibility with Existing Machinery: Sulapac's packaging products are compatible with standard plastic processing equipment, enabling sustainable solutions without significantly modifying manufacturing processes.

According to McDonald's Corporation Purpose & Impact Report 2023–2024, McDonald's Corporation Climate Resiliency Summary 2023–2024, McDonald's sustainability strategy centres on enhancing recycling and reducing waste through targeted packaging solutions and collaborations. Key initiatives include adding recycling bins where infrastructure permits, partnering with waste management companies, and optimizing packaging for recyclability, supported by clear on-package labelling to guide guests. Through Finland's Green Deal, McDonald's significantly reduced plastic waste by reducing 19,000 kg annually between 2019 and 2022 by transitioning to recycled fibre lids and paper cups, with further reductions projected through 2025. Additionally, McDonald's sources recycled materials for its packaging to support a circular economy.

Burger King's sustainability efforts in Finland align closely with its parent company, Restel. However, finding specific, detailed solutions related solely to Burger King Finland can be challenging. The published information is often vague, lacking precise figures on progress toward sustainable packaging targets.

Hesburger's sustainability efforts in Finland are comprehensive and transparent, standing out from other fast-food companies. Their website offers detailed information, including the elimination of plastic straws in 2021 and a project to create uniforms and belts from recycled plastic bottles.

As leading packaging material suppliers, Sulapac and Huhtamäki continue to innovate by introducing sustainable and advanced packaging solutions. While these innovations offer significant benefits, it is ultimately up to fast-food companies to leverage them effectively. Respondents noted that while adopting these sustainable materials can be costly, many businesses are willing to absorb the expenses if it means contributing to positive environmental change.

5 Discussion

This chapter critically examines the primary and secondary data collected from fast food companies and packaging material suppliers, aligning the findings with the theoretical frameworks discussed in Chapter Two. The primary focus is connecting theoretical concepts to practical scenarios to assess their relevance. Furthermore, this chapter addresses the challenges encountered while applying the methodology outlined in Chapter Three and evaluates whether alternative methods could yield more impactful results.

5.1 Discussion of results

When analysing the data, key topics were identified to align with the theoretical framework discussed in Chapter Two. One significant factor is Packaging Functions and Dimensions. The theoretical emphasis on primary packaging highlights its roles in protection, containment, and convenience (Pålsson, 2018). The findings underscore the difficulty of balancing sustainability with consumer demands, as companies face challenges such as cost pressures and evolving expectations. This observation aligns with Wohner et al. (2019), who emphasize that packaging design influences consumer experience, a concern mirrored in the results, where efforts to enhance sustainability often conflict with maintaining convenience.

Consumer behaviour adds further complexity, with convenience often prioritized over sustainability and concerns about greenwashing undermining trust (Nuhija & Lajqi, 2023). Addressing cost challenges and improving infrastructure would help bridge the gap between theoretical sustainability goals and practical implementation.

Sustainability and Environmental Impact are other critical factors identified. Theories on eco-friendly packaging (Hussain et al., 2024) emphasize using biodegradable and fibre-based materials to reduce environmental impact and support the circular economy. The results indicate that fast-food companies, including McDonald's, Burger King, and Hesburger, have tried adopting such materials. However, challenges such as high costs and compliance with regulations, such as the EU Single-Use Plastics Directive (2019/904), are significant barriers, aligning with theoretical discussions on regulatory and financial constraints (European Commission, 2019; Wohner et al., 2019).

Hesburger's efforts to reduce the size and thickness of its hamburger wrappers align with using fewer materials and lightweight packaging, as highlighted by Wohner et al. (2019) and Pålsson (2018). This approach minimizes resource use, waste generation, and transportation emissions, demonstrating how simple design changes can significantly lower environmental impact. By adopting material-efficient packaging, Hesburger reduces its carbon footprint and meets consumer demand for sustainable practices, showcasing the practical benefits of this strategy.

As the theoretical framework outlines, the PPWR focuses on advancing recycling and reuse mandates, setting criteria for recyclable packaging, and increasing recycled content to align with the EU's sustainability goals. It seeks to establish a circular economy by addressing challenges such as recycling complexities in multi-material packaging and leveraging digital solutions for improved waste management. (European Commission, 2022) The results reveal that fast-food companies like McDonald's are incorporating fibre-based and recycled materials into their packaging to align with PPWR goals. However, challenges persist in meeting strict recyclability requirements due to cost pressures and the need for operational adjustments. While projects aimed at transitioning to sustainable materials are underway, these efforts often fall short of achieving the comprehensive recyclability and lifecycle management emphasized by the PPWR.

