LAB University of Applied Sciences

Effect of recycling packaging materials in Finnish organizations

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Bachelor of Business, International Business
2023
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Abstract

Author(s)	Publication type	Completion year
Juho-Paavo Airaksinen	Thesis, UAS	2023
	Number of pages	
	38 pages, 1 appendix	

Title of the thesis

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Degree, Field of Study

Bachelor of Business Administration, International Business

Abstract

This thesis aims to investigate the effect of recycling packaging materials in Finnish organizations. The study will examine the current practices of Finnish organizations with regards to recycling packaging materials and assess the impact of these practices on the environment, economy, and society.

In the theoretical chapter, the reader is introduced to various categories of packaging, including their history, concepts, and examples. The data for this theoretical framework was collected from a range of sources, including internet articles, blog posts, literature, and scientific articles.

The empirical section of the study analyses interview data collected from organization that prioritize recyclable materials in their business plan.

The research findings indicate that numerous potential advantages can be gained from operating sustainable packaging materials, but organizations must also consider the various challenges involved. The study provides direction for future research based on these insights.

Keywords

recycling, packaging materials, circular economy, waste reduction

Contents

1 Introduction

Packaging and its materials are crucial in safeguarding products, reducing storage and consumption, and attracting consumers to make purchases. Different packaging styles fulfil different roles in the product cycle, yet once the product is consumed, packaging materials quickly lose their value and become waste. In 2019, packaging waste in the EU amounted to 177.1 kg per inhabitant, with paper and cardboard being the largest segment of packaging waste materials, followed by plastic and glass. (Eurostat, Statistics Explained 2022.)

Recycling has become a critical issue considering the actual waste produced by society. Recycling involves gathering and processing materials that would otherwise be discarded as waste, giving them a new life as a new product. Recycling is a gesture that supports sustainability and the well-being of our planet, and both consumers and organizations can participate in it. Consumers increasingly favour sustainable trademarks with the maturity ready to pay a premium for recycled products. These actions have pressured companies to adopt sustainable practices to stay competitive. (Forbes 2021.)

In this thesis, the focus is on the sustainability of Finnish companies, particularly concerning packaging materials. The study will investigate the positive effects of recycling packaging materials on a company's business processes and the challenges or possible disadvantages associated with adopting sustainable packaging practices.

1.1 Project objective and delimitations of the study

This thesis focuses on the effects of recyclable packaging materials in Finnish corporations rather than examining the broad concept on a global scale. The research aims to increase knowledge on how recycling impacts an organization's operations, costs, and public image and enhance understanding for both consumers and organizations. The thesis delimits the topic to one central question and three sub-questions to ensure reader-friendliness. The author's decision to set limits for the study, known as delimitations, is critical as it is only possible to study part of the area of investigation thoroughly. The main objective is to identify organizations' difficulties when recycling packaging materials and how this sustainable practice affects their business and operations. The three sub-questions will complete and build upon the main research question and will circle around the topic of recyclable packaging materials. As its primary objective, the report aims to introduce the possibilities of sustainable packaging materials to the reader while focusing on their impact in a corporate context. The thesis assumes no prior knowledge of sustainable packaging materials, and the reader will gain a comprehensive understanding of the topic.

1.2 The main research question

In this thesis, the main research question is ‘’What are the advantages and disadvantages of recycling in organizations business activities?’’. Recycling in business activities offers various advantages, such as cost savings, environmental benefits, enhanced public image, and regulatory compliance. For example, it can decrease waste disposal expenses, conserve raw materials, and reduce energy costs while reducing landfill waste, preserving natural resources, and lowering greenhouse gas emissions. Recycling can also improve a company's environmental reputation, boost brand loyalty, and aid in complying with waste management and environmental regulations. (Conserve Energy Future 2021.)

However, there are drawbacks, including initial infrastructure, equipment and training expenses, limited market demand for recycled materials, and challenges in collection, sorting, and transportation. Collecting and sorting recyclable materials can be labour-intensive, time-consuming, and prone to contamination. Transporting recyclables to processing facilities may be expensive and necessitate specialized logistics. Although recycling substantially benefits organizations, careful planning and management are required to ensure the advantages outweigh the costs. (Conserve Energy Future 2021.) This research question aims to identify and explain the most significant benefits and challenges organizations face when opting for recyclable packaging materials.

1.3 Sub-questions

‘’How has the recycling of packaging materials changed over the years’’ is the first sub-question. As already mentioned previously in the text, the content and history of ecological packaging materials are long and complex. However, by understanding the most significant changes the ecological packaging materials have experienced during their existence, the reader will be able to extract information with a different mindset.

‘’What role do consumers play in influencing the recycling efforts of organizations?’’ is the second sub-question. Evidence suggests consumers are becoming more environmentally conscious and prioritizing sustainability in their buying choices. (McKinsey Sustainability 2011.) This trend is reflected in the rising popularity of eco-friendly products and the growing demand for organizations to embrace environmentally responsible practices, such as recycling packaging materials. (McKinsey Sustainability 2011.)

The third and final sub-question is "What are the most difficult to recycle packaging materials?". This question will allow readers to explore the most challenging packaging materials to recycle.

1.4 Theoretical framework and key concepts

The theoretical framework of this thesis will discuss and open different terms regarding recyclable packaging materials. The theoretical framework includes brief history of the recyclable packaging materials, packaging waste restrictions in Finland, reducing, reuse& recycle and difficult-to-recycle packaging materials. These concepts have been chosen for this thesis as they provide crucial support information regarding the topic, and understanding these, makes it easier to understand the context.

1.5 The structure of the thesis

The introductory chapter of the thesis presents an overview and main reasons of the research topic, which is crucial for readers to understand the main idea before delving into the theoretical background. Afterwards, the first chapter proceeds to the research background, outlining the study's objectives and delimitations for the reader's understanding. The objectives represent the thesis's aims, which are essential to grasp before proceeding. The chapter introduces delimitations and offers valuable insights into the author's approach to conducting the study.

Chapter two relates to the study's methods, providing a straightforward overview of the qualitative research approach and the author's method for completing empirical research. It also explains the motivation behind interviewing professionals within the field.

In chapter three of the thesis, the author aims to provide a more comprehensive understanding of the theoretical background of packaging and waste management. The chapter covers several topics, including different categories of packaging materials and waste, methods for reducing, reusing, and recycling packaging with a company examples, and packaging materials that are difficult to recycle.

Chapter four of the thesis presents the empirical research conducted through semi-structured interviews. It details the data acquisition, and analysis, a discussion of the results and a summary of the empirical findings. Finally, the chapter encloses the study's conclusions, responses to the research questions, validity and reliability estimates, a summary of the study, and potential topics for future research.

1.6 Research method

Qualitative data

This thesis employs a qualitative research approach to gather empirical data. Qualitative data encompasses descriptive and conceptual findings from questionnaires, interviews, or observation. It typically captures people's attitudes, beliefs, opinions, and behaviours descriptively and subjectively. Content analysis, discourse analysis, and grounded theory are commonly used to study qualitative data, enabling researchers to identify themes and patterns. (UK Data Service 2017.)

Semi-structured interviews

Data collection for the thesis involved the use of semi-structured interviews. Semi-structured interviews are a type of research interview that combines both structured and unstructured components. In semi-structured interviews, the interviewer has pre-determined questions or topics to cover. However, there is also room for the interviewer to differ from the script and ask follow-up questions based on the participant's responses. This allows for a more in-depth exploration of the participant's experiences and perspectives and can help the researcher understand the topic being studied. (Scribbr 2022.)

Semi-structured interviews are often used in qualitative research and can be conducted in person, over the phone, or online. They can be instrumental when studying complex or sensitive topics, as the flexibility of the interview structure allows for a more subtle and compassionate approach to understanding the participant's experiences. (Scribbr 2022.)

Some common characteristics of semi-structured interviews include a focus on open-ended questions, a flexible interview structure, a conversational tone, and a willingness to explore unexpected or diverging topics. Overall, semi-structured interviews are a versatile and powerful tool for qualitative research, allowing researchers to gain rich insights into the experiences and perspectives of their participants. (Scribbr 2022.)

Data collection method

The study recognized the value of using qualitative research methods to gather in-depth and subtle insights from individuals with appropriate industry experience to support the study. By performing interviews with trustworthy sources operating in the field of recyclable packaging materials, the researcher gained access to a vast reserve of knowledge and expertise that would have been inaccessible using alternative approaches.