Packaging suppliers like Huhtamaki are innovating with mono-material solutions that align with the PPWR's recyclability criteria. However, limitations in recycling infrastructure highlight a disconnect between regulatory ambitions and practical capabilities. The findings underscore the need for more substantial policy support and

investments in recycling infrastructure to enable full compliance with the PPWR framework. While progress is evident, concerns remain about these changes' economic and operational implications, reflecting the challenges of aligning industry practices with stringent regulatory goals.

The analysis highlights Circular Economy Principles as a promising aspect. The theory emphasizes reducing waste through reuse, recycling, and designing packaging for closed-loop systems (Sillanpää & Ncibi, 2020). The results show that while efforts are concentrated on recycling, there is limited integration of reuse or redesign strategies necessary for achieving closed-loop efficiency. Economic constraints remain a significant barrier for fast-food companies, restricting the broader adoption of circular practices. This contrasts with the theoretical emphasis on a holistic approach, revealing a gap between the ideal framework and its practical application. For instance, Hesburger's official website mentions initiatives such as using recycled plastic bottles to manufacture uniforms and belts and producing restaurant chairs and tables from recycled plastics. While these efforts exemplify circular principles, the absence of evidence regarding how the bottles are collected highlights gaps in implementing comprehensive closed-loop systems.

The principles of eco-friendly packaging (Hussain et al., 2024), emphasizing biodegradable, recyclable, and renewable materials, are evident in the initiatives of Huhtamaki and Sulapac. Huhtamaki's recyclable mono-material solutions, such as high-barrier paper and PE/PP packaging, reflect the shift towards circular economy practices, exemplified by projects like The Cup Collective to improve recycling systems. Sulapac's bio-based, biodegradable packaging, made from 100% renewable materials, further aligns with sustainability goals. Its compatibility with standard manufacturing machinery ensures practical implementation, reducing reliance on plastics and minimizing microplastic pollution. Johansson et al. (2012) discussed that fibre-based materials align with Huhtamaki's cellulose-based recyclable packaging, ensuring durability, moisture resistance, and recyclability. These innovations demonstrate how theoretical principles can drive impactful, sustainable solutions in the packaging industry, reducing waste and promoting a circular economy.

Cost Efficiency emerged as a prominent theme during interviews. The theoretical perspective on balancing cost with sustainability (Wohner et al., 2019) aligns with the findings, highlighting the high costs of biodegradable and fibre-based materials as a significant obstacle. Both fast-food companies and material suppliers voiced concerns about profitability when transitioning to sustainable packaging solutions. The analysis reinforces the theoretical view that economic pressures can hinder sustainability efforts, emphasizing the industry's struggle to maintain profit margins while adopting eco-friendly practices. Furthermore, data collection revealed that suppliers are willing to develop more innovative materials but require fast-food companies to absorb some associated costs. This finding underscores the need for shared responsibility and collaboration to bridge the gap between innovation and financial feasibility in sustainable packaging.

5.2 Discussion of method

The mixed-methods approach, incorporating semi-structured interviews and document analysis, provided a comprehensive understanding of the challenges and solutions related to sustainable packaging. This combination allowed for an in-depth exploration of real-world issues such as cost challenges, regulatory compliance, and consumer expectations, as highlighted in both primary (interviews) and secondary (reports) data sources. Data triangulation from multiple sources ensured a valid and holistic perspective on the research topic.

However, securing appointments with sustainability managers proved challenging, as many were reluctant to share detailed information despite assurances of confidentiality through consent forms. This limitation was mitigated by focusing on interviews with suppliers, who provided more decadent and more detailed insights into the research questions.

Additionally, while analyzing the challenges, it became evident that publicly available sources lacked relevant data. Consequently, only primary data was utilized to address the first research question concerning the challenges within the industry. Furthermore, respondents appeared reluctant during the interviews to share detailed information regarding the challenges. This hesitancy may stem from the involvement of prominent

brands. Including small and medium-scale companies in the study might have helped to mitigate this limitation, as they may have been more forthcoming in sharing insights.

Several factors constrained the study's results. One major area for improvement was the depth of implementation. At the same time, industry efforts to adopt sustainable materials aligned with theoretical objectives and practical success were hindered by significant barriers such as high costs and stringent regulatory requirements. Additionally, thematic gaps were observed. At the same time, the findings offered valuable insights into costs and consumer behavior challenges; more exploration of the implementation of circular economy principles, particularly closed-loop systems and advanced recycling infrastructure, needed to be done.

A further challenge stemmed from the brevity of many primary data responses, which complicated detailed analysis. The author acknowledges that the collected data needed more sufficient to draw certain conclusions, primarily due to the limited number of respondents. However, given the scope of fast-food chains operating in Finland, the respondent pool was considered reasonably satisfactory. Nonetheless, the data remained constrained by the limited number of participants and their reluctance to share specific information due to privacy concerns.

When analysing secondary data, it was observed that companies predominantly highlighted their success stories rather than addressing challenges. Additionally, some companies presented sustainability reports at a global or corporate level, making it challenging to extract Finland-specific information. To address these issues, primary data was utilized; however, the author still had to align findings with the global or corporate context despite the study's focus being limited to Finland.

In conclusion, while the results offered valuable insights consistent with the study's methodology, incorporating additional methods and more detailed analysis would strengthen the findings and bridge the gap between theoretical goals and practical outcomes.

6 Conclusions

This study examined the challenges and solutions related to sustainable packaging within Finland's fast-food industry, focusing on the roles of leading companies and packaging suppliers. The analysis revealed significant efforts to adopt environmentally friendly practices, including biodegradable and fibre-based materials, that are aligned with EU sustainability regulations. However, high costs, stringent compliance requirements, and consumer preferences for convenience present substantial obstacles to achieving broader sustainability goals. With the ongoing discussion of the proposed PPWR, exploring this topic further with insights from the primary data was particularly interesting.

The findings highlight the complex interplay between economic feasibility and sustainability. While fast-food companies are making strides in integrating more sustainable practices, a complete shift toward eco-friendly packaging requires overcoming regulatory and financial constraints. Furthermore, collaboration between companies and material suppliers remains crucial in balancing innovative solutions with profitability. The reluctance to share company-specific data also posed a challenge in comprehensively analysing real-world scenarios alongside the theoretical frameworks.

The study concludes that notable progress has been made, but there is still a gap between the industry's sustainability aspirations and practical implementations. Continued innovation, supported by policy adjustments and consumer education, is necessary to advance toward a more sustainable packaging ecosystem in the fast-food sector. Additionally, when the new regulation is implemented, further constraints may arise in achieving the established targets.

6.1 Limitations of the study

This research encountered several limitations. One primary constraint was the availability of detailed data from fast-food companies, as not all participants were willing to disclose comprehensive information due to confidentiality concerns or time limitations. This restricted the analysis, leading to a reliance on semi-structured interviews and secondary sources, which provided subjective insights that may not fully represent the industry's overall practices.

The study's scope was also limited to primary packaging, excluding secondary and tertiary packaging waste, which constrained the overall environmental impact assessment. The research focused on large fast-food chains, meaning that the sustainability practices of smaller, local operators were omitted, potentially overlooking unique challenges or innovations within that sector. Time constraints further limited the ability to expand the sample size or conduct additional in-depth field studies, impacting the findings' generalizability.

6.2 Suggestions for further studies

To build on this research, future studies could explore secondary and tertiary packaging waste, providing a more comprehensive understanding of the industry's overall packaging footprint. Expanding the study to include smaller fast-food companies would offer insights into diverse approaches to sustainability and may reveal innovative practices that could benefit more significant industry players.

Further research could investigate consumer behaviour in more depth, particularly examining how perceptions of "greenwashing" affect support for sustainable packaging initiatives. Quantitative studies comparing the cost-effectiveness of sustainable materials with traditional packaging would also be valuable for guiding economic decisions in the industry.

Additionally, future work could adopt longitudinal approaches to measure the long-term impact of proposed regulatory frameworks or use case studies to evaluate the real-world effectiveness of specific packaging innovations. Collaborations with policymakers and waste management organizations could offer practical solutions and help align industry practices with evolving sustainability mandates.

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Appendices

Appendix 1: Interview guide for fast food industry professionals

The thesis

I am an Arcada University of Applied Sciences student studying International Business, majoring in Logistics. This thesis, supervised by Ms. Erica Adlercreutz, examines the **Challenges for Sustainable Packaging in Finland's fast-food industry**. The research aims to explore the difficulties fast-food companies face in transitioning to sustainable packaging solutions while ensuring compliance with Finnish and EU regulatory frameworks. Furthermore, the study seeks to identify the strategies and practices these companies use to reduce the environmental impact of their packaging, mainly through collaboration with packaging material suppliers.