In addition to the interviews, existing online data and literature were utilized to supplement and support the study. By analysing this data and cross-referencing it with the knowledge gained from the interviews, the researcher created a complete and high-quality study that provides a well-rounded and informed perspective on the topic.

Content analysis

Once the data had been gathered through the interviews, the author used the content analysis technique to analyse the responses. Content analysis is a form of research which stimulates the analysis of pre-existing data. (Columbia University Mailman School of Public Health 2023.) The content analysis offers several benefits, including the ability to utilize both qualitative and quantitative data. In addition, it is a non-intrusive approach that enables researchers to examine concepts using pre-existing information. Moreover, the method is replicable, considered a valuable advantage in the study. (Crosley 2020.)

Content analysis can be categorized into two types: conceptual and relational. While the initial stages of these analyses share similarities, their results differ. For example, conceptual content analysis emphasizes quantitative approaches, such as calculating the frequency of specific words within a text. In contrast, relational content analysis delves into the connections between concepts, examining their relationships and the contexts in which they appear. (Crosley 2020.) In this thesis, the primary focus is on employing relational analysis to examine the connections between concepts. However, the advantages of conceptual

analysis are considered. If a recurring theme emerges from the interview responses, it can be utilized to enhance the overall analysis.

2 Packaging Materials

2.1 Packaging materials & Ancestors

Since the beginning of human societies, packaging materials have always been needed in our daily routines. Our ancestors have creatively taken advantage of natural resources by using different shells, leaves, nature-provided gourds, hollowed logs, vowed grasses, and even animal organs to carry and store various resources. Later we discovered to take advantage of different weaving processes, which allowed us to create handy baskets from grass and fibres, which could be used to keep excess food. Afterwards followed the discovery of different metals and pottery crafting, which allowed the creation of heavier, and protective packaging models. (Ohio State University Extension 2017.)

2.1.1 Paper and paper products

Paper can be recognized as one of the oldest packaging materials and is also known as "flexible packaging material ". Paper has been used as a packing material since the first century of B.C when the Chinese used sheets crafted with mulberry bark to wrap different edibles. Over the next 1500 years, the mastery of paper crafting increased vastly, spreading across the continents from the Middle East to Europe and finally reaching the United Kingdom in 1310. (Ohio State University Extension 2017.)

The paper used in earlier stages of the industry's history was different to the one it is today. The early versions of paper had flax fibres and old-line rags as their main ingredient, and only in 1867 did the paper originate from wood pulp, which is more common today. The first cardboard boxes for commercial use were manufactured in England in 1870, although the technique for cardboard boxes had existed in China for over 200 years at that point. In 1900, corrugated paperboards replaced the self-created boxes and wooden crates merchants used for trading. (Ohio State University Extension 2017.)

Carton paper had a similar founding story to many other inventions, found in" accident". The founder, Rober Gair, was printing regular orders of seed sacks, but in the process, the metal ruler commonly used to gather the sacks moved its placement and cut the sacks. Gair figured that clipping and wrinkling paperboard would create semi-flexible packaging; hence, the carton was created. (Ohio State University Extension 2017.)

Paper and paperboard packaging had their "golden era" during the 20th century. After that, the significant advancement of plastics in the packaging industry, paper-related products started to get more rarely used packaging material. However, the favour is changing back in the direction of the paper once again as it is the more environmentally friendly choice.

Moreover, using proper barrier technology, similar features to plastic can be achieved with recyclable materials. (Ohio State University Extension 2017.)

2.1.2 Plastic

Compared to the history of paper-based packaging, plastic-based packaging can be found as relatively new. The first appearance of plastic packaging appeared at the Great International Exhibition in London, presented by Alexander Parkes in 1862. The material, called "Parkesine", was bio-based and derived from cellulose. Parkensine was marketed as an alternative option for horn and ivory, which Parks discovered while studying and developing a synthetic substitute for an shellac to obtain waterproofing abilities. Shellac can be considered as a "natural form of plastic". (Plastics Industry Association.)

As Parkensine was based on organic compounds (especially cellulose), Dr. Leo Bakeland created the world's first entirely synthetic plastic called Bakelite. The creation of Bakelite denotes the commencement of the modern plastic industry, as Bakelite was affordable yet highly desired product. Bakelite had elements of dark brown, wood-simulating appearance. One of the reasons for its popularity was its ability to be mass-produced, bringing new design ideas and trends such as Art Deco to the masses. (Science Museum 2022.)

At the beginning of the 20th century, the chemical and petroleum industries started to develop partnerships with organizations like DuPont, BASF, Dow Chemicals and ExxonMobil. These organizations are still primary manufacturers of raw material resins within the plastics industry today. (Science Museum 2022.)

Despite its numerous advantages, the current plastics economy has increasingly evident drawbacks. For example, with over 280 million metric tons of new, virgin plastic produced worldwide each year, merely 14 per cent of all plastic packaging undergoes recycling collection. (Szaky 2019, 31.)

Moreover, considering the added value losses in sorting and reprocessing, a mere 5 per cent of the material value of single-use plastics, which are frequently used only once, gets preserved for future use. Plastic recycling has advanced at a different rate than the persistent demand for plastic production, which could be balanced by capturing more discarded materials. The issue is intensifying plastic production has increased 20-fold since 1964, with expectations to double again within the next 20 years and nearly quadruple by 2050-the same year plastics will outweigh fish in the world's oceans. Most product and packaging innovations have incorporated materials and design incompatible with global recycling systems, resulting in consumer products companies generating more landfill-bound materials than ever. Circular systems focused on reuse-assigning value to products and maintaining

their high utility, have been overshadowed by mostly linear systems that, despite their advanced science and technology, treat products and packaging as disposable items designed to be discarded. (Szaky 2019, 31-32.)

2.2 History of Recycling Paper and Plastic

Unlike with materials such as paper and plastic, recycling has been a standard and natural process throughout the history of humankind; hence no person can claim to have invented it, nor do we have any data available of such a person. But we can list and study some of the first notable recorded instances where the recycling of paper/plastic has occurred. (Hinton's Waste.)

The first ever-recorded instances of recycling can be traced back to Heian Period in Japanese Imperial Court in the year 1031, where paper production started to shift from state control to common society. This led private owners to build paper mills, and it did not take long until the process of reusing paper as an ingredient became more common, as it was realized that it could increase the mills' output. (Hinton's Waste.)

Later in 1690, Americas first paper mill was founded by German-born William Rittenhouse (Wilhelm Rittenhausen). The Rittenhouse Mill took advantage of old clothing, fabrics, cotton, and linen to produce and create recycled paper, which could be used for public printing (Hinton's Waste.)

In April 1800, papermaker Mathias Koops, originated from Pomeranian-English was bestowed English patent no. 2392 for *Extracting Ink from Paper and Converting such Paper into Pulp*. Koops described his process within the patent as "An invention made by me of extracting printing and writing ink from printed and written paper, and converting the paper from which the ink is extracted into pulp, and making thereof paper fit for writing, printing, and other purposes". (Hinton's Waste.)

This instance can be regarded as the first-ever patented process for recycling paper. Mathias Koops patented his technique with the anticipation of supplying an alternative origin of high-quality paper when the more familiar source of paper (linen rags) was short in supply at a relatively high cost. However, the creation of the first patent for recycling paper was not the only fact worth mentioning Mathias Koop. Later in 1800, Koops released the first edition of his book "Historical Account of the Substances", which have been utilized to define events and to bring concepts from the earliest date to the innovation of paper to promote the ambitious venture to produce paper without the dependence on linen rags. Koops had the first edition of his book entirely published on yellow paper produced from straw. In the following year after that, Koops released the second edition of the book. The

second edition of the book was also printed on straw as a basis, but portion of the book was made from recycled paper. The records printed on recycled paper were the first textbooks ever published from recycled paper and may have stayed the only books printed on recycled paper for a century or more. (Hinton's Waste.)

2.3 Different categories of packaging

When it comes to designing and marketing a product, packaging plays a critical role in ensuring that the product is protected, preserved, and promoted effectively. This applies to various goods, such as food and drinks, consumer electronics, and medical devices. Packaging can be divided into several categories and subcategories, but three main categories are widely recognized as primary, secondary, and tertiary packaging. Each category serves a unique purpose in the product's journey from manufacturer to consumer, from protecting the item to improving its visual appeal on the shelves. (Amazon Business 2021.)

Primary packaging

Primary packaging, also known as a retail or consumer packaging, refers to the packaging that is produced in direct touch alongside the product itself. Its main objective is to protect, preserve, contain, and inform the consumer about the product. This type of packaging can take various forms and sometimes includes multiple components for a single product. (Saxon Packaging 2019.)

To illustrate, when it comes to fragrance packaging, both the bottle containing the liquid and the label are considered as a primary packaging. In some industries, such as cosmetics and technology, corrugated primary packaging is commonly used for high-end or gift products. This type of packaging not only protects and preserves the item, but also enhances its visual appeal and helps create a memorable experience for the consumer. (Saxon Packaging 2019.)

Secondary Packaging

The main objective of secondary packaging is to deliver branding display and logistical benefits. It serves to protect and collate individual product units during storage and is commonly used in the beverage, food, and cosmetic sectors to showcase primary packs on retail shelves. This type of packaging is also referred to as grouped or display packaging. (Saxon Packaging 2019.)

Secondary packaging can take various forms, including packaging specifically designed to display multiple product units for sale. Examples of such packaging include retail-ready packaging (RRP), shelf-ready packaging (SRP), or countertop display units (CDUs). These

packaging types help speed up the restocking process from storeroom to shelf and enhance the visual appeal of the product in the retail environment. (Saxon Packaging 2019.)

As secondary packaging is a key element of the marketing funnel, it is often made of corrugated cardboard and finished to a high standard, such as with printing and well-crafted branding and design. This ensures that the packaging not only protects and preserves the product but also communicates the brand message effectively and attracts consumers' attention. (Saxon Packaging 2019.)

Luxury items such as liqueurs, anti-ageing skin creams, and chocolate truffles, often incorporate shiny foil into their secondary packaging. While these eye-catching packages are visually attractive, they pose more challenges for recyclability vice. (Szaky 2019, 153.)

Tertiary Packaging

Tertiary packaging serves to facilitate the handling, transportation, and protection of multiple sales units or secondary packaging by grouping them into unit loads during transit. Unlike primary and secondary packaging, tertiary packaging is not intended to be seen or interacted with by consumers. The main function of tertiary packaging is to provide a convenient and efficient way to transport many products at once. This type of packaging is commonly used for bulk shipments and is typically made of sturdy materials such as wood, metal, or heavy-duty corrugated cardboard. Tertiary packaging can take the form of pallets, crates, or large containers designed to hold and transport multiple units of secondary packaging or individual products. Its primary focus is on optimizing logistics, reducing transportation costs, and minimizing damage to the products during transit, rather than on visual appeal or consumer engagement. (Emballage Cartier.)

2.4 Packaging waste and restrictions Finland

Packaging materials serve as a common supplement in our daily lives. It is used to protect and preserve products for buyers and make them more attractive and convenient for consumers. However, the increasing use of packaging has also led to a significant increase in waste generation, particularly in packaging waste. As a result, the problem of packaging waste has become a major environmental concern, as it contributes significantly to landfills, air and water pollution, and other environmental problems. Currently, 91% of packaging waste is disposed of in landfills or released into the environment. (EDF Supply Chain.)

Packaging restrictions in Finland

Tukes is the Finnish Safety and Chemicals Agency responsible for regulating and supervising the safety of chemicals and packaging in Finland. Their website provides information on

the safe use, handling, and disposal of packaging materials and waste, including different regulations applied to packaging materials.

Using specific heavy metals in packaging and packaging waste in Finland is prohibited, and basic packaging requirements must be met. Packaging or any separable part of it that can be removed by hand or simple physical means is allowed to contain a maximum total of 100 milligrams per kilogram (measured by the weight of the package or its part) of cadmium, lead, mercury, and hexavalent chromium. However, glass packaging and plastic boxes and pallets used in closed and controlled loops may contain more heavy metals under certain conditions. Companies that introduce such packaging to the market must fulfil reporting obligations and meet other requirements if necessary (as per the Commission Decision on plastic boxes and pallets 2009/292/EC and the Commission Decision on glass packaging 2001/171/EC).

The company responsible for placing packaging on the Finnish market (e.g. manufacturers, importers, or packagers) is accountable for ensuring that these packaging requirements are met. (Tukes 2023.)

Specific requirements for the manufacture, composition, reusability, and recyclability of packaging:

- Weight and size must as small as possible
- Hygiene, safety and acceptability levels must meet the requirements
- Must possess feature to reuse and utilize
- Contain the slightest possible concentrations of harmful and dangerous substances
- Withstand multiple transport and usage cycles
- Have a minimal negative environmental impact in terms of packaging end-of-life handling
- Must be safe regarding the safety and wellbeing of workers handling used packaging
- Comply with the requirements concerning the usability of the packaging when the used packaging turns into waste
- Contain an agreed proportion of recyclable material, if the packaging is to be considered recyclable
- Possess lowest possible calorific value, if packaging waste can be utilized for energy
- Be efficiently biodegradable if the packaging waste is considered as an compostable.

(Tukes 2023.)

Extended producer responsibility (EPR)

Extended Producer Responsibility (EPR) refers to the policy idea that broadens a manufacturer's accountability for mitigating the environmental impacts of their products and packaging. This responsibility extends beyond the initial production stage, covering the downstream phase when consumers have finished using the items. Within the European Union, Extended Producer Responsibility (EPR) is a compulsory policy under the Packaging Waste, WEEE, and Batteries Directives. These directives assign the responsibility for financing the collection, recycling, and environmentally sound disposal of packaging, WEEE (Waste Electrical and Electronic Equipment), and batteries to the respective producers. (ComplianceGate.)

EPR regulations requiring brand owners to bear the recycling expenses post-consumer PPP (Paper, Plastic, and Packaging) encourage producers to minimize packaging, integrate eco-friendly materials, and optimize material recovery and quality. Well-structured EPR systems ensure uniformity by implementing state-wide producer-funded industries that accept identical materials across all cities and towns while conveying consistent educational messages. Such policies also assist in fulfilling the industry's demand for supply. Presently, numerous brand owners committing to use recycled content in their products often need help to obtain sufficient recycled materials. Robust EPR laws enable producers to access larger quantities of post-consumer recycled materials. Additionally, these programs provide financial incentives that motivate manufacturers to design more easily recyclable packaging. (Szaky 2019, 75.)

2.5 Reduce, Reuse & Recycle

Today, we no longer repair our clothes or reuse our beer bottles. Rather than investing in high-quality, durable goods that might be more expensive, we often settle for cheaper disposable items that provide instant gratification and convenience, even if they are short-lasting. The downside of this approach is that most of the packaging is discarded as soon as the product is opened or consumed. Ninety-nine per cent of all items become waste within 12 months of purchase. As a result, manufacturers knowingly and consistently produce products and packaging designed for a one-way journey toward landfills and incineration either buried or burned. There are, however, more climate friendly approaches. (Szaky 2019, 21.)

In the context of organizations, the principles of reduce, reuse, and recycle have become increasingly important as businesses recognize their role in promoting sustainability and reducing their environmental impact. These principles can help organizations reduce waste,

preserve resources, and improve their bottom line by reducing costs and increasing efficiency. Many companies have already implemented sustainable practices such as using energy-efficient technologies, reducing packaging waste, and implementing recycling programs. Additionally, some organizations are exploring innovative approaches, such as circular business models that promote the reuse and recycling of materials to create a closed-loop system. Organizations can play a crucial role in promoting a more sustainable and circular economy by adopting these sustainable practices while benefiting their businesses and the planet. (U.S. Environmental Protection Agency.)

As the study aims to investigate the effects of recycling in Finnish organizations on practical level, focusing on the three R's of waste: reduce, reuse, and recycle, we will also inspect the operations of MM Kotkamills, a Finnish company that specializes in producing sustainable paper products alongside with. (MM Kotkamills 2023.)

Reduce

The first principle of the 3 R’s is "Reduce", which means reducing the amount of waste generated by minimizing the use of resources. This can be accomplished through various methods, such as designing products that are more durable, energy-efficient, and made from sustainable materials. (U.S. Environmental Protection Agency.)

To better understand the term ''reduce'' we can ask ourselves: How many components or layers of packaging are genuinely necessary? We can take inspiration from nature, which effectively protects itself efficiently. A practical example is coconut, which requires little additional protection. Its durable husk keeps the contents fresh and uncontaminated until it is opened. However, when transformed into coconut water, a beverage favoured by health-conscious consumers, additional packaging, such as a bottle, a screw-on cap with a tamper-evident ring or an inner seal, and a label are needed. (Szaky 2019,151.)

Organizations can alter their existing procedures to decrease the volume of waste produced by adapting the design, manufacturing, procurement, or utilization of materials or products. To provide a specific example, an organization could promote resource protection among employees by encouraging them to print only necessary documents and by automatically setting printer preferences to print on both sides of the paper. (U.S. Environmental Protection Agency.)

Another effective approach organizations can adopt to minimize waste is determining the optimal product-to-package ratio. By ensuring that packaging only covers the critical area of the products, they can reduce costs and decrease packaging waste, ultimately contributing to a more sustainable and cost-effective operation. (Szaky 2019,150.)

Here are some of the sustainability methods to reduce waste used by MM Kotkamills.

Closed-loop water systems: MM Kotkamills utilizes a closed-loop water system, which means that they reuse and recycle water throughout their manufacturing processes first as cooling water and then in several stages as process water. This helps to conserve water resources and reduce the amount of wastewater generated by the company. Circulation and efficiency improvements are continuously reducing overall water consumption. (MM Kotkamills 2023.)

Efficient energy use: MM Kotkamills has invested in energy-efficient technologies and processes to reduce their overall energy consumption and they use waste heat generated by their Sawmill production processes to power their mills with bark. (MM Kotkamills 2023.)

Reuse vs Recycle

Reuse and recycling are two essential concepts in the field of sustainable resource management. While both approaches aim to reduce waste and promote environmental sustainability, they differ in their specific objectives and methods. Therefore, it is important to understand the main differences between the two before advancing in the study. (ModernMilkMan.)

Recycling refers to the process of taking an object's materials and processing them for use in other applications, reducing waste and repurposing valuable resources into new products instead of discarding them after a single use. Reusing on the other hand, involves repurposing items and products for extended use. By avoiding disposal and keeping the item in use, you extend its lifespan and eliminate the need for excess energy and materials that would be required to dispose of it and produce a new one. (ModernMilkMan.)

Reuse

By reusing products and packaging, their functional lifespan is expanded, which in turn postpones the need for disposal or recycling. Reuse contains activities such as repairing, remodelling, cleaning, or merely salvaging worn or previously utilized products, devices, furniture, and building materials. For instance, by promoting the use of reusable coffee mugs among building occupants as opposed to disposable, single-use cups, the organization can effectively reduce the volume of coffee cup waste that needs to be managed and disposed of. (U.S. Environmental Protection Agency.)

If creating a package made solely from one (ideally recyclable) material is not feasible, the alternative could be to design a package using multiple materials that can be effortlessly

separated, facilitating easier recycling and disposal while bringing possibilities to reuse. (Szaky 2019,154.)

One toy package that stands out for its innovative design is Disney's Moana doll packaging. It allows consumers to detach the plastic window from the carton easily and provides instructions and messaging that promote proper recycling of the components. Furthermore, it encourages children to include the remaining Moana doll packaging in their playtime, adding an element of fun and reusability. (Szaky 2019,154.)

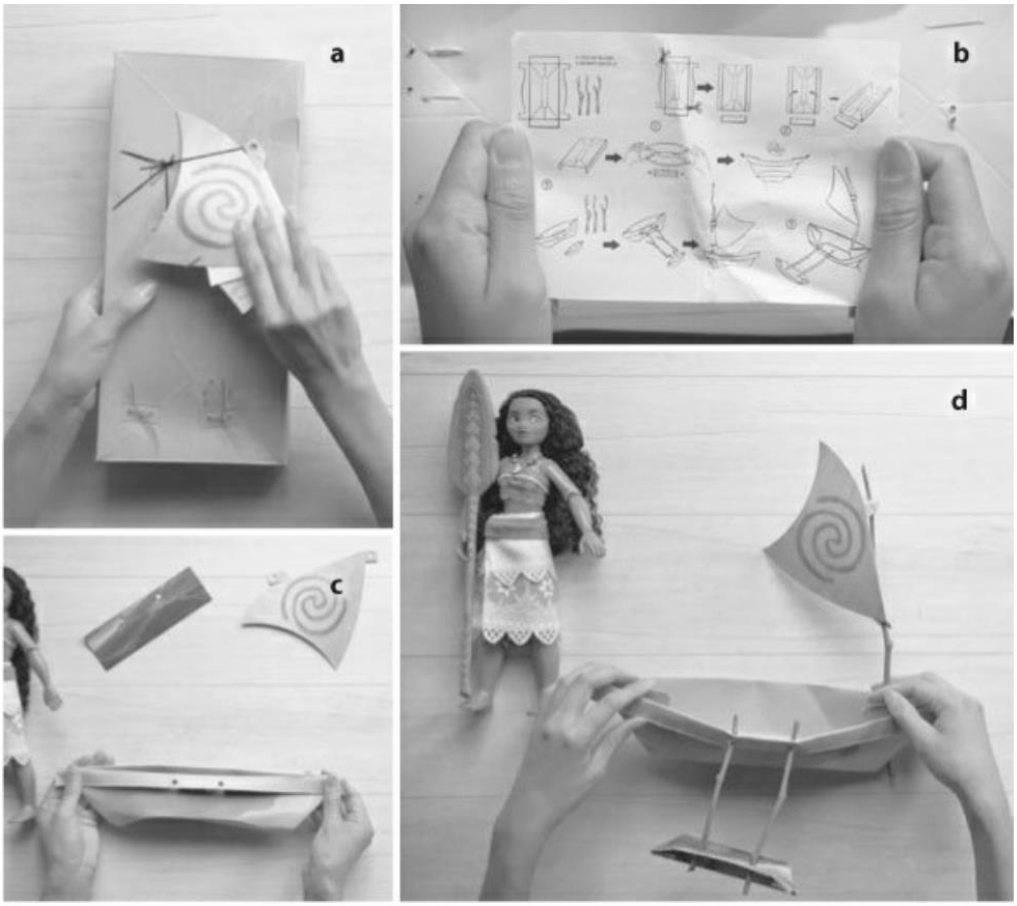

Image 1. Displays the unique and genius packaging of Disney's Mona doll, encouraging users to reuse. (Szaky 2019,155.)

Returning to an industrial example, according to the information provided on their sustainability page, MM Kotkamills has implemented a closed-loop production process that allows them to reuse waste from their sawmill production, extending a raw material lifespan for their other products.

MM Kotkamills reuses their sawmill by-products by converting it into a pulp that is used as a raw material for their Absorbex-product line, which includes solutions for various applications, including High pressure laminates. This process of reusing waste helps the company to reduce their environmental footprint by minimizing the amount of waste that they generate and by using fewer natural resources. Besides this, the final product offers long-lasting use and effective carbon storage. (MM Kotkamills 2023.)

Recycle

In theory, all packaging can be recycled, provided the person is willing to cover the expenses. This is a crucial point to remember when considering manufacturers' promises to make their products technically recyclable by a specific date. The practical recyclability of a product or package depends on whether recycling it is economically practicable. As an exaggerated example, if the goal is to make all products and packages recyclable, one solution would be to create them from solid gold, as there would be an immense demand for its collection. In such a scenario, garbage cans might be unnecessary, as discarded gold would likely be picked up within moments of disposal. (Szaky 2019,75-76.)

When recycling costs exceed disposal expenses, the additional burden of maintaining recycling efforts is transferred to another stakeholder involved in the product's lifecycle. Taxpayers frequently finance municipal programs entirely or partially, meaning the actual cost of packaging ultimately rests on them, even if they never purchased the product, rather than the consumer or the producing company. This distribution of costs can be seen as unfair, as individuals who consume fewer products end up funding those who generate more waste, as well as the industry that developed the product and its packaging. (Szaky 2019, 76.)

Overall, recycling provides numerous environmental, social, and business advantages and promotes a more circular production economy. With current technology and processes capable of overcoming nearly any challenge, it is essential to make an effort to recycle even difficult items, divert packaging from linear disposal through innovative design, and expand end markets for recycled materials. (Szaky 2019, 91-92.)

To look at the practical example, MM Kotkamills produces a range of sustainable paper and packaging products that are made from recycled fibres. These products include consumer packaging, food service packaging, and laminate papers used in various applications. To demonstrate, the organization has shared and detailed life-path of recycling process:

>MM Kotkamills manufacturers cup stock

>The cup producers cast cups

>Restaurants or cafeterias serve coffee or other refreshments in the cups

>Consumers use the cups and then places them in the dedicated recycling boxes

>A local waste management company delivers the boxes that contain used cups back to the MM Kotkamills

>The used cups serve as raw material for Absorbex® Eco laminating paper.

(MM Kotkamills 2023.)

Overall, MM Kotkamills' commitment to using recycled fibres and renewable raw materials in their production process is a key part of their sustainability strategy. By recycling paper and cardboard waste and using renewable resources, they can create high-quality, sustainable paper and packaging products while minimizing their environmental impact.

2.6 Difficult to recycle packaging materials

The issue of difficult-to-recycle packaging materials has become increasingly noticeable as concerns about waste and environmental impact have grown in publicity. While many materials are recyclable, some are more difficult to recycle. Unfortunately, the most difficult materials for recycling are often not widely accepted in recycling programs or require specialized equipment or processes to recycle, enhancing the difficulty of recycling. (Waste & Resources Action Programme, WRAP.)

Mixed Materials

Products composed of mixed materials pose challenges for recycling, as it is necessary to separate the materials for efficient processing and subsequent reuse. Frequently, these products combine materials in a way that consumers may notice, such as water bottles made of distinct plastic types for the body and cap, with one being recyclable and the other not. When these materials are discarded together, existing recycling systems need to be able to separate them without incurring high human labour costs. Even when the distinction between materials is apparent, the additional separation step can prevent some individuals from participating in recycling, leading them to dispose of the entire product in the recycling bin instead. Other common examples of mixed-material products that can be difficult to recycle include paper cups, toothpaste tubes and cartons (milk, juice etc.). (RTS 2023.)

Composite materials

Composite materials fuse two or more materials to form a new substance such as mixes of different types of metals, wax, plastic, or paper. Separating composite materials is considerably more difficult because the constituent materials are fundamentally combined. Common examples of composite packaging: wax and plastic-coated papers, coffee bags, animal nutriment bags and wrappers around candies. (Ratcliffe 2023.)

2.6.1 What Makes Something Recyclable?

In general, the greater the number of processes needed to include waste material in a new product, the higher the cost. Using the example of dirty diapers, the technology necessary to effectively clean, separate, and recycle them into usable materials is complex and costly. In a hypothetical municipal recycling scenario, handling a dirty diaper at a facility, compared to an aluminium can, involves additional and considerable investments in logistics and processing. This includes enhanced training for staff members and a distinct set of sorting and processing technologies. (Szaky 2019, 85.)

Establishing a delivery infrastructure for picking and transporting soiled diapers would require special containers, storage units, and comprehensive education to ensure the process is easy, safe, and convenient for consumers. Thus, to introduce diaper recycling to consumers, there would need to be an increase in logistics and processing investments (both initial and ongoing), as well as funding sources (potentially from Voluntary Producer Responsibility [VPR] programs or EPR-style regulations) to initiate these investments and support the system's "value equation". The primary determinant of whether the packaging is recycled or not is economic viability. Recycling depends on the supply and demand for secondary materials in a market where it is cost-effective. Someone must be willing to pay for it; if the cost is too high, recycling simply doesn't occur. (Szaky 2019, 86.)

One of the most significant challenges associated with recycling difficult-to-recycle products is the need for more infrastructure and technology available to process these materials effectively. Unfortunately, many recycling facilities are not equipped to handle these materials, so they often end up being sent to landfills or incinerated instead of recycled. This represents a missed opportunity to reduce waste and conserve valuable resources. (RTS 2023.)

To address this issue, several strategies for improving the recyclability of difficult-to-recycle products for consumers and organizations. One approach is to develop new technologies and processes for separating and recycling multi-layered materials. For example, this could involve the use of new sorting technologies or the development of new recycling methods

that are better able to handle these materials. In addition, efforts should be made to reduce the use of difficult-to-recycle materials in the first place by encouraging the use of alternative materials or designing products in ways that make them easier to recycle. (RTS 2023.)

Another key recommendation is to improve the communication and education surrounding recycling, both among consumers and within the organizations that wish to apply recycling in their business model. Consumers need to be better educated about what materials can be recycled and how to properly prepare these materials for recycling. At the same time, the recycling industry needs to be more transparent about what materials they are able to recycle and how they are processing these materials. This will help to build trust and confidence in the recycling system and encourage greater participation in recycling efforts. (SustainAbility 2023.)

3 Empirical research and data analysis

3.1 Data acquisition

The study involved interviews with individuals in the recyclable packaging materials industry. The fields changed between consumer beverages and industrial materials. The interviews aimed to gather reliable information about the research topic. In addition, the data obtained from these interviews was intended to support and validate the findings presented in the theoretical section of the study.

It was crucial to gain practical insights into how organizations carry out their recycling efforts, despite the number of credible sources detailing how such efforts should be managed. This approach was intended to provide a complete understanding of the challenges and opportunities of implementing sustainable practices in the industry where packaging materials are recycled in a way or another. By presenting diverse viewpoints and new insights, the research aimed to contribute to the existing knowledge on the topic and provide guidance for companies seeking to improve their sustainability performance by actual examples.

Data was collected through semi-structured interviews for the empirical portion of the study. The semi-structured format allowed for a relaxed and open atmosphere during the conversations, allowing interviewees to express their thoughts and opinions freely. The interviews were conducted both online and in person. During the interviews, note-taking was unnecessary as the conversation was recorded and studied later. This method allowed the researcher to review and analyse the discussions, focusing solely on the essential information and recording only the answers to the questions posed. In other words, the irrelevant conversation was bypassed, and the key points were captured in written form. This approach helped to ensure the accuracy and relevance of the data collected. The study involved interviews with participants three organizations, including Alvar Pet (a pet food and beverage company), MM Kotkamills Absorbex (a sustainable packaging materials manufacturer) and Kotipizza (one of the most well-recognized restaurants in Finland and Influential pizza chain amongst the Nordics).

The interview questions were carefully prepared well before the interviews, and participants were allowed to review them before the meetings to better prepare for the discussion. The questions were designed to produce detailed information on the opinions and perspectives of companies regarding the research topic.

3.2 Data analysis

Each interview participant was presented with a standardized set of questions beforehand. Following the completion of the interviews, the responses were subjected to an analytical process that involved identifying and categorising similarities and differences among them.

The semi-structured nature of the interviews, which were conducted using Microsoft Teams and in person, allowed the researcher to document the key points of the interviews effectively. The interviews formed a series of open-ended discussions centred around pre-defined questions. After posing each question, a discussion occurred between the interviewer and the interviewee. While analysing the interviews, the author carefully reviewed each recording and transcribed the corresponding answers for each question. Given the length of the discussions, certain pieces of information were dismissed from the final answers.

After transcribing the responses to all the questions presented during the interviews, the author analysed the interviewees' answers to identify similarities and differences. The author did not utilize additional analytical tools to assist in this process. Instead, the author summarized the responses that shared common themes and arranged them into a specific answer for each question. When multiple perspectives were offered on a single question, the author included them in the answer. Ideas gathered from the interviews that could not be incorporated into the answers were presented in the conclusion section. Analysing the responses to the interview questions made it possible to construct a comprehensive description of the viewpoints of diverse professionals in the recycling field. Additionally, the interviews afforded an understanding of the effects of recycling on companies and the common obstacles and successes encountered in this context. All the interviewees were drawn from Finnish companies, as the study aimed to investigate the effects of recycling on Finnish organizations. The interviews were conducted in Finnish and subsequently translated into English.

3.3 Analysis of the interview

The first question

The first question asked was *Can you please describe your company's current approach to recycling packaging materials?* It was not purposed to gather data or strategies but served as a baseline question and provided a foundation for the conversations allowing the author to compare and contrast different approaches. In addition, the first question set the stage

for more in-depth follow-up questions regarding specific practices, challenges, and opportunities for recycling packaging materials. It was purposed to guide the conversation and allow interviewees to delve deeper into the topic while focusing on thesis objectives.

Second question

Second question was *What specific types of packaging materials does your company recycle, and in what proportion?* The second question was essential in determining the specific packaging materials being recycled. It helped measure the success of recycling efforts, understand their environmental impact, evaluate the effectiveness of recycling programs, and compare the three organizations.

Company 1's approach to recycling packaging materials is comprehensive, with a commitment to recycling all possible materials, such as metal, cardboard paper, and glass. The organization actively tracks its recycling statistics, indicating a dedication to continuous improvement in this area. The use of recycled plastic bottles to create chairs for office and restaurant spaces demonstrates an innovative approach to incorporating recycled materials into the company's operations.

Company 2 exhibits a solid commitment to sustainability by ensuring that 100% of its packaging materials are recyclable. In addition, the organization has an unofficial policy against using materials categorized as mixed waste, further demonstrating its dedication to minimizing its environmental impact. The company's primary reliance on cardboard materials, followed by metal cans and minimal use of plastic, reflects a strategic choice of packaging materials with higher recyclability.

Company 3 business model is centred mainly around industrial recycling, indicating a solid commitment to sustainability and resource efficiency. Implementing recycling points throughout the factory and encouraging employees to bring cardboard waste from their homes demonstrate Company 3's dedication to creating a complete recycling infrastructure. This infrastructure facilitates the recycling of packaging materials and fosters a culture of sustainability within the organization. In addition, company 3 purchase of cardboard waste from local waste management companies to use in its product lines presents a circular economy approach. This strategy reduces waste and resource consumption by reusing and integrating materials into production. By encouraging employees to bring cardboard waste from their homes and providing recyclable cardboard coffee cups, company 3 is actively engaging its workforce in sustainable practices.

All three companies commit to recycling packaging materials and integrating sustainable practices into their operations. However, each company displays unique strengths and areas for improvement. Company 1 demonstrates comprehensive recycling efforts and innovation through using recycled materials in products but faces challenges with plastic recycling. Company 2 excels in its commitment to 100% recyclable packaging materials and strategic material choices, positioning it as a potential industry leader. Company 3, with its unique industrial recycling-focused business model, showcases a comprehensive recycling infrastructure and a circular economy approach, although its focus appears primarily on cardboard recycling. All three companies are committed to recycling packaging materials and integrating sustainable practices, with unique strengths and areas for improvement.

Third question

The third question presented was *How did your company decide to implement recycling practices for packaging materials? What factors influenced this decision?* By asking this question, the researcher tried to understand the driving forces behind the decision to implement recycling practices for packaging materials in Finnish organizations.

Company 1 operates on a franchise model, which implies that all franchises in the chain are expected to adhere to the same standards and practices. The company has always expected primary forms of recycling (glass, metal, cardboard) to be implemented across its franchises, suggesting that recycling has been a long-standing priority for the organization and is considered an essential part of its operations. The ongoing commitment to recycling practices have contributed to the organization's receptiveness to new regulations and the adoption of advanced recycling methods. The implementation of the new Finnish waste law in 2021 has catalysed increased recycling efforts in Company 1. This demonstrates the significant role that legislation and government policy can play in influencing organizations' decisions to adopt sustainable practices.

The response provided by *Company 2* offers a distinct perspective on the implementation of recycling practices for packaging materials in Finnish organizations. Company 2's entire business model is built around the concept of sustainability. This suggests that recycling practices for packaging materials are not an isolated initiative but an essential part of the company's overall strategy and vision. Furthermore, company 2 acknowledges the role of branding and consumer preferences in implementing recycling practices for packaging materials. By building a brand around sustainability, the company aims to attract environmentally conscious consumers who share its values. The company's mission-driven approach and comprehensive sustainability considerations distinguish it from other organizations and

provide valuable insights into how a focus on sustainability can influence decision-making processes.

Company 3 mentions the primary motivator for adopting recycled packaging materials as the need to increase production capacity to match market demand. This response highlights the importance of market forces and economic considerations in influencing organizational decision-making regarding recycling practices. Company 3 has found a way to balance its sustainability goals with its business objectives. By adopting recycled packaging materials to meet market demand, the company demonstrates its commitment to sustainability without compromising its ability to compete in the marketplace. This example illustrates the potential for organizations to align their environmental and economic interests in decision-making processes. Although not precisely mentioned in the response, using recycled materials to replace existing product materials may also offer cost and resource-efficiency benefits.

The responses from the three interviewed companies offer diverse perspectives on the factors that influenced their decision to implement recycling practices for packaging materials in Finnish organizations. Each company has unique motivations and approaches, providing valuable insights into the various drivers behind adopting sustainable practices. For example, company 1 highlights regulatory compliance and a franchise model, Company 2 focuses on a mission-driven approach and committed sustainability, and Company 3 prioritizes market-driven factors and innovative solutions. These diverse perspectives highlight the importance of considering various factors when adopting sustainable practices, as different drivers can coexist and complement each other in promoting recycling and environmentally friendly initiatives.

Fourth question

The fourth question was *Can you share any challenges your company has faced while implementing recycling practices for packaging materials? How have you overcome these challenges?* The main purpose of this question was to identify the common and unique challenges that organizations face while implementing recycling practices for packaging materials. This information is crucial for understanding the practical difficulties and potential barriers to adopting recycling initiatives in the Finnish context.

The response from *Company 1* revealed several challenges they have encountered while implementing recycling practices for packaging materials, specifically plastics. These challenges can be broadly classified into two categories: The complexity of recycling plastic materials & Geographical differences in recycling accessibility. The need for seven different recycling bins for plastics alone highlights the complexity of the process and the logistical

challenges associated with it. Additionally, the variation in waste management services further complicates the recycling process, as different companies may offer varying support and recycling options. Besides this, recycling is more accessible in shopping centres and densely populated areas, while it becomes more challenging in sparsely populated regions. This disparity suggests that there might be infrastructural or logistical limitations in certain areas, which could hinder the efficient implementation of recycling practices.

Company 2's response highlights several challenges they have faced while implementing recycling practices for packaging materials, which can be classified into three categories: sourcing sustainable packaging materials, balancing sustainability with product quality and lifespan and international recycling legislation and possibilities. Company 2 has encountered difficulties finding collaborative partners to provide sustainable packaging materials with the desired features. This challenge indicates that there may be a gap in the market for suppliers who can meet the specific demands of organizations seeking sustainable packaging alternatives. Besides this, sustainable packaging options can sometimes compromise the quality and lifespan of consumables. Additionally, they must consider various factors, such as customers' ability to recycle and how sustainable materials interact with the product. These factors demonstrate the complexity of finding packaging materials that balance sustainability goals with product quality and customer satisfaction. Finally, company 2 mentioned that differences in recycling legislation and possibilities between countries pose challenges for international operations. These disparities can create complications for organizations that must comply with various regulations and adapt their recycling practices accordingly.

Company 3 has experienced difficulties transforming recycled cardboard paper into a usable ingredient for its products due to unwanted substances, such as glue, plastics, and styrofoam. This challenge indicates that the recycling process for cardboard materials is complex and requires extensive refineries to ensure the purity and quality of the final product. In addition, company 3's trials at public events with recycling containers for cardboard cups revealed that consumers often improperly dispose of other materials in these containers, such as plastic or food. This behaviour complicates the recycling process and can lead to contamination of the recyclable materials, making it more challenging to ensure the quality of the recycled cardboard paper.

Comparing the results from all three companies reveals that the challenges faced in implementing recycling practices for packaging materials are many-sided and can vary based on the specific materials, locations, and contexts. Overall, the challenges in implementing re-

cycling practices for packaging materials include the complexity of recycling materials, geographical differences and international legislation, sourcing sustainable materials, and consumer behaviour in recycling.

Fifth question

The fifth interview question was *What benefits have your company experienced since implementing recycling practices for packaging materials (environmental and business-related benefits)?* This question was designed to stimulate information on the perceived benefits companies have experienced since adopting recycling practices for packaging materials. Additionally, the question aimed to gain a comprehensive understanding of the advantages of implementing these practices by asking about both environmental and business-related benefits.

Company 1's experience demonstrates that implementing recycling practices for packaging materials can lead to numerous environmental and business-related benefits: Environmental benefits, Energy savings and Cost benefits. Adopting sustainable packaging materials aligns with the company's commitment to carbon neutrality and demonstrates its dedication to reducing its environmental footprint. Company 1 is reducing waste generation and promoting a circular economy by using recyclable materials. In addition, using recyclable materials can minimize the energy consumption associated with producing new packaging materials, contributing to a more energy-efficient production process. This reduction in energy usage further supports their carbon-neutral goals and exemplifies how environmental and economic benefits can go hand in hand. Finally, company 1 has found that using recyclable packaging materials has led to cost savings in waste management. Emphasizing recycling over waste disposal often results in lower costs associated with emptying recycling containers than managing energy waste. Although these cost savings can vary between cities, the overall trend suggests that the company's adopting recycling practices have positively impacted its financial bottom line.

Company 2's answers indicated benefits as follows: Environmental benefits, Customer satisfaction / brand image and customer feedback. Company 2 reported that using recyclable packaging materials has led to a minimized carbon footprint in their business operations and on the consumer's end. This demonstrates their commitment to sustainability and reduced environmental impact, a key objective for environmentally conscious organizations. While Company 2 has not been able to quantify the cost savings directly, as they have always used recyclable materials in their business plan, they believe the most significant business-related benefit comes from increased customer satisfaction and an improved brand image. By prioritizing sustainable practices, Company 2 aligns itself with consumer

values and meets the growing demand for environmentally responsible products and services. In addition, company 2 takes active customer feedback, and the positive response to their sustainability efforts has been demonstrated through survey appreciation. This feedback is a valuable indicator of the company's success in meeting customer expectations and the market demand for sustainable practices. It also suggests that the company's commitment to using recyclable packaging materials resonates with consumers and contributes to a strong brand reputation.

Company 3's background demonstrates the following benefits: Branding, Customer perception and Market benefits. Company 3 has reported that using recycled materials in its products has become an influential factor in shaping its brand. By incorporating sustainable practices, they are positioning themselves as an environmentally responsible organization, which can appeal to a growing customer base that values sustainability. In addition, the company's commitment to using recycled materials differentiates them from competitors and enhances their brand image. Using recycled materials has strengthened Company 3's branding and positively impacted its customers' perception. Customers appreciate the climate-friendly approach, which contributes to their satisfaction and loyalty. By addressing environmental concerns, Company 3 is catering to the preferences of an increasingly environmentally conscious customer base. The markets for recycled products tend to be narrower than those for regular products, which presents an opportunity for the company to carve out a niche and establish a competitive advantage. By focusing on recycled materials, company 3 is catering to a specific market segment that is likely to experience growth as environmental awareness increases among consumers and regulators.

The interviews with the three companies revealed that implementing recyclable packaging materials can lead to reduced environmental impact, cost savings, enhanced brand image, and increased customer satisfaction. Although the extent of these benefits may vary among companies, the overall trend highlights the importance of adopting sustainable practices in packaging across different industries.

3.4 Summarizing the empirical part

In conclusion, semi-structured interviews proved to be an effective means of data collection, allowing professionals to provide diverse responses. The objective was to explore the challenges and advantages associated with the utilization of recyclable packaging materials, as well as to understand the driving forces behind them. Key findings included the direct impacts of using such materials, real-world examples, and company strategies, all revised under each question. Further dialogues with professionals yielded valuable insights and

ideas about the subject matter. Overall, the interviews went through the most critical challenges and benefits of recyclable packaging materials while focusing on motivational factors, companies' journeys and outcomes.

4 Conclusions

4.1 Research question answers

The primary objective of this thesis was to examine the critical effects of employing recyclable packaging materials in Finnish organizations while identifying the main advantages, challenges, and concerns. Integrating the theoretical and empirical aspects of the analysis allowed the author to conclude the findings. The study's results contain various factors that organizations should consider when implementing recyclable packaging materials.

The main research question was: *What are the advantages and disadvantages of recycling in organizations' business activities?* Throughout the study, numerous advantages and drawbacks were presented for readers to consider when reflecting on using recyclable packaging materials when a company operates in Finland. The intention was to provide a complete overview of packaging materials in general, including relevant legislation, the most difficult materials to recycle, and the primary challenges and benefits associated with their use.

The theoretical framework began with a short history of packaging materials and recycling, delving deeper into the specifics of paper and plastic. Essential to understanding packaging materials, the theoretical section also covered basic information about various packaging categories. After that, the discussion turned to critical aspects of Finnish legislation related to packaging materials, followed by an introduction to the three R's of waste minimization and practical examples. Finally, the theoretical portion examined the most challenging packaging materials to recycle. After the theoretical part, the information received from professional interviews was thoroughly analysed.

4.2 Success of the recyclability program

The primary research question's complexity prevents a straightforward response, as numerous approaches exist to address this topic. So instead, the thesis outlined the main benefits and challenges businesses may encounter when integrating recyclable packaging materials into their business plans, which can be categorised into *environmental* and *business-related* benefits.

Environmental benefits are an essential aspect of adopting recyclable packaging materials. By minimising their carbon footprint, companies can reduce their environmental impact and participate in global climate change relief efforts. Supporting sustainability goals, such as attaining carbon neutrality and restraining waste production, aligns with adopting recycling

practices. Additionally, promoting a circular economy model, where resources are repurposed, ultimately reducing waste and conserving resources, is enabled through recyclable materials.

Business-related benefits also arise from integrating recyclable packaging materials into a company's operations. Cost savings can result from lower energy expenditures and waste management savings, positively impacting a company's financial performance. A dedication to sustainability and recycling initiatives can bolster a company's brand image, rendering it more attractive to environmentally conscious consumers. Moreover, companies prioritising sustainability will likely witness heightened customer satisfaction due to the increased demand for environmentally responsible products and services. Finally, by concentrating on recyclable materials, businesses can access niche markets, secure a competitive edge, and address a particular market segment with substantial growth potential.

Overall, implementing recycling practices for packaging materials can lead to significant environmental and business-related benefits for companies. By incorporating recyclable materials into their operations, companies can reduce their environmental impact, achieve cost savings, and improve their brand image, customer satisfaction, and market positioning. This thesis highlights the importance of aligning business practices with environmental responsibility and consumer preferences to achieve long-term success.

4.3 Challenges in the recyclability program

Incorporating recyclable packaging materials into business plans presents companies with various challenges that can be grouped into several key categories. One of these categories includes the complexities associated with recycling a diverse array of materials, such as plastics and cardboard, which involves distinct processes for sorting and segregation. This complexity may lead to logistical hurdles in implementing and managing recycling industries.

Another challenge is sourcing sustainable packaging materials, as companies may need help finding partners supplying materials with the desired features. The market may need suppliers capable of meeting the specific demands of organizations seeking eco-friendly packaging alternatives. Furthermore, striking a balance between sustainability, product quality, and lifespan can be difficult, as sustainable packaging options might compromise the durability and effectiveness of the consumables. Companies must carefully consider customer recycling capabilities and the interactions between sustainable materials and their products to achieve a harmonious balance between environmental goals and customer satisfaction.

Geographical disparities in recycling accessibility also pose challenges for companies operating in different locations. For example, recycling practices may vary between densely populated areas, where recycling is more accessible, and sparsely populated regions, where infrastructural or logistical limitations may hinder recycling efforts. Additionally, international recycling legislation and possibilities create challenges for companies with global operations, as they must adapt their practices to confess with varying regulations across countries.

The process of transforming recycled materials into usable components for products is another challenging aspect, often requiring complex refineries to ensure the purity and quality of the final product. Companies may need to invest in research and development or collaborate with technology providers to devise more efficient and cost-effective methods for processing recycled materials. Finally, consumer behaviour in recycling can impact the effectiveness of recycling programs, as inappropriate disposal can contaminate recyclable materials and complicate the recycling process. Therefore, companies must raise awareness of proper recycling practices and educate consumers on the importance of correctly disposing of materials in designated recycling containers.

Addressing these challenges requires a comprehensive approach that considers the entire supply chain and the unique requirements of sustainable packaging. Companies can overcome these challenges by implementing tailored solutions, investing in research and development, collaborating with suppliers and waste management companies, and promoting consumer education on proper recycling practices. By doing so, they can successfully incorporate recyclable packaging materials into their business plans and contribute to a more sustainable environment.

The theoretical component offered foundational knowledge on the advantages and drawbacks of sustainable solutions, which supported the empirical aspect. Nevertheless, the empirical part was vital to gather insights from real-life experiences within the Finnish context.

The sub-questions - How has the recycling of packaging materials changed over the years, what role do consumers play in influencing the recycling efforts of organizations, and What are the most difficult to recycle packaging materials - aimed to provide a comprehensive and practical perspective for the reader, showcasing the range and different aspects of the study's subject matter.

In summary, the primary research questions were addressed, and the objective was achieved to provide the reader with valuable insights and practices related to the process.

The topic was explored from multiple perspectives, and the findings were effectively communicated to the reader.

4.4 Validity and reliability

The credibility of this study relies on evaluating the precision of the measurements and determining whether the outcomes accurately represent their intended purpose. The theoretical framework provides evidence to verify the empirical findings, enhancing the research's validity. Moreover, the consistency and similarities between interview responses further contribute to the study's legitimacy. In evaluating the study's dependability, we must consider the replicability of its outcomes. Semi-structured interviews offer the benefit of being easily reproducible. (Middleton 2019.)

As there are various ways different organizations can utilize recyclable packaging materials in their business model, a change in interview participants would lead to some variation in results. Involving more participants could reveal additional solutions, advantages, or challenges that did not come up with the three participants interviewed.

Regardless, the study's outcomes can be considered reliable due to the evidence in both theoretical and empirical aspects. In addition, it is worth noting that the interview participants were professionals with up-to-date and precise field knowledge from using recyclable packaging materials. However, involving a more significant number of participants could further enhance th e research's reliability.

4.5 Summary of the study and future research topics

The reader should acquire fundamental knowledge regarding packaging materials, Finnish legislation, and the primary challenges and advantages of using recycled materials. The study consisted of theoretical and empirical sections, aiming to give the reader essential information on the subject and gather trustworthy, up-to-date, and insightful trough the interviews. The responses were analysed and connected with the theoretical section, mutually reinforcing the findings, and ultimately producing a potent research study.

The thesis topic is a valuable area of research as it is pointed towards supporting the transition to a circular economy, where waste is minimized, and resources are used efficiently. By extending the lifecycle of materials through recycling, organizations can conserve resources, reduce the demand for raw materials, and decrease their environmental footprint. Several related topics can be explored for future research, *including Evaluating the potential of innovative and biodegradable packaging materials as alternatives to traditional packaging in Finnish organizations.* Another valuable research area would be to study *The role of*

government policies and motivations in promoting sustainable packaging and recycling practices in Finland.

References

Amazon Business. 2021. Types of Packaging Materials. Retrieved January 10, 2023, Available at https://business.amazon.in/en/discover-more/blog/types-of-packaging-materials

Columbia University Mailman School of Public Health. 2023. Content analysis. Retrieved April 10, 2023, Available at https://www.publichealth.columbia.edu/research/population-health-methods/content-analysis

Conserve Energy Future. 2021. Advantages and Disadvantages of Recycling. Retrieved June 24, 2022, Available at https://www.conserve-energy-future.com/advantages-and-disadvantages-of-recycling.php

EDF Supply Chain. Sustainability 101: Packaging Waste – The Problem. Retrieved March 20, 2023, Available at https://supplychain.edf.org/resources/sustainability-101-packaging-waste-the-problem/

Emballage Cartier. Primary, Secondary and Tertiary Packaging: What's the Difference? Retrieved 3 March 2022, Available at https://www.emballagecartier.com/en/article/primary-secondary-and-tertiary-packaging-whats-the-difference

Eurostat. 2021. Packaging waste statistics. Retrieved 3 March, 2022, Available at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Packaging_waste_statistics

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. Packaging waste. Retrieved March 15, 2022, Available at https://www.bmuv.de/en/topics/water-resources-waste/circular-economy/types-of-waste-waste-flows/packaging-waste

Green Processing. 2021. Recyclable Packaging - What Is It & Why Use It? Retrieved March 3, 2022, Available at https://www.green-processing.com/recyclable-packaging/

Hinton's Waste. History of Recycling Timeline. Retrieved January 7, 2023, Available at https://www.hintonswaste.co.uk/news/history-of-recycling-timeline/

Kotkamills. Absorbex®. Retrieved February 15, 2023, Available at https://kotkamills.com/products/absorbex/

Kotkamills. Sustainability. Retrieved February 15, 2023, Available at https://kotkamills.com/sustainability/

Kotkamills. Wood. Retrieved February 15, 2023, Available at https://kotkamills.com/products/wood/

McKinsey & Company. 2011. The business of sustainability: McKinsey Global Survey results. Retrieved June 7, 2022, Available at https://www.mckinsey.com/capabilities/sustainability/our-insights/the-business-of-sustainability-mckinsey-global-survey-results

Middleton, F. 2019. Reliability vs. Validity in Research | Difference, Types and Examples. Scribbr. Retrieved 5 May 2023. Available at: https://www.scribbr.com/methodology/reliability-vs-validity/

MM Karton. Sustainability: Our Responsibility. Retrieved February 15, 2023, Available at https://www.mm-boardpaper.com/en/company/sustainability/#planet-631748432026771777818

National Institute for Children's Health Quality (NICHQ). 2017. Qualitative Data Analysis: 7 Things Researchers Need to Know to Get it Right. Retrieved March 24, 2022, Available at https://www.nichq.org/insight/qualitative-data-analysis-7-things-researchers-need-know-get-it-right

Recycling Technology Solutions. 2018. Recycling Offenders: The Most Difficult Materials to Recycle. Retrieved March 15, 2022, Available at https://www.rts.com/blog/recycling-offenders-the-most-difficult-materials-to-recycle/

Recycling Technology Solutions. 2019. The State of Recycling Today. Retrieved March 6, 2022, Available at https://www.rts.com/resources/guides/the-state-of-recycling-today/

RTS. 2023. Recycling Offenders: The Most Difficult Materials to Recycle. RTS Blog. Retrieved 4 April 2023. Available at: https://www.rts.com/blog/recycling-offenders-the-most-difficult-materials-to-recycle/

Science Museum. The Age of Plastic: Parkesine and Pollution. Retrieved July 17, 2022, Available at https://www.sciencemuseum.org.uk/objects-and-stories/chemistry/age-plastic-parkesine-pollution

Scribbr. Methodology. Retrieved March 8, 2022, Available at https://www.scribbr.com/category/methodology/

Saxon Packaging. 2019. Difference Between Primary, Secondary & Tertiary Packaging. Retrieved January 10, 2023, Available at https://www.saxonpackaging.co.uk/difference-between-primary-secondary-tertiary-packaging/

Solar Schools. Reduce, Reuse, Recycle. Retrieved March 15, 2022, Available at https://www.solarschools.net/knowledge-bank/sustainability/reduce-reuse-recycle

Szaky, T. 2019. The Future of Packaging: From Linear to Circular. Berrett-Koehler Publishers.

Tukes. 2023. Pakkaukset ja pakkausjätteet [Packaging and Packaging Waste]. Retrieved April 10, 2023, Available at https://tukes.fi/kemikaalit/pakkaukset-ja-pakkausjatteet

UK Data Service. Qualitative Data. Retrieved April 15, 2022, Available at https://ukdataservice.ac.uk/learning-hub/qualitative-data/

U.S. Environmental Protection Agency. Recycle: Basic Information. Retrieved February 15, 2023, Available at https://www.epa.gov/recycle

U.S. Environmental Protection Agency. Recycling Basics. Retrieved March 3, 2022, Available at https://www.epa.gov/recycle/recycling-basics

The Modern Milkman. 2021. What's the Difference Between Recycling and Reusing? Retrieved February 16, 2023, Available at https://blog.themodernmilkman.co.uk/whats-the-difference-between-recycling-and-reusing/

Waste & Resources Action Programme (WRAP). (2020). Understanding difficult-to-recycle products: Packaging and household goods. Retrieved February 15, 2023, Available at https://wrap.org.uk/sites/default/files/2020-08/WRAP-Difficult-to-recycle-products.pdf

Appendix 1. Interview questions

The questions asked in the interview:

Can you please describe your company's current approach to recycling packaging materials?

What specific types of packaging materials does your company recycle, and in what proportion?

How did your company decide to implement recycling practices for packaging materials?

Can you share any challenges your company has faced while implementing recycling practices for packaging materials? How have you overcome these challenges?

What benefits have your company experienced since implementing recycling practices for packaging materials (environmental and business-related benefits)?