This research addresses two key questions:

1. What challenges does the fast-food industry face regarding sustainable packaging?
2. What solutions have been implemented or are currently being explored to reduce the carbon footprint of packaging?

The study adopts a qualitative approach, using semi-structured interviews as the primary data collection method. These interviews offer a detailed perspective on industry challenges and practical solutions, allowing respondents to share nuanced insights based on their experiences. In addition, publicly accessible publications on sustainable packaging from fast-food companies operating in Finland will serve as secondary data. This information will be analyzed to identify critical challenges and solutions, focusing on how companies disclose their compliance with sustainability regulations and strategies for minimizing packaging-related environmental impacts.

Thematic analysis will uncover recurring patterns and bridge gaps between theoretical concepts and real-world practices.

The respondents

This study's respondents include professionals working in Finland's fast-food industry. These individuals are specifically involved in sustainability, packaging, and operations, which makes them directly engaged in addressing packaging challenges and promoting sustainable practices within their companies. These professionals were selected due to their expertise and active role in handling packaging-related sustainability issues.

Before the interviews, respondents will receive a detailed consent form explaining the study's purpose, their rights to confidentiality, and their option to withdraw from the study at any time. Additionally, respondents will be allowed to review their interview transcripts and have the right to request the removal of their data. After the interview, a brief will be provided to clarify how the data will be processed and used in the study.

The interview

Place and date of the interview:

Company:

Name of the respondent:

Position of the respondent:

The questions

General Information

- What is your role in the company, and how long have you worked in the fast-food industry?

Challenges in Packaging

- What are your company's most significant challenges in transitioning to more sustainable packaging?
- Can you describe specific functionality-related issues, such as food preservation or convenience?

Circular Economy Implementation

- How does your company incorporate circular economy principles, such as recycling or reusing materials, into your packaging strategy?
- What barriers have you encountered when trying to close the material loop?

Impact of EU Regulations

- How have EU regulations, such as the Single-Use Plastics Directive, influenced your packaging practices?
- What specific steps have you taken to ensure compliance with these regulations?

Consumer Expectations and Packaging

- How do consumer demands for sustainability influence your company's packaging choices?
- Have you observed any shifts in consumer behavior related to eco-friendly packaging?

Innovations and Future Plans

- What innovations has your company implemented to reduce the environmental footprint of your packaging?
- Are there future strategies or innovations that you are currently exploring?

Cost Considerations

- How do you balance the cost of sustainable packaging with maintaining profitability in your fast-food operations?
- Has cost ever limited your ability to implement more sustainable solutions?

Supplier Collaboration

- How do you collaborate with packaging suppliers to develop or source sustainable packaging materials?
- Can you provide an example of a successful collaboration?

Long-Term Goals

- What are your company's long-term goals regarding sustainable packaging?
- How do you plan to meet future sustainability targets?

The ending

To conclude, I would like to express my sincere gratitude for your time and thoughtful insights. Your input is invaluable to this research and provides a critical real-world perspective that significantly enriches the study.

The information you shared today will be carefully analysed and integrated into the thesis, and I will keep you informed about the study's progress. Please do not hesitate to reach

out if you have any follow-up questions or wish to review the findings. Once the research is complete, I am glad to share the final outcome with you.

Thank you once again for your valuable contributions and for sharing your time with me today. I look forward to staying in touch and potentially discussing the outcomes with you in the near future.

Appendix 2: Interview guide for packing material suppliers for the fast-food industry

The thesis

I am an Arcada University of Applied Sciences student studying International Business, majoring in Logistics. This thesis, supervised by Ms. Erica Adlercreutz, examines the **Challenges for Sustainable Packaging in Finland's fast-food industry**. The research aims to explore the difficulties fast-food companies face in transitioning to sustainable packaging solutions while ensuring compliance with Finnish and EU regulatory frameworks. Furthermore, the study seeks to identify the strategies and practices these companies use to reduce the environmental impact of their packaging, mainly through collaboration with packaging material suppliers.

This research addresses two key questions:

- 1 What challenges does the fast-food industry face regarding sustainable packaging?
- 2 What solutions have been implemented or are currently being explored to reduce the carbon footprint of packaging?

The study adopts a qualitative approach, using semi-structured interviews as the primary data collection method. These interviews offer a detailed perspective on industry challenges and practical solutions, allowing respondents to share nuanced insights based on their experiences. In addition, publicly accessible publications on sustainable packaging from fast-food companies operating in Finland will serve as secondary data. This information will be analysed to identify critical challenges and solutions, focusing on how companies disclose their compliance with sustainability regulations and strategies for minimizing packaging-related environmental impacts.

Thematic analysis will uncover recurring patterns and bridge gaps between theoretical concepts and real-world practices.

The respondents

This study's respondents include professionals working in Finland's fast-food industry. These individuals are specifically involved in sustainability, packaging, and operations,

which makes them directly engaged in addressing packaging challenges and promoting sustainable practices within their companies. These professionals were selected due to their expertise and active role in handling packaging-related sustainability issues.

Before the interviews, respondents will receive a detailed consent form explaining the study's purpose, their rights to confidentiality, and their option to withdraw from the study at any time. Additionally, respondents will be allowed to review their interview transcripts and have the right to request the removal of their data. After the interview, a brief will be provided to clarify how the data will be processed and used in the study.

The interview

Place and date of the interview:

Company:

Name of the respondent:

Position of the respondent:

The questions

General Information

- What is your role in the company, and how long has your company been supplying packaging materials to the fast-food industry?

Material Innovation

- What types of materials do you provide for fast food packaging that align with circular economy principles?
- Can you share some examples of recent innovations in biodegradable or recyclable packaging?

Challenges in Material Development

- What are the main challenges you face in developing sustainable packaging materials for fast food?
- How do these challenges affect the cost of your solutions?

Compliance with Regulations

- How do you ensure your packaging materials comply with the EU's sustainability and recycling regulations?
- What adjustments have you made to meet the requirements of the Single-Use Plastics Directive?

Circular Economy and Reusability

- How do your materials contribute to a closed-loop recycling or circular economy model?
- What improvements could be made to ensure higher recycling rates for fast food packaging?

Collaboration with Fast Food Chains

- How do you work with fast food companies to ensure that your packaging solutions meet functional and sustainability requirements?
- Can you describe a successful partnership with a fast-food company that has led to innovative sustainable packaging?

Consumer Perceptions and Packaging

- How does consumer demand for sustainable packaging impact your material development?
- Do you see any trends in consumer preferences shaping the future of packaging materials?

Future Trends in Packaging Materials

- What trends do you see shaping the future of sustainable packaging materials in the fast-food industry?
- How do you plan to address these trends in your product development?

Cost-Effectiveness and Innovation

- How do you balance developing sustainable materials and keeping them cost-effective for fast food companies?
- What role does innovation play in reducing material costs while maintaining environmental benefits?

The ending

To conclude, I would like to express my sincere gratitude for your time and thoughtful insights. Your input is invaluable to this research and provides a critical real-world perspective that significantly enriches the study.

The information you shared today will be carefully analysed and integrated into the thesis, and I will keep you informed about the study's progress. Please do not hesitate to reach out if you have any follow-up questions or wish to review the findings. Once the research is complete, I am glad to share the final outcome with you.

Thank you once again for your valuable contributions and for sharing your time with me today. I look forward to staying in touch and potentially discussing the outcomes with you in the near future.

Appendix 3: Consent form

Agreement on Informed Consent

RESEARCH: Challenges for Sustainable Packaging in Finland’s Fast-food industry by Dayanthani Ekanayake

PURPOSE OF RESEARCH: *To identify and analyse the challenges faced by the fast-food industry in Finland regarding sustainable packaging* and explore the *solutions implemented or currently being implemented* to reduce the carbon footprint associated with packaging. The research focuses on gathering insights from industry professionals directly involved in packaging and sustainability to understand how fast-food companies are adapting to environmental regulations and consumer demands for eco-friendly packaging solutions.

- I have received, read and understood the information given to me about the research and its goals.
- I have received sufficient information on the gathering, processing and reporting of data.
- All answers and other divulged information will be treated as confidential and individual interviewees will not be identifiable from the final research report.
- All the gathered information will be securely erased after the research report has been published
- I am aware that the interviewer is recording the interview in order to improve the reliability of the research.

I hereby consent to being interviewed in accordance with the above (the interviewee signs):

Signature

Name and contact information

I hereby promise to treat any information divulged by the interviewee in accordance with the above (the interviewer signs)

Signature:

Name and contact information:

Time and place: