Repack the packaging of fast-moving consumer goods

Master thesis - Industrial Design Engineering
MSc Strategic Product Design

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Preface

Dear reader,

I'm thrilled and proud to write this preface for my graduation thesis, feeling full of joy and accomplishment. This work marks the high point of my studies and is the result of intensive effort, research, and dedication. After 6 years of studying at TU Delft, I am grateful for all that I have learned and accomplished, and especially for the completion of this thesis.

I want to start by expressing my thanks to my supervisors, Lise Magnier and Caroline Kroon, for their guidance, expertise, and inspiration throughout this journey. Your support and feedback have contributed to my growth and improved the quality of my research.

I would also like to give a big thanks to all the participants who dedicated their time and knowledge to play a part in my research. Your valuable insights and effort have been crucial in gathering relevant data, making my thesis even more meaningful and impactful.

Additionally, I want to thank my family and friends for their support throughout my entire study period. Your trust in me has always motivated me to give my best and successfully complete this thesis.

Finally, I hope that this thesis contributes to the existing knowledge in the field of sustainable packaging and inspires others to pursue further research.

Enjoy reading,

Line Hietink

Abstract

This research examines the potential for sustainable packaging in the context of supermarket products, focusing on the concepts of reuse and standardisation.

The central question addressed is whether consumers retain positive attitudes towards purchase intention, brand image, perceived quality, aesthetic attractiveness, and perceived environmental friendliness when packaging for fast-moving consumer goods (FMCGs) is standardised to its core function of protection, while marketing elements are transferred to online communication channels. The study uses a wide range of methods, including reading lots of articles, talking to people who know a lot about the topic, analysing data, experiments and in-depth interviews.

The findings reveal positive consumer responses towards the concepts of reuse and standardisation. Although no statistically significant results emerge from the mixed experiment design, the analysis of open-ended questions demonstrates a clear and positive attitude among participants. Consequently, it can be concluded that consumers generally show a favourable and cooperative attitude towards packaging standardisation and reuse, provided that convenience, hygiene and accessibility are prioritised.

This research is of significant relevance due to the substantial volume of plastic waste generated by packaging, evolving legislative frameworks, and the urgent need for environmental changes. It emphasises the necessity for proactive changes and innovative approaches to address sustainability challenges in the packaging industry. By shedding light on consumer perceptions and preferences, this study offers valuable insights for businesses and policymakers seeking to navigate the transition towards more sustainable packaging practices.

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Introduction

Project background

A curiosity in how the packaging of fast moving consumer goods is changing led to this research. Alongside with this interest, there are recent and ongoing movements that support the change of packaging. To begin with, packaging and packaging waste legislation were proposed in the European Union last November with a focus on product reuse and recycling. In order to reduce waste and emissions, these legislation will ensure that packaging are more uniform throughout Europe [Euractiv, 2022]. Reuse systems will be established and used to meet these reuse objectives. Although these methods for reuse are not new, they will alter how customers shop. [Ellen Macarthur Foundation, 2019]. The exploration of packaging reuse in this report is closely linked to the concept of standardisation, which involves establishing uniform processes and specifications to promote efficiency, consistency, and sustainability.

Furthermore the growth of online purchasing has emerged as a prominent trend in the packaging industry. This pattern developed as a result of the COVID-19 restrictions, which greatly increased e-commerce. Online shopping is still and will continue to be well-liked as a result of changes in consumer behaviours and preferences. [PWC, 2022] However, brick and mortar, which refers to traditional physical stores, grocery shopping is still common, and a more hybrid purchasing pattern has emerged. Hybrid shopping behaviour is purchasing both online and in brick and mortar.[PYMNTS,2023]. Understanding how these evolving consumer behaviours and preferences shape packaging expectations and requirements are considered aspects of my research.

The increasing prominence of internet marketing, characterised by targeted and dynamic advertisements, along with the growing influence of online channels on consumer behavior, presents an intriguing perspective for the packaging industry. Considering these online marketing trends, this research seeks to explore the crucial relationship between packaging innovation, consumer preferences, and the dynamic digital landscape. The study aims to look into the significance of aligning packaging strategies with online marketing trends to successfully engage consumers and encourage sustainable brand success.

The primary goal of this research is to determine the ideal circumstances and specifications for new, sustainable packaging and grocery behaviour scenarios for fast-moving consumer goods. The secondary goal is to provide and test the new packaging designs and reuse scenarios for a particular product category and to offer guidelines and recommendations to make fast-moving consumer goods more sustainable.

Research question

The following research question resulted from the study into the background, relevance, and purposes:

Could consumers still have a positive purchase intention, brand image, perceived quality, aesthetic attractiveness and perceived environmental friendliness when standardising the packaging of FMCGs, by designing a packaging that is reduced to its original function of protection, and where its marketing elements are moved to online communication channels?

Methods

The research has been divided into several sections to answer these goals and the research question. I started researching the history, legal framework, purposes, and components of packaging. In addition, I have researched how people shop, how people utilise supermarkets both online and offline, and how packaging is now marketed, recycled, reused, and standardised. This literature review provided the framework for the extensive semi-structured interviews I performed. The focus of these interviews were to learn more about the needs, desires, and expectations that consumers have for the packaging of supermarket goods. I chose a semi-structured interview method as it allows for flexibility during the interview session. The results of the interviews and the literature review have been merged to provide broad principles for the new design of fast-moving consumer goods, which marks the beginning of the study's second phase. Developing new, sustainable packaging for a product category and testing its purchase intention, brand image, perceived quality, aesthetic attractiveness and perceived environmental friendliness were more of my focus in the third phase. Once again, the findings of scientific studies and the insights of consumers based on a experiment formed the foundation for the conclusions of this research. I have assessed the data from this test for significance in SPSS, in order to derive the conclusions, discussions and recommendations.

Research outlines

Discover

Setting the research's scope is the first section of the research. In this part you can learn about the general research on the several subjects that contribute to the project. Topics include the development of packaging, its functions and components, consumer behaviour, marketing initiatives and reuse and standardisation and its advantages and disadvantages. The subjects covered in this chapter show why reuse and standardisation are positive developments for packaging, and which challenges it faces.

Define

The purpose of part 2 is to collect information from the consumers point of view via interviews. The knowledge gained from these interviews and the research study is merged in this section to form principles and recommendations that are built upon in the other sections. These results serve as the foundation for choosing and supporting the categories for the remainder of the study, and form the take-aways for the design principles.

Develop

In this section, the focus lies on the development of reuse scenarios and the creation of standardised packaging designs. Through an extensive review of literature and analysis of consumer insights, the design specifications are established. This section outlines all the decisions made and the final outcomes achieved in terms of the packaging designs.

Validation

The new design concepts are put to the test and evaluated in this part in a between- subject experiment.The analysis focuses on assessing the impact of standardised reusable packaging on purchase intent, brand image, perceived quality, aesthetic attractiveness, and perceived environmental friendliness. All these variables and hypotheses are thoroughly described and defined within this section.

Deliver

In the concluding section, the results of the study are presented. Conclusions are derived and the research question is answered. Recommendations for achieving sustainability in the packaging of fast-moving consumer goods are presented. Subsequently, discussions, limitations, and further recommendations relating to this research are discussed.

Discover

In this chapter I dive into all relevant aspects of packaging, consumer behaviour, and online marketing elements. I also explore the possibilities of making fast moving consumer goods packaging more sustainable and examine the challenges associated with it. All further research steps are built around the key findings that arisen from this study.

Introduction to projectscope

This study's focus is on the packaging of supermarket goods, sometimes referred to as fast moving consumer goods (FMCG). FMCGs are goods that rapidly move from retail store shelves, necessitating frequent restocking [Oxford English Dictionary, 2023]. Medicines and stationery are also examples of fast-moving consumer goods, but this study will only focus on food and non-food items that are sold in supermarkets. Fast-moving consumer goods are used frequently and have a short lifespan. Because the products' packaging is frequently discarded right away after use, they also contribute significantly to the problem of packaging waste [Zeeuw van der Laan & Aurisicchio, 2019]. Fast moving consumer goods come in a variety of shapes, sizes, and materials today, and the packaging plays a significant role in the sale and use of the products [Simms & Trott, 2010]. The history, function of the materials, and changes of FMCG packaging will all be covered in more detail in the paragraphs that follow.

The fundamentals of packaging for Fast Moving Consumer Goods: Key elements and basics

According to the [Oxford English Dictionary, 2023] , packaging is any material used to wrap or safeguard items that are sold in stores. According to Kotler [2005], packaging includes all the activities of designing and producing the container for a product. Three distinctly different purposes of packaging can be identified when evaluating the full scope of packaging. The three functions are briefly explained in this paragraph.

Protection

The original function of packaging for food products is to protect food products from environmental and industrial factors [Mahmed, Mohammed and Hassen, 2016]. The packaging must protect the products during the whole supply chain to maintain the quality of the product. Therefore sometimes different packaging layers are used, the different types of packaging are discussed below. The protection works both ways, it protects the inside from the outside factors and the outside from the inside (the product). Besides the protection for environmental and industrial factors, packaging also protects against biological and chemical hazards [Emblem & Emblem, 2012], on top packaging extends the shelf life of the contained product.

For this research when talking about 'the protection function of packaging' I imply the material and shape that is used to protect the product, for all outside and inside factors that can have influence on the content. In this research the focus will be on primary packaging

Information

Together with the growth of packaging materials and technologies the more

information and additions are put on packaging. The information ranges from ingredients to usage instructions to quality marks. In several other researches the function of information is described as facilitating handling, convenience, creating utility or service. [Lindh, Williams, Olsson and Wikström, 2016].

For this research when talking about the information function it contains all information that facilitates handling, tells about the content and all information that is restricted by the laws.

Communication

Another considerable function of packaging is marketing. The packaging of a product is the closest a brand can come to their consumers. [Lindsay, 1997] As described by [Vidales Giovannetti, 1995] packaging is crucial given that it is the first thing that the public sees before making the final purchase decision. He names packaging as the silent salesman, as it informs the consumer of the quality and benefits that we are going to obtain when buying the certain product.

When talking about the communication function of packaging, all marketing elements such as logo, colour, slogans, and visualisations that are presented on the packaging are implied.

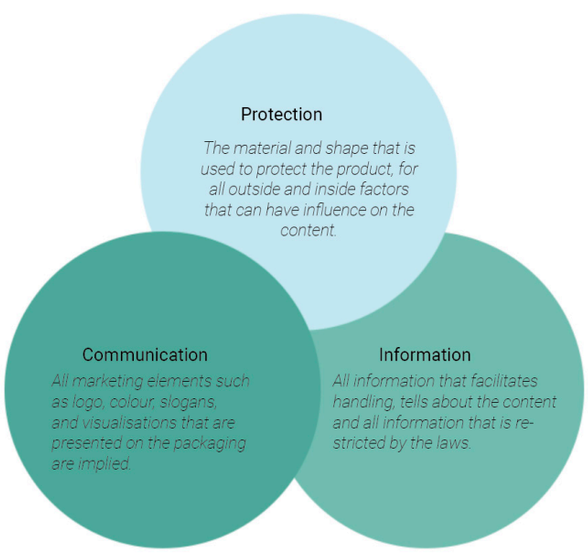

Figure 1: Functions of packaging

Types of packaging

Since a product navigates through a whole supply chain different requirements for protection are needed in each stage. In the packaging industry there are 3 types of packaging [Cartier packaging, 2019]:

Primary packaging

Primary packaging is the packaging that is used to protect the product itself, it is thus directly in contact with the product. This packaging is the packaging where the consumer interacts with.

Secondary packaging

This type of packaging is used to cover the primary packages in bigger amounts. It protects its primary packaging during small transports, I.e cardboard boxes.

Tertiary packaging

Tertiary packaging is used for the bigger transports of the products. It bundles the secondary packaging and is used to easily distribute big amounts of products. Think of bulk transport on pallets.

For this research I focus on primary packaging. The focus on primary packaging is crucial because it is the type of packaging that consumers come into contact with when it comes to supermarket products. It is necessary to develop more sustainable solutions for primary packaging that both reduce environmental impact and meet consumer expectations. By focusing on sustainability in primary packaging, we can bring about positive changes in the entire packaging industry.

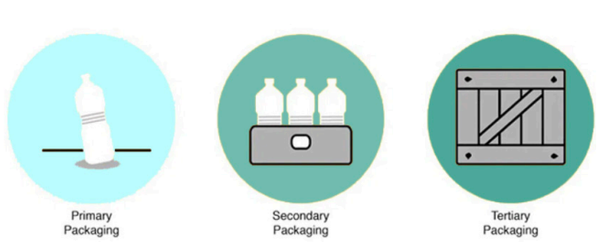

Figure 2: Types of packaging

Origin of packaging

Over the past few years, there has been a considerable change in how things are packaged. Food used to be prepared locally, with only the necessary quantity being used or produced at any given time. Gradually food was kept in storage for later consumption or when there was left over food. The food was then covered in organic materials like shells, woven leaves, or animal skins. The packaging has evolved throughout time, becoming increasingly sophisticated. The first metals and pots for storing food were created with the discovery of ores and compounds.

One of the first types of packaging to be discovered is paper. Nevertheless, that paper used back then is not the paper that is currently used for packaging. It was found in about 105 BC that paper could be created by combining different fibres with water and letting them dry. Used rags, fishing nets, and tree bark were used for this. Once this method gained popularity, “paper” was developed and started to be used regularly for product packing. After the introduction of this approach, individuals began to create an automated version of it. Henry and Sealy Fourdrinier were successful in building a paper machine in 1803.

Francis Wolle invented the first paper bag machine in 1851. Following this development, other innovations were made, and in the 1870s, bags continued to advance in functionality. The machines became so advanced in 1905 that they could produce in-line printed paper bags.

Carton is another descendant of paper. A defect in Robert Gair’s machine led to the accidental discovery of carton. Since then, the packaging industry has made extensive use of this material. The numerous cereal sales greatly boosted the sales of carton. The first company to incorporate this material in its products was the well-known brand Kellogg’s. Even days, many grocery products are made from this material, often coated with a plastic lining.

Tin is one more material that is frequently used for packaging. When Napoleon Bonaparte offered a great treasure in 1809 to anyone who could come up with a better way to store supplies for his troops, this type of packaging was born. When Mr. Appert discovered that products enclosed in tin cans last longer, he became the creator of canning. Peter Durand discovers tin a year later.

Glass is a widely used packaging material. Initially, glass was used to make cups and bowls, but in 300 B.C., the blowpipe was invented, making it feasible to make rounded containers. With the invention of the split mould process in the 17th and 18th centuries, irregular forms could be produced, and brand and product names could now be put right away to the mould. Over time, as other materials became more popular for uses that were more widespread, glass came to be utilised for things that were more expensive.

Plastic cannot be overlooked when considering packaging materials. The fact that plastic is currently one of the most popular materials for packaging is surprising; the first handmade plastic was only created in 1856. At the beginning, plastic was mostly employed in the military sector because at the time, winning the war depended on the materials. Several types of plastic were developed after the war, and plastic usage continued to rise. Due to all of its potential, plastic was first viewed as quite ideal; Because it was such an ideal material to produce and use, the growth of this material in the packaging industry has been rapid. The costs of this material are low, and it possesses the right qualities for packaging purposes. However, as a result, the packaging is made as light and cheap

as possible, often leading to it being discarded after a single use. In this way, plastic packaging greatly contributes to environmental pollution. Nowadays, we are aware of the pollution that this material causes, and it is no longer always considered the ideal material.

Labels are relatively recent inventions in the packaging industry, much like how the majority of packaging materials saw significant development in prior years. In 1660 in England the catchphrase 'let the buyer beware' was quite popular, making some merchants selling low quality goods to unknowing customers. As a response, other retailers began to brand their goods to let the buyers know how high-quality their products were.

The Smith Brothers introduced their own trademarks in 1866 in order to promote their cough drops. The branding of a product through its packaging was a new method of marketing. Nowadays, it is difficult to imagine a product that does not have a label to identify and market the product. Along with serving as a branding tool, labels have also served as a means of educating consumers on the contents of food goods, how to utilise them, and any applicable laws.

[DBNL, 2023], [Abbey Polythene, 2019], [A history of packaging, 2023]

Conclusion

In the past, we placed great importance on reusing packaging as much as possible due to limited availability and individual ownership. The primary objective of packaging was to extend the shelf life of products. Additionally, there was significant emphasis on using specific materials for different products, particularly luxury items. However, nowadays, our focus has shifted towards using the most cost-effective packaging options for the majority of products. This change has been influenced by the abundance of various packing materials, particularly with the rise of plastic, as well as the need to distribute products over greater distances.

The emergence of brands and labelling aimed to provide assurance to consumers regarding the quality of products. Brands sought to establish their reputation and ownership by emphasising the quality they offered. The wide variety and unique shapes of packaging we see today are a direct outcome of the ongoing competition among companies in the domain of packaging design. Labelling was perceived as a way to differentiate from other brands and capture customers' attention, leading brands to continuously improve and outdo one another.

Future of packaging of FMCG

The packaging of fast-moving consumer goods has advanced significantly since the development of new materials. With the development of plastic, however, many reusable packaging options, such as the glass milk bottle, have lost favour, and an increasing number of single-use plastic substitutes have been created.

The amount of plastic trash and harm that these single-use packages produce is currently becoming more and more clear to us. Single-plastic packaging contributes to pollution when improperly disposed, polluting water systems and natural environments. Additionally, as single-plastic packaging breaks down, it generates microplastics that can be ingested by organisms, potentially impacting ecosystems and human health. We urgently need a shift in buying habits, packaging, and behaviour. There are already various initiatives that aim to shift the shopping behaviour, [See chapter 2] but it is not enough.

The introduction of laws for the entire EU in November 2022, however, is

the most recent and significant shift. These new legislations regarding waste packaging and plastic packaging were created by the European commision. With the goal of having all packaging recyclable or reusable by 2030, the European Commission has proposed a revision of the EU's packaging and packaging waste legislation. These laws include suggestions for new reuse targets because they are focused toward developing a reuse economy. To accomplish this goal, the European Commission will issue new legislation that will boost uniformity and stop needless gas emissions from transportation and production.

The proposal also contains legislation to encourage recycling in addition to the reuse goals. By 2030, all packaging must be recyclable, and by 2035, recycling at scale is required. The committee has created recommendations for easily recyclable packaging in order to accomplish this goal.

Packaging of FMCG as a problem

In recent years, the use of single-use packaging has experienced a significant growth in The Netherlands [Eurostat, 2023]. This growth can be attributed to various reasons. Firstly, the convenience and affordability of single-use packaging have made it a popular choice in a society where time and effort are scarce. Additionally, the overall consumption has increased, leading manufacturers to prefer single-use packaging due to its low production costs. This, combined with the on-the-go lifestyle, has resulted in a rise in single-use packaging.
Unfortunately, this growth in single-use packaging usage has not been accompanied by an adequate end-of-life solution. In the Netherlands, recycling is not effective due to several reasons. Firstly, the improper disposal of packaging leads to a significant portion of it ending up in landfills. Moreover, the Netherlands faces challenges in effectively managing plastic waste, including complex sorting systems, contamination issues, and limited recycling infrastructure. Consequently, the recycling rate in the Netherlands remains remarkably low: Only 27% of all plastic packaging waste can be recycled at the moment [WUR,2021]. About 14% of the plastic waste we produce today is actually recycled [Ellen Macarthur, 2017]. And the products that are recycled are actually downcycled during the recycling process, which means that the quality of the materials declines. To address this environmental concern, it is crucial to shift the focus towards the reuse of packaging, as supported by the Butterfly Diagram proposed by the Ellen MacArthur Foundation. By emphasising the reuse of packaging materials, the demand for single-use plastic can be minimised and establish a more sustainable approach to packaging management.

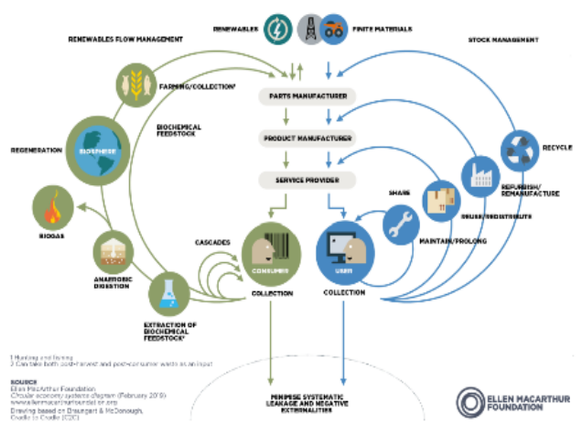

Figure 3: Butterfly diagram

The Butterfly Diagram illustrates a circular economy model wherein resources are used efficiently, emphasising reuse and minimising waste. By transitioning from single-use plastic to reusable packaging, we can significantly reduce the overall consumption of plastic materials. Reusable packaging systems, such as returnable packaging, offer a more sustainable alternative. The reuse

of packaging not only decreases the demand for single-use plastic but also helps establish a closed-loop system where packaging is consistently reused, which reducesthe need for continuous production and disposal. This transition promotes the principles of a circular economy, where resources are used efficiently and waste is minimised, ultimately leading to a more environmentally friendly and responsible system.

History teaches us that throwing away packaging after just one use is a modern phenomenon. In response, the new laws encourage a return to recycling and reuse, and a shift in behaviour is crucial. As explained above, it has been proven that recycling is not the best and only solution for the Netherlands, but the focus of everyone should shift towards reuse.

For this research, the focus has been chosen on the reuse of packaging. This choice is based on the fact that the consumer itself has more influence on reuse and the impact of reuse on the environment is greater.

Reuse & standardisation

Because of the focus on reuse this term will be discussed. I'll also define standardisation discuss its meaning and explain the relevance of standardisation

Reuse

The European Union has set up a key mission for the packaging of single waste items in Europe: reusing packaging. Since many fast-moving consumer goods are now not recycled or reused but are instead viewed as single-use plastic packaging, the emphasis on reuse is a result. The benefits of using these products packaging more frequently are significant.
Reusing products reduces waste and reduces the need for resources by slowing down material flows and possibly extending their useful life. Similar to this, [Greenwood et al., 2021] claim that by preserving the usage, value, and worth of packaging, reusable packaging systems can aid in the reduction of plastic packaging waste. In 2019, the Ellen MacArthur Foundation has done research that resulted in various reuse models. The EMF framework divides reuse models into two fundamental categories: the desired consumer behaviour, such as refilling or returning, and the setting/ location in which the behaviour occurs, such as at home or on the go.

Figure 4: reuse model Ellen MacArthur Foundation

The first distinction made in product reuse is ownership; meaning that the consumer owns the product and is responsible for cleaning and refilling it or the firm has the ownership and responsibility on the packaging. Exclusive reuse refers to consumer ownership, whereas sequential reuse denotes responsibility by the company.

Exclusive reuse is when a product is reused by a single user throughout the product lifetime for the same purpose for which it was conceived, and with the support of reuse-enabling infrastructure. The user owns the product, and is responsible for its recovery, reuse and subsequent reintroductions in the consumption phase.
Sequential reuse is when a product is used again throughout the duration of

its life by different users for the same purpose for which it was designed, supported by infrastructure that makes reuse possible. The user is in charge of returning the reusable item to the provider after using it. Afterwards the supplier is in charge of recovering it for reuse and reintroducing it to the consumption phase for a different user. The cycle of “utilisation-recovery-preparation” keeps repeating until either the consumer decides not to return the item, the reusable item loses its usability, or the provider decides to stop selling the item.

For this research the focus will be on sequential reuse, meaning that the consumers don’t own one package that they reuse but all consumers use reusable packaging and ‘share’ all reusable packages. The focus is on the right part of the model since this part is about reusing packaging. The left part is waste prevention, but is not the reuse of packaging, it is reuse of personal ownership. [KIDV webinar, 2023].

Standardisation

As the focus will be on sequential reuse models it is interesting to dive into standardisation. Standardisation is the process of making something conform to a standard. Standardisation of packaging means that standard packaging will be used for multiple products in order to gain an advantage in transport, cleaning, collection, refilling and production [Coelho et al., 2020]. When packaging is standardised, it may involve both brand-specific versions that adhere to the standardised dimensions as well as packaging that is no longer brand-specific and can be used across brands.

Currently Secondary and tertiary packing is where standardisation in packaging is most commonly used. Consider the boxes, pallets, and other containers that products are currently delivered in. Standardisation in primary packaging is rarely used, however it does occur in a few products; beer bottles, fizzy drinks cans and cigarette packaging. Because of the lack of standardisation in primary packaging, this research will focus on the standardisation of primary packaging of fast moving consumer goods. Standardization is crucial for facilitating the reuse of products and packaging. By creating standardized formats and specifications, reusable items can be efficiently collected, processed, and reused. Standardisation plays a crucial role in enhancing the economic viability of reuse models. By establishing standardised processes and specifications, it streamlines the logistical process involved in reusing packaging. This, in turn, reduces costs associated with the production of new packaging. With standardised systems, businesses can efficiently collect, clean, and redistribute reusable packaging, minimizing waste and resource consumption. By enabling a seamless and cost-effective reuse process, standardisation promotes the adoption of sustainable packaging practices. As a result, businesses can achieve economic benefits while reducing their environmental footprint. Therefore, standardisation acts as a vital enabler for the success and widespread implementation of reuse models.

According to Tuck-Sherman, there are many benefits to standardising FMCGs, including the need to scale up reuse and advance the circular economy. [KIDV, 2023] As stated, standardising packaging helps reverse logistics, cleaning procedures, and equipment. As a result of standardisation, operations are simpler to carry out, machines do not require constant setup, and there are the same product types. So, it is simpler to reuse standardised packaging. These benefits in transit, washing, and logistical operations are still there even if brand components ,such as a logo, are present on the standardised package. By putting these elements on labels or stickers, for

which agreements have also been made among the brands, they can be easily removed, making the packaging itself uniform for all brands and products within the category. Standardisation of packaging is also better for products' ability to be recycled because it allows for easier product separation and recycling due to less complex and distinctive packaging ,which brands use to stand out.[Coelho et al., 2020]

Standardisation is a solution to improve the efficiency of reuse models, and it is crucial to simplify and harmonise packaging in order to achieve the goals of reusing packaging of fast moving consumer goods. The focus of this research is therefore on standardisation and sequential reuse models for fast moving consumer goods.

Conclusion reuse and standardisation

The reuse of packaging holds several significant benefits for both the environment and the economy. Firstly, the reuse of packaging reduces the overall consumption of resources and decreases the volume of waste generated. By extending the lifespan of packaging materials through reuse, the need for continuous production of new packaging is less, resulting in reduced energy consumption and gas emissions associated with manufacturing processes. Additionally, the reuse of packaging contributes to a circular economy, where resources are kept in use for as long as possible.
The standardisation of packaging plays a crucial role in enabling reuse. When packaging is standardised, it enables greater compatibility and interchangeability between different products and brands. Standardisation helps to create an infrastructure for reuse systems, it allows for efficient sorting, storage, and distribution of reusable packaging, streamlining logistics and reducing costs.

Standardised packaging also promotes ease of use for consumers, as they become familiar with consistent formats and handling procedures.
In conclusion, the reuse of packaging offers significant environmental and economic advantages. By extending the lifespan of packaging materials, resource consumption and waste generation are reduced. Standardisation of packaging plays a crucial role in enabling efficient and widespread reuse systems.

Reuse and standardisation barriers & advantages

As previously mentioned, we as consumers initially valued packaging more, and the packaging was used repeatedly for many years. The value of reuse was eventually lost as the transition to the cheapest packaging was made, plastic. Because of this new way of dealing with packaging, reusing it was suddenly more of a barrier. For both customers and companies, this barrier is in four specific topics, below is a brief explanation.

The logistics
If packaging is reused, customer and business logistics will change. After all, used packing must be sent back or picked up. There is a difference in who is responsible for this action depending on whether the user returns it on their own, or hires a third party to collect and clean it. The package must be picked up, cleaned, and then refilled before being delivered back to the store. As a result, there are additional steps that need to be taken to reuse the product, and the infrastructure is currently lacking. The lack of infrastructure makes it more difficult, expensive, and environmentally damaging to reuse packaging, which makes it a barrier.

Convenience
Reusing packaging will, as was previously said, alter how consumers now use items. Consumer convenience

may be tested in a variety of reuse scenarios. The consumer is required to return the product, or at least arrange it for collection. Although it ought to become part of the routine, people occasionally forget to bring the packaging with them.
For businesses, needing to collect or at least reuse the packaging is also a new way of operating. This primarily relates to the company's obligation to manage the collection and cleaning that goes along with it. Due to the decreased convenience, consumers and brands need to be motivated/forced in some way, or there should be a reward for reusing.

Costs
The initial investment of moving to reusable packaging for businesses will undoubtedly be high. Both the development of the collection, cleaning, and refilling infrastructure and the creation of standardised reusable packaging. Reusable packaging cannot close the loop until there are several goods in the system and the materials are typically a little more expensive. For example for every beer bottle sold, there need to be 7 others to close the loop [Evers, expert from Heineken]. But once the system works, it will significantly cut costs.
Research emphasizes that standardisation not only enables improved supply chain performance but also contributes to cost reduction. The research highlights that standardized packaging systems lead to operational efficiencies, reduced complexity, and minimized waste throughout the supply chain. By aligning packaging formats, sizes, and specifications, companies can optimise production, inventory management, and transportation, resulting in cost savings. Furthermore, standardised packaging promotes economies of scale, as consistent designs and components can be produced in larger quantities, leading to lower unit costs. [Coelho et al., 2020] ,argue that the cost reduction aspect of standardisation makes it an attractive strategy for companies seeking to enhance their competitiveness and profitability in the marketplace.

Branding
When brands transition to reusable standardised packaging, they also switch to less colourful, brand own and limited-edition packaging. This will be a substantial challenge for brands because packaging is now a significant component of brand marketing.

Contramination
Contamination can pose a significant barrier to the standardization of reusable packaging. As multiple individuals use the same packaging, there is an increased risk of cross-contamination, especially if the packaging is not adequately washed or sanitized between uses. This becomes even more challenging when the reusable packaging is intended for diverse types of products. The potential for different products with varying levels of allergens or contaminants to come into contact with the packaging raises concerns about cross-contamination and can hinder efforts to establish standardized practices. This is perceived as a problem among consumers when it comes to adopting reusable packaging [Baxter et al., 2016]. To ensure successful standardization of reusable packaging, robust cleaning protocols, proper hygiene practices, and clear guidelines on product compatibility are essential to mitigate contamination risks.

Conclusion
As previously stated, there will still be difficulties with packaging standardisation and reuse. First off, brands won't be able to differentiate themselves as they do now by using various shapes and materials. A creative solution must be found to tackle this challenge. Another challenge of reuse is to keep up the practice of returning the packaging. Customers

must be encouraged to do this by presenting them an incentive. In this way, the barrier of costs for companies can also be lowered by closing the loop earlier.

Another challenge of standardisation and reuse is the responsibility and logistics of standardisation and reuse. Who is responsible for pickup and cleaning, as well as who owns the package at what time. Moreover, these activities must not produce more CO2 emissions than single-use packaging. The standardisation of packaging offers numerous advantages for packaging reuse and hybrid shopping behaviours. Nevertheless, it will inevitably impact the appearance and shopping experience of products. Therefore, one objective of this study is to explore the potential consequences of standardising packaging for fast-moving consumer goods.

Standardisation and reuse initiatives

As mentioned earlier, there have been initiatives for several years now that focus on reusing, standardising, and changing behaviour towards packaging. Below, a few initiatives are briefly explained.

Loop

Loop is a global platform for reuse. They collaborate with brands and manufacturers to enable refillable versions of the conventional single-use products. Loop aims to make reuse as convenient as possible. When your loop product is finished, you bring back the product to a return point. Loop then handels the collection, cleaning and refill, so that the product can be reused again. The product categories they offer differ, it depends on the collaborations they have now. Loop operates in the UK, France, the VS, Australia and Japan.

Figure 5: reuse model Ellen MacArthur Foundation

Pieterpot

Distributes groceries all across the Netherlands in canning jars. The collecting, cleaning, refilling, and bringing of the products are all handled by Pieter Pot. You pay a deposit when you order the pots you use at home. Pieter Pot's goal is to enable you to purchase without purchasing packaging. The goods that PP sells include nuts, seeds, pastes, oils, and juices.

Figure 6: Pieterpot products

Unpackaged

Is a zero waste grocery store that offers traditional bulk shopping. These shops can be found in the UK. The goal is to make it possible for businesses and individuals to refill and reuse products.

Figure 7: Unpacked products in supermarkt

PR3

Is an initiative or more structured way of working with the emerging reuse, refill

and standardisation initiatives in the US.It is a partnership to reuse, refill and replace single- use plastic. Their goal is to de-risk, simplify and optimise the inevitable transition from single use to reusable packaging.

Figure 8: Initiative structured reuse and disposal PR3

Marketing initiatives and trends

The removal of brand-specific elements from packaging is a challenge when standardising packaging, as previously mentioned. However, if we look at the history of packaging over the past 70 years, customizing packaging further in terms of shape, color, and other attributes to make it more brand-specific is a relatively recent phenomenon. This addition became necessary when products in supermarkets had to rely on their packaging to sell themselves, rather than relying on salespeople. Gradually, we became used to packaging featuring marketing components such as colours, slogans, shapes, and functionalities. This led to each brand adopting its own distinct packaging design.
With the start of digitalisation in the economy, advertisements and other digital methods of product promotion have been introduced. The marketing industry is currently undergoing various new initiatives, including developments such as:

- Content marketing:
Many marketing strategies now concentrate on producing informative and relevant material that will engage and inform consumers. Brands are focusing on producing high-quality content across various channels, build trust with the consumers.

- Personalisation
It has become more crucial than ever to personalise marketing messages and experiences to each consumer's individual needs and preferences. Data analysis, automation, and the application of artificial intelligence can all be used to personalise information and recommendations.

- Short videos
Nowadays a lot of brands make use of short videos, the videos are approximately 21-34 seconds. The goal

is to convey the message as quickly as possible in a short time because people's attention span is very low, namely 8 seconds on average.

- Effects of sustainability
Sustainability has been a popular topic for commercials and advertising tricks. When communicating with customers, it is essential to explain how the product helps to improve the environment or reduce pollution. Transparency and honesty about the production chain or material choices are a good example of this.

- First-party data
Businesses want to produce increasingly personalised advertising, which they can do if they have information about the consumer. Companies can offer this type of advertising by establishing a relationship with the customer by checking in or by tracking their own app use. As a result, businesses are more focused on developing their own websites and mobile applications where users may register for accounts and access first-party data.

- Interactive marketing
Interactive marketing involves components in the internet material such as games, quizzes, or polls. You may very easily gather and make use of customer feedback using interactive marketing. On social media platforms, this type of marketing is becoming increasingly common.

- Omnichannel marketing
Marketing that is omnichannel ensures that customers are provided with an integrated experience across all channels and touchpoints. You may encourage both online and offline purchases by placing digital advertisements in the physical retail environment. The challenge is to make the right advertisement at the right time. Getting as much personal information as you can will eventually make this easier.

- User generated content
This trend is especially popular with Gen Z and millennials. User-generated content refers to videos that customers create while using a product, which inspires other people to purchase the same product. [Traffic Today, 2023]

Apart from these trends, three technologies have emerged that focus on enhancing users' perception and interaction with digital information and virtual elements. These technologies provide users with diverse ways to engage with digital content:

- QR codes (Quick Response codes)
In particular designed for smartphones and tablets, QR codes are a type of barcode that can scan a lot of information extremely quickly. To facilitate quick and easy switching between media channels, QR codes were created. This frequently occurs from offline to online. The QR codes make it simple to bring information to life.

- Virtual reality (VR):
Is a computer-generated, three-dimensional world. The goal of virtual reality is for the user to experience and interact with the virtual environment as if it were real. We already know about some VR features, such as Snapchat's filters and Ikea's ability to let you place and visualise furniture in a room.

-Augmented Reality (AR):
An interactive experience known as augmented reality (AR) adds computer-generated perceptual data to the real environment. Aisles at supermarkets can thus be decorated with additional figures, shapes, or other promotional components. We are now familiar with augmented reality, for instance in the form of the pokemon go game where virtual creatures are exhibited in the actual world. Another example is the

additional information that is given on well-known buildings when you are in front of it.

All the aforementioned trends and techniques have been organised in the table below. This table provides an overview of each trend or technique, highlighting its specific goal, the function it serves, and the intended effects it aims to achieve. [Fg|pg, 2022]

Goal	How	Trend/tool	Effect
Provide information	Content marketing	Trend	Producing informative and relevant material
	QR-code marketing	Trend & tool	Providing quick access to information
	Interactieve marketing	Trend	Engagement
Personalisation	Personalising marketing messages	Trend	Insights in individual needs and preferences
	First-party data	Trend	Collecting customer data through interactions of tracking app use
Short-term impact / inventation for purchase	Short videos	Trend & tool	Conveying messages quickly in a short time
	Effects of sustainability	Trend	Communicating product's positive impact on the environment
Omni-channel marketing	Omni-channel marketing	Trend	Delivering an integrated experience across all channels and touchpoint
Encourage interaction	User generated content	Trend	Encouraging customers to create content featuring the product
	Augmented reality	Tool	Adding digital components to the real environment
	Virtual reality	Tool	Creating a realistic interactive virtual environment

Figure 9: Marketing trends and techniques

Consumer purchase behaviour

On average, Dutch consumers do their groceries 2-3 times a week, multiple purchasing decisions are made with each visit. [Deloitte, 2021] Despite the fact that many individuals believe that purchasing things is a conscious decision, numerous studies have shown that purchasing decisions are more often made unconsciously than consciously [Zaltmann, 2000]. According to Raheem, Ahmed, Vishum, and Imanuddin, consumer decision-making lacks objectivity, consistency, and logic. As a result, they frequently evaluate quality primarily on packaging [Silayoi & Speece,2017]. Since the purchasing behaviour of fast-moving consumer goods occurs unintentionally, it is a challenge for the marketing of these products to pierce this unconscious state of being. Packaging is a crucial tool for promoting goods and encouraging purchase intention, according to earlier studies. A product's look has a direct impact on consumers' intents to purchase. [Ko et al., 2013]

The fact that many purchases are now done under intense time constraint affects the decisions made during the purchasing process next to the fact that these decisions are frequently subconsciously influenced. A product that instantly grabs notice is often bought when the purchasing process is rushed. It has been established that 73% of all purchases of fast-moving consumer goods are done at the point of sale, and it has also been established that packaging plays a key role in seven out of the ten factors that influence in-store purchase decisions [Connoly & Davidson,1996], [Kauppinen-Raïsanen,2014]. Moreover, 85% of decisions are taken without considering any alternatives. And 90% of people buy anything after merely looking at the front of the packaging and without actually holding the item. According to these numbers and the fact that many purchases of everyday goods are made quickly and unconsciously, grabbing people's attention is a major factor influencing consumer purchasing behaviour [Olsen, 1994] , [Selame & Koukos, 2002]. There are numerous components that can be used to grab attention. According to research, packaging colour significantly affects associations and attention-getting [Kauppinen-Räisänen, 2014], [Singh, 2006]. Consumers can better visualise and distinguish between competing brands because of the packaging colour. [Grossman & Wisenblit, 1999], [Agariya et al., 2012]. Customers frequently buy products whose packaging colours appeal to them [Becker et al., 2011]. It has also been stated that the font style is a crucial component of packaging since it attracts customers and helps them in understanding the intended message.

Given that the purchasing process is largely unconscious, and research suggests that standing out plays a crucial role in consumer decision-making, it is worth exploring whether standardisation has any impact on consumer purchase behaviour. Or whether this change is not necessarily significant, as the decision-making processes are even more subconscious than research suggests. Then companies can potentially change their perspective and consider the inability to differentiate as a less significant concern.

Brick and mortar & e-commerce shopping behaviour

When consumers shop at a supermarket, the colour and placement of the products, as well as the location in the store, have a significant impact on the purchases they make. The majority of decisions are made subconsciously, and customers often purchase more than they had originally intended. Some households schedule trips to the grocery store, while others impulsively make one or more daily trips for lesser

items. The packaging of supermarket goods affects consumer behaviour in every situation. [Raheem, Ahmed, Vishnu & Imamuddin, 2014]

With online shopping, the consumer has more control over what product categories they see. They will get a few options after choosing the product category they want. Customers are not steered toward other shelves in order to purchase the desired item. So, online shopping is frequently less expensive. [PYMNTS,2023] Online shoppers tend to be busy households, those with limited mobility, or those who require a lot of heavy items. Several new users have also experienced online shopping as a result of COVID-19. [McKinsey, 2020] Another factor contributing to the increase in online shopping habits, besides COVID, is the wider availability of online supermarkets. Nonetheless, the statistics indicate that traditional brick and mortar stores are still well-liked. A total of 20.5 percent of Dutch households use the internet for grocery shopping occasionally [Distrifood, 2023] In recent years, a so-called hybrid shopping behaviour has actually emerged. [PYMNTS, 2023]

As retailers need to become omnichannel to remain relevant, supermarkets need to integrate their supply chain and logistics for both offline and online supply to remain cost effective. [Reyersen van Buuren, 2020]. The impact of this research is that if it turns out that standardization has a positive effect on consumer purchasing behavior, the trend of omnichannel shopping will benefit from it. This is because standardization helps streamline processes and reduce differences in packaging. As a result, it becomes easier for consumers to have a seamless shopping experience. Additionally, standardization can lead to more efficient logistics and cost savings for companies, which promotes overall growth in omnichannel shopping.

Hybrid shopping behaviour en standardisation

The effect of standardisation is greatest when online shopping is done. This is because the supplycycle then fits together best. [Packaging standardization and cost-cutting, 2018] When the new products are delivered, the empty products can be picked up, cleaned and filled in the warehouse and delivered again. But as said today's consumer behaviour is becoming more hybrid. It will be very difficult for suppliers to establish a differentiation in this situation, therefore if standardisation occurs for the online supermarkets, it will be implemented for the brick and mortar supermarkets. Hybrid shopping needs to be fostered as much as possible, which is in accordance with the findings of the research conducted by PWC and the interview with Frans Muller on the future of retail. Besides, the greatest impact on sustainability will come from introducing standardisation in both offline and online shopping environments.

Shopping behaviour of the future

There will be changes to supermarkets in the future. The economic crisis, the Ukraine war, and rising inflation have reduced consumer spending [PWC,2022].As a result, shoppers make more purchases online in order to compare prices and calculate their costs. [WUR, 2018]

The convenience of the customers will be even more of a focus, since customers already expect convenience as all forms of fast delivery satisfy their needs. Expectations for quality, variety, and services have never been higher yet patience for delivery times has drastically dropped. Customers desire: omnichannel alternatives, both online and offline, options for one-stop shopping, continuous availability, smartphone accessibility, efficiency and

quickness of service during checkout, purchase, delivery, or collection and different payment alternatives [PWC,2022].

Additionally, consumers seek personalised digital experiences, such as engaging in phone calls, chats, or augmented reality interactions with customer support representatives. [PWC, 2022]They also desire the ability to shop through social networks, including accessing digitally integrated community reviews of products, and the convenience of shoppable photos and videos. Environmental consciousness, sustainable purchasing, traceable origins, and waste-free packaging are also important considerations for consumers. Furthermore, high-income individuals have a preference for premium goods that meet their desires for fresher and superior products.

As a result, consumers' purchasing habits are evolving, and retailers must adjust to make both online and offline shopping as simple as possible. Here are a few emerging trends in the supermarket industry:

More small shops in large cities
Return depots
Milkrun delivery
Click & Collect supermarkt

Return depots and standardisation
Consumers are willing to reuse products, which is also in line with what the interviews showed. Return depots can contribute to minimising the length and maximising the speed of the return cycles. All of these benefits would be significantly greater if standardised packaging is developed.

Milkrun delivery and standardisation
Milkrun delivery is a delivery method used to transport loads from various suppliers to one customer. This kind of delivery is advantageous for supermarket supply logistics and sustainability. The packaging might be standardised to make logistics even simpler and shareable. [PWC, 2022]

Click & collect / more shops in cities
As the supermarket experience needs to become more streamlined, supermarkets can take advantage of multiple small supermarkets in large cities. For quick last-mile delivery, they could restock items from these shops, or they could use them for click and collect services.

Conclusion chapter 1

Due to today's advances in packaging, it is practically impossible to imagine a world without the wide variety of shapes and colours that characterise modern packaging. Over time, there have been significant changes in the packaging's materials and way of usage. The amount of waste and environmental pollution caused by the packaging of fast-moving consumer goods has increased significantly and needs to change dramatically.

Consumers are, thankfully, becoming more conscious of their impact on the environment and of the environment in general. A change in the packaging industry appears to be approaching when combined with guiding laws.

Because of the inefficiency and low recycling rates in the Netherlands, it has been proven in recent years that recycling is not the optimal end-of-life solution for packaging, and the focus should shift towards reuse. Reuse and standardisation of packaging are not wholly novel solutions when one considers the history of packaging and learns from secondary and tertiary packaging. But this represents a significant shift for both consumers and brands. Consequently, consumers should be encouraged to return the packaging, and brands should make concessions on brand-specific elements in the packaging. While if you look closely, the packaging world

is lagging behind the marketing trends that are currently there. Therefore, there is enormous room for growth in the branding of standardised packaging. This chapter has explored a number of subjects. For the grocery shopping of the future, two key pillars support an emphasis on supermarket product standardisation. These pillars are: (1) the laws and environment; (2) current and future customer shopping habits. The first chapter focussed on literature and trend research. To gain insight on the consumer perceptions of product standardisation and reuse is needed to create a more holistic view. Therefore is the emphasis of the following chapter on gathering information from in-depth, semi-structured interviews with consumers.

Research outlines

Discover

Setting the research's scope is the first section of the research. In this part you can learn about the general research on the several subjects that contribute to the project. Topics include the development of packaging, its functions and components, consumer behaviour, marketing initiatives and reuse and standardisation and its advantages and disadvantages. The subjects covered in this chapter show why reuse and standardisation are positive developments for packaging, and which challenges it faces.

Define

The purpose of part 2 is to collect information from the consumers point of view via interviews. The knowledge gained from these interviews and the research study is merged in this section to form principles and recommendations that are built upon in the other sections. These results serve as the foundation for choosing and supporting the categories for the remainder of the study, and form the take-aways for the design principles.

Develop

In this section, the focus lies on the development of reuse scenarios and the creation of standardised packaging designs. Through an extensive review of literature and analysis of consumer insights, the design specifications will be established. This section outlines all the decisions made and the final outcomes achieved in terms of the packaging designs.

Validation

The new design concepts will be put to the test and evaluated in this part in a mixed subject experiment.The analysis focuses on assessing the impact of purchase intent, brand image, perceived quality, aesthetic attractiveness, and perceived environmental friendliness. All these variables and hypotheses are thoroughly described and defined within this section.

Deliver

In the concluding section, an overview of the project is provided. Conclusions are derived and the research question is answered. Recommendations for achieving sustainability in the packaging of fast-moving consumer goods are presented. Subsequently, discussions, limitations, and further recommendations relating to this research are discussed.

Define

In this chapter, the focus is on obtaining insights from consumers through semi-structured in-depth interviews. The interview itself and the insights gained from it are described. Supplemented with the necessary literature study, conclusions are drawn for the continuation of the project. interview therefore strongly reflects the willingness to standardize and reuse. Below are the research's key findings per category.

Interview

A semi-structured interview was conducted with 12 consumers. The 12 interviewee's differ in age [21-89], sexe [male/female],education [University student/ graduated HBO/University] geography [village/ big cities] and income [student / employed/ retired]. The interview took approximately 40 minutes per interviewee and was conducted in real life. The data was recorded through audio recordings with consent of the interviewee [appendix 1]. In order to capture the essential insights of the interview, the interviews were transcribed and summarised.

The purpose of the interview was to learn more about how consumers perceive reuse and standardisation of packaging. The interview was broken up into three sections to get this insight: general packaging, standardisation, and reuse possibilities.

Each part consisted of questions that were accompanied by images. The images were used to make the answer more expressive, through the images you get the interviewees and the conversation more loose. The images shown were of grocery store shelves or product packaging, both in its current form and in standardised forms. See figure [10] for a few, all are given in appendix [2]

The questions asked to each interviewee all covered the same subjects and themes, but there was flexibility for dialogue and inquiry to elicit as much information as possible. The questions were grouped into three sub themes: general packaging, standardised packaging, and reuse scenarios. Within each subtheme, the questions aimed to uncover the interviewees' perspectives on specific choices or issues. The focus was primarily on exploring the considerations expressed by the interviewees and delving into the reasoning behind their thoughts. The inclusion of photos facilitated the ability to pinpoint and compare specific aspects.The products; detergent, cola, yoghurt, ketchup, and soap were used to ask more specific questions about standardisation and reuse model preferences. For the detailed list of questions and accompanying graphics, please refer to Appendix [2].

Figure 10: Standardised and non standardised packaging

The next paragraphs will present the main findings and guidelines concluded out of the interview.

Insights

In general, every interviewee expressed a strong interest in finding ways to increase the sustainability of fast-moving consumer products packaging. Therefore, the interviewees liked to see the reuse scenarios and standardised options that were provided.[Appendix 2] I'll go over each section's insights below.

General packaging
- In order to attract attention and influence purchasing decisions, colour and size of the packaging are crucial.
-Easy usage (shape and cap) and size are important for laundry detergents. Cleanliness is key in detergent packaging.
- With most weekly products, consumers already know the item they want to purchase; only sometimes, however, do they try out another item because of an offer or because it stands out/ grabs their attention .
- A lot of interviewee's claim that they are not influenced by packaging.

Standardisation
- The majority of consumers are quite accepting towards standardised packaging.
- The brand name does not necessarily have to be on the packaging if the standardised products are filled by themselves. If they don't handle the filling process themselves, they are interested in knowing which brand is responsible, as it relates to the quality of the content.
- It may take some time to adapt to standardisation, but eventually, it will become the norm. This means that consumers need to be introduced to and guided towards standardised products. - The transition to standardised products should be implemented gradually and in a straightforward manner.
- Stick or carrot mentality, so either rewards or costs serve as the motivators to drive consumer behaviour change.
- Distinct product categories should have unique shapes for their packaging. This is because consumers tend to associate specific shapes with particular product types. For example, a tall and slender shape may be commonly associated with bottles of liquid beverages, while a wide and flat shape may be associated with cereal boxes. Therefore, even within the context of standardizing products, it is crucial to maintain differences in packaging shapes for completely different product categories.

Reuse
- Consumers generally show a positive attitude towards the reuse of packaging. Some have questions about how the process would work and what changes would be necessary and who is responsible for these changes.
- The requirement to bring one's own filled container for all shopping items can diminish the spontaneity of the shopping experience. Presently, many individuals conveniently make impromptu visits to the supermarket after work. However, it is observed that people often forget to bring reusable bags for their vegetables. To address this, it is crucial to carefully consider strategies for changing consumer behaviour.
- Additionally, the extended shopping time required for reuse poses a potential drawback, as it necessitates prior planning to bring along empty packaging and the need to return them
- Various product categories require distinct reuse models, as consumer willingness to clean the packaging themselves may vary depending on the specific product category; Products that are sensitive to bacteria or are sticky are preferred to not be cleaned or filled by themselves.
- Deposit system works excellent for reuse scenarios.

These insights are very interesting for this study and will be incorporated

accordingly. Nevertheless, the limitations of this research lie in the fact that consumers may express socially responsible thoughts and intentions regarding their behaviour, but their actual actions might differ. Therefore, when conducting this research, it is important to recognize that people may require more guidance and enforcement than they realise in order to effectively change their behaviour.

Conclusion insights in relation to standardisation and reuse of packaging

Broadly speaking, the insights gathered from the interviews allow for the formation of three categories that combine standardisation and reuse scenarios. These categories are distinguished by two factors: whether the filling and cleaning processes are carried out by the consumer or by someone else, and the typical frequency of product purchases. The following are the three categories:

1. *Liquid household items* like detergents, cleaners, and soaps. In this specific category, customers show a willingness to wash and refill the packaging themselves at the store. However, they also highly appreciate the option of reuse and return. Where standardisation can bring a lot of efficiency. These products are typically purchased on a monthly basis.

2. *Solid food products* such as nuts, flour, grains, and muesli, have a preference for reuse and refill through purchasing papers or packaging that can be transferred into refillable jars at home. These products are typically purchased on a weekly or bi-weekly basis. For this particular product category, there is already an initiative , Pieterpot, that delivers these products in standardised jars and collects them from consumers' homes to reuse again.

3. *Products that are sensitive to bacteria or tend to be sticky*, such as dairy, oil, and honey, require a different reuse strategy. It is most effective for this category to return or collect reusable packaging and buy new, pre-filled reusable packaging. Standardisastion could possibly be an interesting aspect for this product category because of the collection and reusage of the packaging. Daily or weekly purch ases of these items are common.

As the research primarily emphasises return and reuse scenarios, the second product category, which involves reuse at home through purchasing papers or packaging for refillable jars, will not be utilised further in this study.

The product categories

The findings from the research will serve as guidelines for developing standardised packaging for two specific product categories: detergents and dairy products. These categories were selected based on a comprehensive literature review and insights obtained from the interviews. The reasons behind this choice will be explained in the following paragraph.

Dairy

Dairy, as reported by EW (2022), ranks among the top five product categories with the highest food sales. The most common material for milk packaging is double-layered carton. Considering the hygienic concerns associated with milk, consumers prefer not to be responsible for washing and refilling containers. The possibilities for reuse and standardisation in this product category are particularly intriguing due to its high frequency of use and the current packaging's limited recyclability. The similarity in packaging across different brands suggests that standardisation may be a viable option in the near future. These factors further contribute to the interest of exploring this product category within the scope of this study.

Laundry detergent

Laundry detergent is an essential household product that is commonly found in almost every home. Typically, detergent is packaged in large plastic bottles.

Laundry detergent is typically purchased every two weeks or on a monthly basis. This product category holds significance for the research due to its relatively higher cost in supermarkets and the wide range of options available. With the availability of numerous product variations, standardisation can have a notable impact. The use of colour, shape, size, material, and other visual elements plays a significant role in influencing consumer buying behaviour [Ahmed & Parmar, 2014]. In a market with a diverse assortment of products, the design of the packaging holds considerable importance.

Differences and similarities between these product categories

To conclude the products differ in:
- The frequency of purchasing
- How the price is in comparison to other supermarket products
- The difference within the categories regarding the packaging design
-The material of the packaging

And are similar in:
- Both products are bought by almost every household.
- High potential for reusability
- Other product categories can potentially adopt the standardised packaging.

Both ideas might be implemented for similar products if the standardised design has no negative effects on consumer behaviour. For laundry detergent, consider cleaning products and soaps, and for the dairy category, consider juices and oils.In the next chapter, the focus is on creating these potential standardised packages.

Figure 11: Milk packaging of different brands

Figure 12: Laundry detegent packaging of different brands

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In this section, the focus lies on the development of reuse scenarios and the creation of standardised packaging designs. Through an extensive review of literature and analysis of consumer insights, the design specifications will be established. This section outlines all the decisions made and the final outcomes achieved in terms of the packaging designs.

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The new design concepts will be put to the test and evaluated in this part in a mixed subject experiment.The analysis focuses on assessing the impact of purchase intent, brand image, perceived quality, aesthetic attractiveness, and perceived environmental friendliness. All these variables and hypotheses are thoroughly described and defined within this section.

Deliver

In the concluding section, an overview of the project is provided. Conclusions are derived and the research question is answered. Recommendations for achieving sustainability in the packaging of fast-moving consumer goods are presented. Subsequently, discussions, limitations, and further recommendations relating to this research are discussed.

Develop

In this chapter the focus is on creating new standardised design proposals to be able to test them later on purchase intention, brand equity, perceived quality, aesthetic attractiveness and perceived environment friendliness. In order to produce the design, I first investigate the branding function, packaging and labelling needs, materials, dimensions and the deposit system. The findings from these studies then serve as the design principles. The design choices are described and the resulting designs are presented.

Packaging design as a branding tool

A good packaging design strives to draw in the customer, convey the message to the customer, pique the customer's interest, and ultimately sell the product. [Kotler, Armstrong, Brown, Stewart and Chandler, 1998].

The packaging must be distinctive among all the other identical products in order to attract the customer. The packaging must be self-selling. This is possible by using originality in terms of colour, form, size, trademark, logo, copy, and composition.

In order to communicate with the buyer, the message must be clear right away. This message may be direct or indirect. A graphic or icon of the ingredients makes the product apparent in direct messages. Indirect communications rely more on the form, colour, texture, and design to convey internal qualities like worth, elegance and so forth. According to research, colour is the primary factor impacting the indirect message in this case. Labels are a further means of interacting with customers; they frequently contain details regarding usage, ingredients, and allergies. [Sharma, Singh, Agariya and Johri, 2012]

The desire for a product is often stimulated by the convenience offered by its packaging design or additional features. Customers are more willing to pay a higher price when a strong desire is present. Therefore, the perceived value of the packaging can be significantly influenced by its shape and functionality. [Sharma et al., 2012]

Of course, a key function of packaging is to boost sales of the product. A good packaging design concentrates on generating the desire for repeat purchases. This can be accomplished through solutions for reuse, by being extremely convenient for use or disposal, or both. Hence, shape and material are important here. [Kotler, 2000)]

Requirements for packaging

In Europe, there are established regulations specifying the information that must be included on both food and non-food packaging. These regulations cover various aspects such as ingredients, quantity, material, disposal instructions, shelf life, origin, and supplier details. The specific requirements for the labels are outlined below:
[European Union, 2023]

- Name of the product
- List of ingredients
- Information on allergies
- The amount of ingredients included
- The shelflife
- Country of origin (if needed to clarify)
- Name and address of supplier
- Netto amount
- Special storage conditions
- Usage instructions
- Alcohol percentage (if included)
- The nutritional values

Front label

Because there is still room for labels on the packaging within standardisation, brands can incorporate various branding aspects. By examining the current elements present on milk and laundry detergent packaging and learning from the literature on the most important elements for recognition and differentiation, I have developed the following design criteria for the front label:

Milk
On nearly all milk cartons found in supermarkets, the brand logo and type of milk are prominently displayed. Additionally, the background colours of the packaging are predominantly white, green and blue. These colours represent the fresh pasture and blue sky in which the cows graze. Some packages also feature a Dutch flag and cow icon, along with a freshness claim, emphasising the product's origin and quality. [Appendix 3]

Laundry detergent
For laundry detergents, the brand logo and packaging colour are central. The packaging of laundry detergents is often characterized by their vibrant colors and is commonly made of HDPE (high-density polyethylene) with a sleeve around it where the product infromation is given. Additionally, each package indicates the type of detergent and the number of washes it can provide and shows a brand-specific icon. Many laundry detergents also feature a sustainability claim on the packaging. See appendix [3] for the analysis of current packaging elements.

To conclude the label must include:
1. Branding and logo: The front label should prominently feature the brand name and logo to ensure brand recognition and create a visual identity for the product.
2. Product name and type: the label should clearly indicate the product name and type, "halfvolle" or "colour" for example.
3. Visual elements: The front label should have a shape that aligns with the brand image and differentiates the brand from the others.
4. Colours and typography: The label should be in the colours of the brand and communicates the product's attributes.
5. Regulatory requirements: The label should meet all necessary legal requirements; for the front label this means that if an icon is showed this ingredient must be included and on the ingredient list. On the back label All requirements set by the European Union should be included.

Standardisation dimensions

Dimensions play a crucial role in the standardisation of packaging. By creating consistent dimensions for packaging across different product categories, companies can achieve several benefits. Standardised dimensions facilitate efficient production and distribution processes. Manufacturers can optimise their operations by using standardised packaging equipment, reducing costs, and improving overall supply chain efficiency. And one of the key advantages of standardisation and agreed dimensions is the ability to use packaging across different brands and product categories.

Based on the consumer interviews, it has been found that consumers express a desire for larger packaging to minimise the need for frequent purchases, while still maintaining practicality and usability. Below the optimal sizes for both products are described.

Optimal size for milk
The 1-litre bottle size for milk is the most optimum choice for several reasons. It is a balance between providing an appropriate quantity of

milk for household consumption while maintaining doable portability. A 1-litre bottle offers a substantial amount of milk that can typically last for several days, meeting the needs of individuals or families. Additionally, the size is convenient for handling and pouring without being too heavy.

Optimal size for laundry detergent
The 2,25-litre size is a balance between providing a sufficient quantity of detergent and avoiding excessive bulkiness or storage challenges. This size is often preferred by individuals or families who prefer to purchase detergent in larger quantities to minimise frequent shopping trips. Furthermore, the 2,25-litre size often offers cost advantages and value for consumers. Purchasing detergent in bulk quantities can result in cost savings compared to buying smaller sizes more frequently. Lastly, the 2,25-litre size is more sustainable since less smaller bottles are used and discard over time.

While a litre bottle is the optimal choice for milk, a family pack size of 2,25 litres is the most environmentally friendly option for detergents. It's also crucial to have a symmetrical container as the benchmark size; this has to do with force distribution and transportation. The dimensional requirement for the products are as follows:

Milk: symmetrical bottles with a capacity of one litre
Detergent: symmetrical bottles with a capacity of 2,25 litres

Materials & Impact

Milk

Milk is often sold in laminated cartons, plastic jugs, and occasionally glass bottles. The majority of milk cartons sold in supermarkets are made of laminated carton packaging. [See figure 13]. Laminated cartons are created by combining layers of cardboard with a layer of plastic and, in the case of milk cartons, an aluminium coating. The presence of laminated layers in packaging prevents the products from being recycled due to the need for heat to dissolve the layers and the need for water to recycle the cardboard. As a result, milk cartons cannot be recycled, the quantity of waste packaging adds to environmental damage.

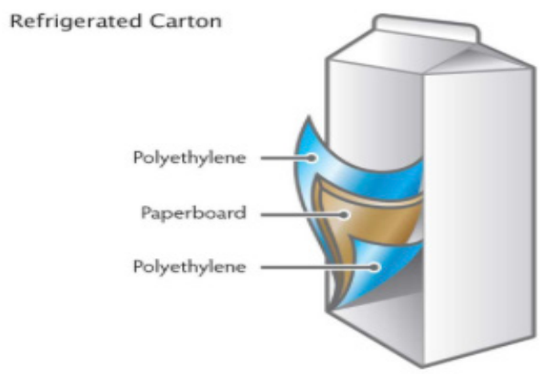


Figure 13: beverage carton

For the standardised design, glass will be used as the material for milk bottles. Glass has the advantage of being easily reusable multiple times, with beer bottles, for example, being reused 20 to 30 times according to Leo Evers [Expert from Heineken]. Additionally, glass is infinitely recyclable, maintaining its glass properties indefinitely. It provides excellent preservation for food items as it effectively blocks gases and moisture from the contents. Moreover, glass shows the natural colour and texture of milk, offering customers a clear view of the bottle's contents. This transparency can enhance the perception of quality and freshness. The aesthetic appeal of glass bottles can also enhance the overall presentation of milk, making it more appetising on store shelves and

in refrigerators. [Stichting duurzaam verpakkingsglas, 2023]

LCA glass and layered beverage carton

Based on multiple LCA analyses and literature studies [Appendix 4], the difference between layered beverage cartons and reusable glass has been assessed. This research found no significant difference in global impact between reusable glass and layered beverage cartons. [Circulair analystics, 2020]. However, there are several arguments that make this analysis not conclusive in determining which material is better. Firstly, the comparison is not entirely accurate since there are few LCAs available for reusable glass bottles compared to a wide range of analyses for layered beverage cartons. Additionally, the analysis is also susceptible to the parameter of end-of-life scenarios. In the case of layered beverage cartons, it is not possible to reuse the packaging. Furthermore, the recycling rate for this type of packaging is low (31%) [Van Velzen, 2022]. The recycling rate is low in the Netherlands because there is no specific recycling target for beverage cartons, and Dutch beverage cartons are less clean due to the higher packaging of yoghurt and custard in these cartons. Due to the packaging being made of three layers, the recycling process cannot be conducted in the Netherlands, and the packaging is transported to Germany, France or Spain where the process begins. Currently, only the paper layer can be effectively recycled, with limited application only to non-food cardboard packaging. The other layers are downcycled.[KIDV, 2022], [Van Velzen, 2022].

Only a few examples of reusable glass bottles were considered in the LCA comparison, and there is more potential for the end-of-cycle phase. Glass bottles can be reused multiple times before being recycled. This process is feasible in the Netherlands, and the quality of glass remains high with a recycling rate of 90%.

On the other side due to their heavier weight, glass packaging naturally comes with environmental drawbacks, particularly in terms of transportation. Additionally, there are costs and energy consumption associated with cleaning. However, the success of reusable bottles depends on several key factors. These factors include the number of times the bottle is reused, the amount of recycled material used in its production, the distance it travels, the type of vehicle used for transportation, and the cleaning methods employed. Furthermore, the end-of-life scenarios, such as recycling or proper disposal, also play a significant role in the overall environmental impact of reusable glass bottles. By carefully considering and optimising these aspects, the environmental benefits of reusable glass packaging can be maximised.

For the type of transport, distance, and cleaning processes, there are significant variations, making it challenging to provide precise numbers. However, ideally, all transportation should be done using electric vehicles, and the distance traveled should be minimized as much as possible. As for cleaning, optimisation should focus on minimising water usage, reducing the use of cleaning agents, and implementing water reuse practices.

For the aspects of reuse, amount of recycled material, and end-of-life scenarios, it is easier to use the available figures, and the following analysis is derived from life cycle assessments:

The three packaging options being compared in these LCA's are plastic bottles, beverage cartons, and glass. For these packaging types, a diagram has been created to illustrate the composition of materials and the use of recycled materials. It shows that glass

packaging performs the best in this regard.

Table 3: Packaging characteristics

Material	HDPE	Reusable Glass	Beverage Carton
Volume [L]	0.5, 1 and 2	0.586	0.5, 1
Weight [g]	17, 31 and 40	238	25, 43
Recycled content	0%	30%	0%
Cap material	HDPE	Aluminium	HDPE
Cap weight [g]	2	0.25	2
Cap recycled content	0%	0%	0%

Figure 14 : LCA material

Research suggest that the global warming impact of a glass bottle is significantly reduced by approximately 40% when it is reused once. However, the environmental benefit does not continue to increase at the same rate with subsequent reuses and stabilises after eight reuses. This phenomenon is illustrated in figure 15, which shows the relationship between the bottle's reuse rate and the global warming potential indicator (gCO2 eq/L). The graph demonstrates a notable decrease in emissions during the initial reuse cycles, with emissions reduced by over a third within five cycles. After this point, the emissions gradually level off and reach a plateau. As the number of cycles increases, the impact on the bottle's environmental footprint shifts from the production stage to the transportation and cleaning stages [Coelho et al., 2021]

Figure 15: Reuse bottle

The CO2 emissions are initially higher for glass, as depicted in Figure 14 6. However, by reusing these bottles, you can distribute these "costs," resulting in a much lower environmental impact compared to the other packaging options. Figure 17 illustrates when this break-even point is reached. These figures are based on an assumed return rate of 80%, but if this rate increases, the break-even point is achieved even earlier, further enhancing the use of glass as a packaging material. This rate has been used for the analysis of glass milk bottles in England. It is interesting to note that the recycling rate of plastic bottles in the Netherlands is 95%. If the recycling rate of glass bottles are to follow a similar trend in the Netherlands, it would mean that the reuse scenarios would be even more sustainable, and the break-even point would be lower than depicted in these graphs.

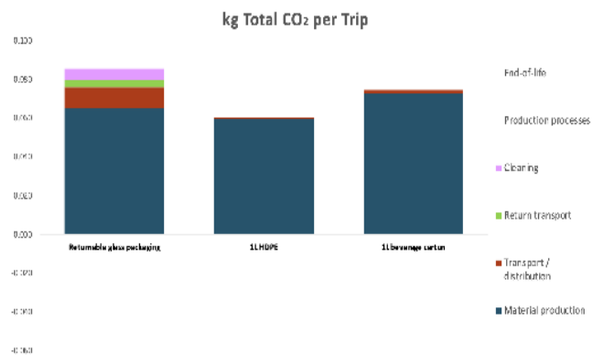


Figure 16: Kg CO2 material milk bottles

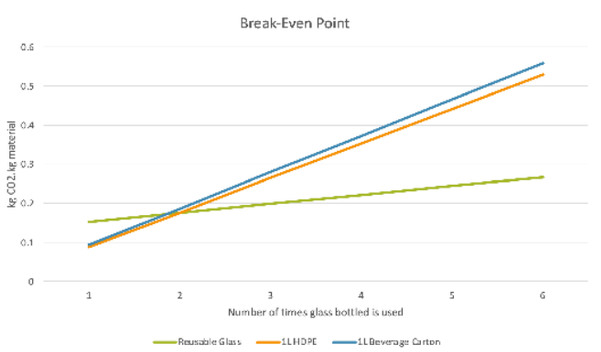


Figure 17: Breakeven reusable bottle

Due to the reasons that the packaging law promotes reuse and subsequently high recycling rates, and considering the focus on packaging reuse in this research, the decision has been made to opt for glass bottles for the standardisation of dairies, with both high reuse potential and high recycling rate.

Laundry detergent

The packaging of detergent bottles are commonly made from HDPE, PP and PET sometimes enhanced with stickers or sleeves to promote the product [sleeved packaging = when a cardboard or plastic “jacket” is slid over a box or tray.] In the packaging of detergent an overplus of plastic is used, since laundry detergent is a single used plastic the waste coming from this product is considerably high. [Zembla,2022].

Currently, the detergent bottles have come in many different shapes to stand out on the shelves. However, these shapes have an effect on how well they protect and can withstand bumps during transport.

For the standardised model, an HDPE symmetrical detergent bottle will be most suitable for the reuse scenarios. Given its strength and durability, HDPE is a good choice for the packaging of laundry detergents. It can bear the strains of handling, shipping, and storage without easily cracking or breaking. Additionally, HDPE has a high level of resistance to chemicals, including all of the ingredients contained in washing detergents. It acts as a strong barrier, preventing any reactions between the detergent and the packing material or leaking into it. On top, HDPE is a lightweight material, which benefits consumer convenience and transportation effectiveness. Lightweight bottles minimise the overall weight of the packing, which lowers fuel consumption, lowers shipping expenses, and reduces the carbon emissions that go along with it. Additionally, lighter bottles are simpler for consumers to hold and use it, increasing user convenience.

LCA HDPE detergent bottle and other options

Based on multiple LCA analyses and literature studies, the environmental impact of different laundry detergent packaging options, including HDPE bottles, PET containers, and flexible pouches, has been evaluated. Assessed across multiple categories, the HDPE bottle has the lowest environmental impact. [see figure 18]

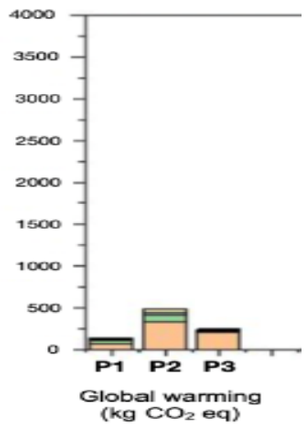


Figure 18: Kg CO2 laundry detergent

The same applies to detergent packaging as described in the LCA of milk packaging; that when packaging is reused more frequently, the ‘costs’ and CO2 emissions of production can be distributed over the number of reuse cycles. However, these costs and emissions still exist for transport and cleaning each time it is reused.

Furthermore, as mentioned earlier, HDPE bottles are well-suited for reuse, and the material is fully recyclable. These findings align with the research objective, and therefore, the HDPE bottles are chosen as the preferred packaging option.

Netherlands deposit system

In the Netherlands we are well known for deposit systems, all beer bottles and plastic bottles do have a deposit system. Even for several months now, deposit has also been set to tin. The deposit system in the Netherlands is one of the best in the world. It is among the best since the supply and delivery of the packaging are both well-organised, and because customers hand in their bottles politely, allowing the supply to proceed along quickly as well.[Leo Evers,2023]

Within the deposit system, a deposit amount is added to the price of the products. This deposit can vary depending on the size and type of packaging. After use, consumers can return the empty packaging to collection points, such as supermarkets or special machines, where they receive the deposit amount back. The returned packages are then collected, sorted, and cleaned so that they can be refilled and reused or recycled.

The Dutch deposit system has several benefits; It encourages the reuse of packaging, which reduces waste production and lowers the demand for new packaging. Additionally, the system promotes the recycling of materials, contributing to a more circular economy and a reduction in environmental impact.

At the moment, figure 17 only applies to glass bottles in the Netherlands. Currently, PET bottles and cans are immediately recycled. However, for the scenarios in this study, the process indicated in the figure below is assumed.

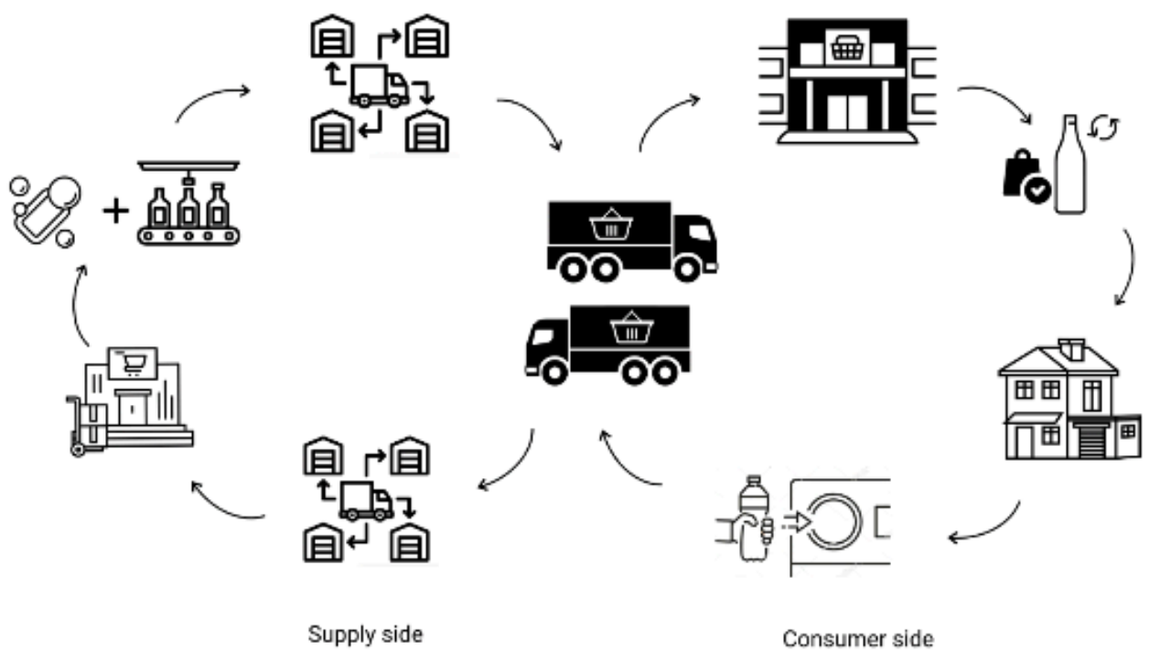


Figure 19: Deposit system

Pooling

When the packages are standardised in shape, material and colour companies selling the same kind of products can do pooling. The packaging pooling system, also known as shared packaging, is a system in which reusable packaging is shared and efficiently used within a logistics chain. Instead of producing and using new packaging each time, the packaging is reused by multiple parties in the supply chain.

Within the packaging pooling system, a pool of packaging is created. These packaging items are managed by a specialised service provider responsible for their maintenance, cleaning, and distribution. When a company packs goods, they use the packaging from the pool instead of purchasing new packaging. After delivery of the goods, the empty packaging is returned to the service provider, where it is inspected, cleaned, and made available for use by other companies.

The packaging pooling system has several benefits. It reduces the need for producing and disposing of disposable packaging, resulting in cost savings and less waste. It also promotes more efficient logistics as the packaging is managed and used in a streamlined manner by multiple companies in the supply chain. On top it reduces investment and risk while accelerating circulation.

To enable pooling, it is critical that agreements be formed regarding the use of shape, material, and glue. Pooling is currently done with beer bottles in the Netherlands.

Expert interview

During a video call with Leo Evers, an expert in the field of packaging and logistics with over 30 years of experience at Heineken, we engaged in an open discussion on various aspects of standardisation. Leo's extensive knowledge and expertise in the beer industry, particularly in packaging standardisation, reuse systems, and supply chain logistics, provided valuable insights. The following key insights emerged from our conversation:

The expert interview provided valuable insights into the topic of packaging standardisation and reuse, particularly in the context of the beer market. Historically, standardisation was driven by cost-saving measures, and the major brewers decided to introduce a standardised bottle to the market. However, one drawback of standardisation is the lack of distinctive packaging. They overcame this problem by differentiating in labels.

The implementation of a successful deposit system, such as the retouremballage system in the Netherlands, has proven to be highly effective. It has led to significant reuse of packaging, particularly in the case of beer bottles, which are reused an average of 12 times per year. This system is not only financially advantageous for companies but also contributes to environmental sustainability by enabling complete reuse of packaging.

The popularity of reuse systems is noticeable in the high return rate of packaging in the Netherlands. Higher return rates are associated with increased brand popularity, and the turnover rate of the product plays a crucial role in this regard. The Dutch retour emballage system is considered one of the most well-functioning systems in the world.

In terms of logistics, when returning crates at a supermarket like Albert Heijn, the process involves a maximum of one intermediary step. The crates are sent to Albert Heijn's distribution center, where they are collected by Heineken or a Heineken wholesaler. Heineken takes responsibility for cleaning the crates and even applies an additional coating in some cases, ensuring quality control.

However, in other countries where there is a lack of proper returnable infrastructure, Heineken repurchases the bottles from bottle collectors. This situation arises due to the absence of suitable returnable facilities, forcing the choice between purchasing new bottles or buying them back from collectors. It is worth noting that specialty beers are often not packaged in standardised bottles, due to the fact that their sales volume are significantly lower.

The interview with Leo provided valuable perspectives on the functioning of the deposit system for beer crates, highlighting the ease of returning crates to different stores and the presence of various colored/branded bottles in the crates. Heineken collects the empty crates from the stores through their respective suppliers. The crates are then transported to Heineken's distribution center, where they are cleaned and refilled. Heineken accommodates the return of different bottle colors, as they sell various brands like Amstel.

Overall, the expert interview offers important insights into the benefits of packaging standardisation and reuse, explained using the example of beer bottles showing successful examples such as the retouremballage system in the Netherlands. It also raises awareness of the environmental implications and logistical considerations involved in implementing such systems.

Conclusions design criteria

The design criteria are based on various sources, including consumer requirements, laws and regulations, branding insights, material analyses, and reuse scenarios. These different sources contribute to the development of the design criteria.

First, consumer requirements play a crucial role in determining the design criteria. By conducting the consumer interviews and gaining insights into their needs and preferences, design criteria are established that align with the consumer desires.

Furthermore, laws and regulations are of great importance in the design criteria. This includes guidelines related to safety, health and ingredients. The laws considered for the design criteria are based on the laws of the European Union.

Branding insights also contribute to the design criteria. By considering the brand identity, values, and visual communication of the brand criteria have been created with the aim of allowing some degree of freedom for the standardised packaging.

In addition, material analyses are essential to ensure the sustainability and functionality of the design. By understanding which materials are suitable for the intended use, and sustainability considerations, criteria have been established for both product categories.

Finally, reuse scenarios play a role in determining the design criteria. By considering possibilities for reuse, recycling, or circular design, the design of the new packaging will be sustainable and future-proof.

Based on these different research topics explained in depth in the above paragraphs, there are several criteria

that need to be considered in creating the standardised packaging design:

Milk:

1. Reusable glass bottles
2. Litre-sized bottles
3. The type of product should be indicated on the bottle
4. The brand should be displayed on the bottle with its logo
5. Some form of colour should be used to create recognition
6. The European packaging laws must be displayed on the bottle
7. The bottles should have a de posit system in place
8. The packaging should be sym metrical to provide benefits for transportation, cleaning, and refilling.

Laundry detergent:

1. Reusable HDPE bottles
2. 1.3065-liter bottles
3. The type of detergent should be visible
4. The brand of the product should be visible with its logo
5. Some form of colour should be used to create recognition
6. The European packaging laws must be displayed on the bottle
7. The bottles should have a de posit system in place
8. The packaging should be sym metrical to provide benefits for transportation, cleaning, and refilling.

Design Choices

Milk
As mentioned before the standardised packaging of milk will be made of glass.

Brands can apply labels with their own logo, colour scheme, shape and content to the bottles. Because the brands are able to apply their own labels (within the agreed dimensions), there is still a form of differentiation among the various brands. By reaching agreements on the adhesive used, the process of label removal can be standardised for all brands, facilitating pooling. Thus, within the boundaries of the standardised packaging, there is still some degree of marketing freedom. The standardised milk bottles for this research have the following design:

Figure 20: Design standardised milk and juices

Of course, in the process of standardisation, there is in terms of marketing freedom a part that brands must give in as the can't vary in shape,size or packaging material. In the process towards standardisation, the following elements of packaging are eliminated compared to the current packaging:

- The brand packaging colour
- Differentiation since there is no differentiation in shape
- Icons of the content to quickly convey the message
- Some design / input to convey the quality and worth of the product
- Storytelling
- Sustainability claim

These are the elements that somewhat disappear in the standardisation process. For the standardised+ model, these elements are added, which is elaborated in the next paragraph

The standardised+ packaging

Due to the increasing focus on online marketing and the consumer's mobile-driven behaviour, the aforementioned elements that are lost in the standardised physical packaging can potentially be addressed through digital marketing. For the marketing of the standardised+ design, careful consideration was given to the elements that are primarily eliminated during the standardisation process, namely providing information and the short impact /enticing people to make a purchase.

Referring back to the previously presented table [figure 9], these trends emerge as key factors to address. By focusing on these aspects, the marketing strategy for the standardised+ design can effectively communicate the necessary information to consumers while also creating an initial impression to encourage purchase. Incorporating trends such as content marketing, personalization, and interactive marketing can help achieve these objectives.

By scanning the QR code on the packaging, consumers can watch a video showing the elements that would typically appear on the packaging, along with additional informative and inspiring content. For this research's milk bottle, the focus is on the milk's freshness and the good caretaking of the cows selling the content and quality of the product. The consumer is also informed on the fact that this milk is sold in reusable bottles and that by buying this product they help in reducing plastic waste. See figure [21]

It is important to note that the content of these QR codes is entirely at the discretion of each brand, allowing them to differentiate themselves once again. The elaborated version presented here is just an example to provide a better understanding.

Figure 21: Design standardised+ milk and juices

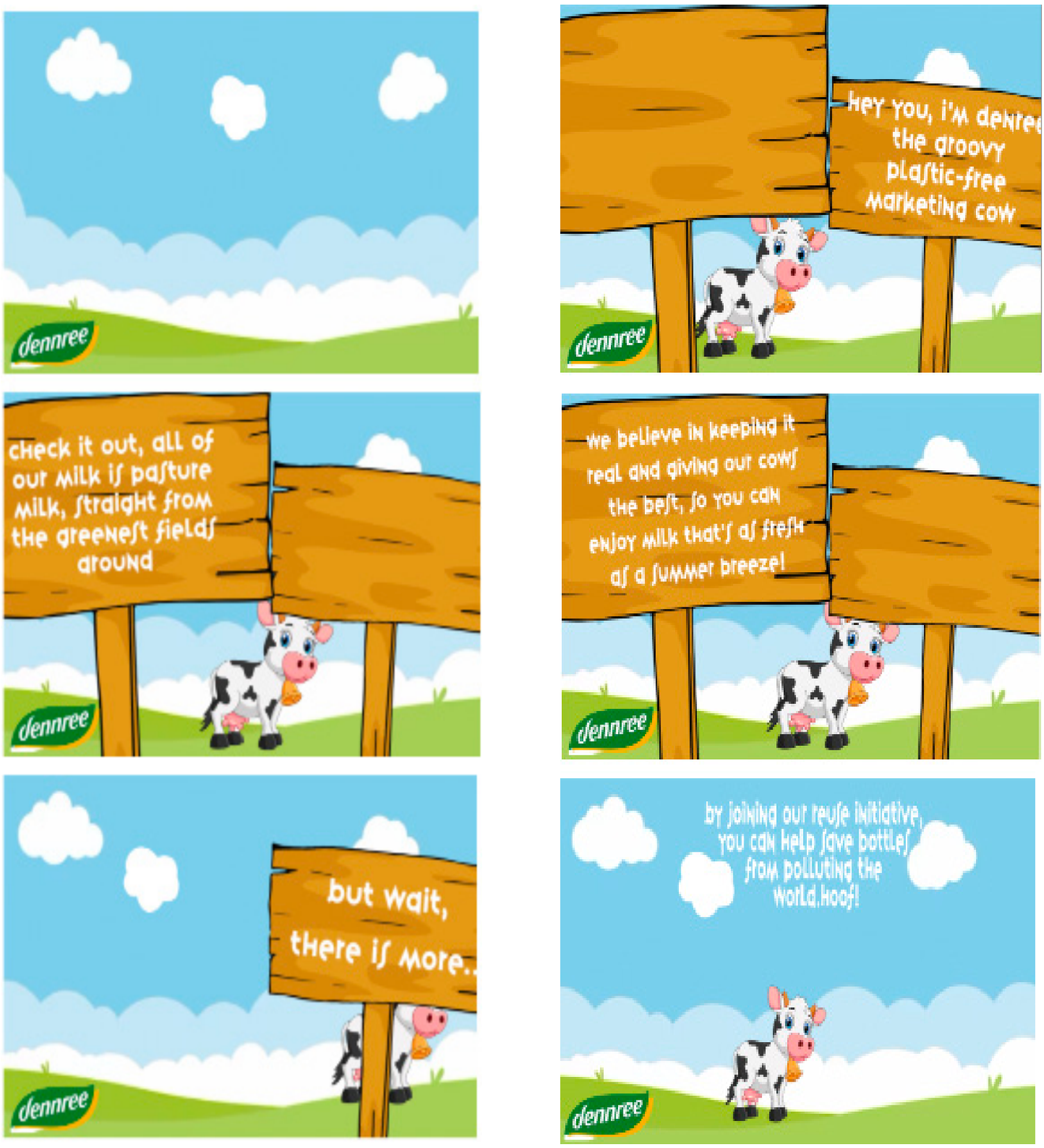


Figure 22: standardised+ marketing milk

Below is a brief explanation of why the various elements are included in the video:

- Logo: brand imago and association
- Packaging colour: there is still some color in the labels of the standardised packaging, but to compensate the colors that are normally used in the packaging are added as background colors in the video for the standardised+ packaging
- Somehow differentiation: Brands can still differentiate in the shape of the label. But they can also differentiate through extra marketing. In this example, it is a small video, but other companies can do extra marketing in different ways such as infographics, a game, linking to a website, etc.
- Icon to quickly convey the message/ some design to convey the quality and and worth: In the standardised+ design, elements such as grass and a cow are used to convey the message of fresh milk.
- Storytelling: Normally, packaging also tries to tell its story. Even though this is often not very elaborate, the standardized+ model attempts to convey a story. In this case, the focus is

on the company's commitment to pure products and the proper care of their cows.
- Sustainability claim: Current packaging often states that it is sustainable/ organic. That can still be included on the labels, but in this design, the sustainability aspect is broadened by mentioning that the bottles are reusable, thereby making a positive contribution to the environment.

Laundry detergent

HDPE in white colour will be used for the standardised detergent packaging. HDPE is one of the most sustainable plastics that can be produced. HDPE has a long lifespan and is completely recyclable. White bottles were chosen since recycling is better when no colours are added.

Brands can apply labels with their own logo, colour scheme, shape and content to the bottles. Because the brands are able to apply their own labels (within the agreed dimensions), there is still a form of differentiation among the various brands. By making agreements on the adhesive used, the process of label removal can be standardised for all brands, facilitating pooling. Thus, within the boundaries of the standardised packaging, there is still some degree of marketing freedom. The standardised detergent bottles for this research have the following design:

Figure 23 : Design standardised laundry detergent and other cleaning products

Again, in the process of standardisation, there is a part that brands must give in, in terms of marketing freedom, despite what can still be retained in the standardised design. For cleaning products, the following elements are eliminated compared to the current packaging

- The colour of the brand packag ing
- Differentiation through design, as there is no differentiation in shape
- Slogan and icon representing the content to quickly convey the message
- Design elements that convey the quality, value, and elegance of the product
- Storytelling aspect
- Sustainability claim

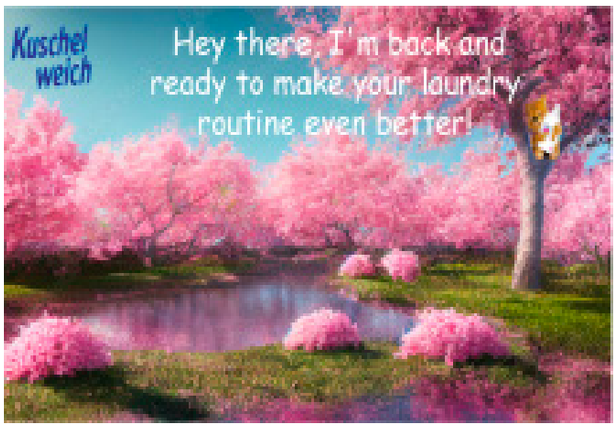
The standardised + packaging

For this design, the same marketing trends are used: content marketing, video marketing, personalisation, and the effects of sustainability for the standardisation + marketing, since the same elements as in the packaging of milk where cancelled out because of the standardisation. The packaging still aims to not only protect but also inform and motivate the consumer to make a purchase.

typically appear on the packaging, along with additional informative and inspiring content. For this research's laundry detergent the focus is on the quality and fragrance of the content (content marketing). The story is told by the brand's own iconic bear. Also the consumer is informed on the fact that this brand sells their product in reusable bottles and that they thus contribute to reducing the plastic packaging waste. (personalised + sustainability and social responsibility).

Figure 24 : Design standardised+ laundry detergent and other cleaning products

By scanning the QR code on the packaging, consumers can watch a video showing the elements that would



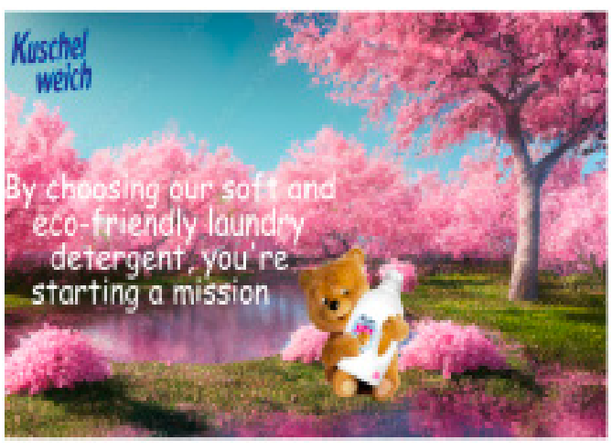


Figure 25: Standardised+ marketing laundry detergent

Below is a brief explanation of why the various elements are included in the video:

- The colour of the brand packaging: There are still some brand colours in the labeling, but to compensate for the reduced differentiation in colour, the standardized+ design added the colour as the background in the video.
- Differentiation through design: The labels all have their own shape and colour to differentiate, and in the case of laundry detergents, additional differentiation can be achieved through online marketing.

- Slogan/icon to convey the message and quality: In the clips of the standardised+ design, the fragrance and quality of the contents in the bottle are emphasized. This is conveyed through images of blossoms and sentences discussing the quality.
- Storytelling and sustainability claim: In this design, storytelling is used to convey both the quality of the product and how the company and packaging are sustainable. Through storytelling, the aspects of quality and sustainability are made more vivid.

In the design for standardised+ packaging, I incorporated the use of QR code marketing and short videos to engage and reach consumers. These modern marketing techniques offer various advantages and opportunities for effective communication. In the following sections, the benefits and challenges of QR code marketing and short videos are discussed.

QR marketing advantages and challenges

Advantages

1. Customised experiences: With the help of QR codes, brands can design focused and individualised interactions. For instance, keeping track of past purchases. As a result, it enhances user experience overall, increases engagement, and makes marketing more relevant.

2. Direct interaction: QR codes offer an immediate and direct link between the physical world of packaging and the digital world. With 1 scan, the consumer can see all kinds of extra information. This immediate engagement helps capture consumer attention and encourage with the brand.

3. Cost-effective and adaptable: QR codes are simple to produce and print on a variety of packaging, posters, and in-store displays. This makes it easier for marketers to connect with the consumer on different touchpoints and provides consistent brand experience across channels.

4. Instead of intrusive advertisements that are imposed unwantedly, QR code marketing offers a targeted approach. QR code marketing enables brands to provide advertising and information in a way that gives customers control over receiving messages. It avoids unwanted advertisements and provides a focused and personalized experience, increasing the likelihood that customers will appreciate the message and respond positively. [Van Bolderen, 2022]

Challenges:

1. Limited adoption: Although QR codes are becoming more well-known, they have not yet achieved full adoption among the general public. Not everyone is familiar with using QR codes or has the appropriate app installed to scan them.

2. Poor placement and visibility: If a QR code is not properly positioned or not clearly visible, it can be difficult for consumers to scan it.

3. Although QR code marketing provides the ability to deliver targeted information to individual customers, it is important to acknowledge that not all information needs can be fully met. People are unique and have different interests, preferences, and needs. As a result, it can be challenging to use QR code marketing to provide each individual customer with the exact information they want to see.[Digital Strategy, 2023]

Short video advantages and challenges

Advantages:

1. Attention Span: People have shorter attention spans in the hectic world of today. Short videos address this by providing viewers with short and compelling information that grabs their attention immediately. They are perfect for grabbing attention and quickly and effectively delivering important marketing messages.

2. Bite-sized Consumption: Short videos are ideal for viewers who are on the go because they are simple to watch in short periods of time. They can be viewed while on the road, waiting in line, or between tasks. By packaging marketing messages into short videos, brands can ensure that their content fits into the busy lifestyles of the target group.

3. Shareability and Virality: Short videos have a higher likelihood of being shared across social media networks due to their engaging and concise nature. If a short video is compelling, entertaining, or informative, viewers are more likely to share it with their friends, followers, or networks. This sharing behaviour can lead to increased brand exposure, organic reach, and potential viral growth.

4. Mobile-Friendly Format: With the widespread use of smartphones, short videos are optimised for mobile viewing. They are designed to be easily viewed and shared on mobile devices, aligning with the mobile-centric habits of modern consumers. Brands can leverage this format to effectively target mobile users and deliver their marketing messages where their audience spends a significant amount of their digital time.

5. Brand Personality and Storytelling: Short videos provide an opportunity for brands to showcase their personality, values, and unique brand story. Brands can develop an emotional connection with viewers and increase brand loyalty by using storytelling strategies.

6. Metrics and Analytics: Short films frequently have built-in analytics and data on digital platforms, enabling brands to monitor performance, engagement rates, and audience demographics. Making it easier to improve their marketing strategies. [Duda, 2021]

Challenges:

1. Limited message delivery: Due to the limited duration of short videos, it can be challenging to effectively convey a complex message. It can be difficult to provide sufficient context and information within a short video, which may result in the loss of important details.

2. Limited storytelling opportunities: Due to the short duration, it is difficult to tell a complete story in a short video. It can be challenging to create a narrative structure and develop a profound storyline that keeps the audience engaged and leaves a lasting impression.

3. Short videos are popular and widely used in marketing, making it challenging to stand out and be distinctive. [Orlando video, 2022].

Research outlines

Discover

Setting the research's scope is the first section of the research. In this part you can learn about the general research on the several subjects that contribute to the project. Topics include the development of packaging, its functions and components, consumer behaviour, marketing initiatives and reuse and standardisation and its advantages and disadvantages. The subjects covered in this chapter show why reuse and standardisation are positive developments for packaging, and which challenges it faces.

Define

The purpose of part 2 is to collect information from the consumers point of view via interviews. The knowledge gained from these interviews and the research study is merged in this section to form principles and recommendations that are built upon in the other sections. These results serve as the foundation for choosing and supporting the categories for the remainder of the study, and form the take-aways for the design principles.

Develop

In this section, the focus lies on the development of reuse scenarios and the creation of standardised packaging designs. Through an extensive review of literature and analysis of consumer insights, the design specifications will be established. This section outlines all the decisions made and the final outcomes achieved in terms of the packaging designs.

Validation

The new design concepts will be put to the test and evaluated in this part in a mixed subject experiment.The analysis focuses on assessing the impact of purchase intent, brand image, perceived quality, aesthetic attractiveness, and perceived environmental friendliness. All these variables and hypotheses are thoroughly described and defined within this section.

Deliver

In the concluding section, an overview of the project is provided. Conclusions are derived and the research question is answered. Recommendations for achieving sustainability in the packaging of fast-moving consumer goods are presented. Subsequently, discussions, limitations, and further recommendations relating to this research are discussed.

Validation

This chapter aims to conduct tests on the new packaging design with regards to its impact on purchase intention, brand equity, perceived quality, aesthetic attractiveness, and perceived environmental friendliness. It provides an explanation for the selection of these specific dependent variabeles and details how they will be tested. Additionally, the chapter outlines and substantiates the hypotheses proposed.

Research goal

The aim of this research is to assess the consumer's reaction to the standardisation of supermarket packaging, driven by sustainability concerns and the recognition of the need for change. The goal is to draw conclusions about the effect of standardisation on purchase intention, brand image, perceived quality, aesthetic attractiveness and perceived environmental friendliness, and for this purpose, two different product categories that are commonly purchased by households in the Netherlands are being studied (Milk & Laundry detergent).

To compare and analyse the effects, three conditions of packaging are being compared: unstandardised, standardised, and standardised+.

Stimuli

Product type and packaging design are manipulated in a 2x3 mixed subjects design. Product category has two levels: milk and laundry detergent. The packaging design has three levels: unstandardised, standardised and standardised+.

	Milk [α]	Laundry detergent [β]
Unstandardised [I]	αI	βI
Standardised [II]	αII	βII
Standardised+ [III]	αIII	βIII

For the analysis, aI, aII, and aIII will be compared with each other, as well as bI, bII, and bIII. The distinction is made between the three different packaging designs based on the aim of analysing potential significant differences between unstandardized packaging and standardised packaging, as well as between standardised packaging and standardised+ packaging. This analysis will be conducted for two different product categories to draw broader conclusions and to examine if there is any difference between the various product categories.

Milk

Unstandardised packaging

Standardised packaging

Difference with unstandardised: All packages have the same material, size and shape.

Standardised+ packaging

Difference with standardised: All packages have a QR-code with brand own marketing.

Laundry detergent
Unstandardised packaging

Standardised packaging

Difference with unstandardised: All packages have the same material, size and shape.

Standardised+ packaging

Difference with standardised: All packages have a QR-code with brand own marketing.

Variables explanation

The dependent variables for this research are based on literature research. I have chosen 5 endpoints to test the significance of the new packaging proposal. In this paragraph the reasons behind these endpoints are further explained.

Purchase intention
There are several definitions to describe purchase intention. [Zeithaml,1998] States that purchase intention is the desire of customers to make the actual purchase in product or services based on internal and external factors. Purchase intention is called by [Kotler & Keller, 2006] as a way that customers behave before they make a purchase. For this research I combined the several definitions and stated purchase intention as: The attitude towards a purchase and the willingness to buy a specific product.

The measuring of the purchase intention is a key driver for the marketing strategy [Schmidt & Bijmolt, 2019]. For all companies in the fast moving consumer goods sector it is important to have a high purchase intention since it is a useful measurement to predict the future revenue from the product. Measuring the purchase intention will give insights in the effectiveness and effects of a potential change of packaging. When the purchase intention will drastically reduce it is quite a risky step to take for brands.

To assess the purchase intention the participants are asked to rate 3 questions on a 7-point likert scale ranging from strongly disagree to strongly agree

Would you buy this product?
If you were planning to buy milk/ detergent, would you choose this product?
If a friend was looking for a milk/ detergent, would you advise him

Brand image

[Keller, 1998] Stated brand image as a perception about a brand as reflected by the brand associations held in consumers memory. In addition, brand image is defined by [Aaker, 1992] as a set of associations, usually organised in some meaningful way. I stated the definition of brand image as; the emotion and association that arises in the consumer's head when he or she is in contact with the product and brand.

Since the brand image influences the brand equity and therefore positively influences the competitive position [Juntunen et al, 2011],[Chang & Lui, 2009], [Mishra and Datta, 2011] it is important for the validation of this research to know if the brand image stays equal or at least does not get worse when changing the packaging design, therefore the brand image will be an endpoint for this research.

To analyse the brand image the participants are asked to answer 3 questions on a 7-point likert scale ranging from strongly disagree to strongly agree. The 3 questions are:

This packaging makes me feel satisfied with this brand.
This packaging makes me feel connected to this brand.
This packaging makes me stay with this brand.

Perceived Quality

Some define the perceived quality as the quality of a product or service according to the customer's perception. Perceived quality according to [Aaker, 2007]is a customer perception of product and service quality related to the intended purpose, [Zeithaml, 1998] defined perceived quality as the judgement about the excellence or superiority of a product.

For this research I defined perceived quality as; the value consumers give to a product based on the sensory experience they have with the product.

There is evidence that packaging has a significant and direct influence on perceived quality [Mensah, Kwasi Oppong and Addae, 2022]. Also it has been proven that there is a significant relationship between perceived quality and satisfaction [Parasuraman et al., 1994]. Furthermore it is proven that customer satisfaction has influence on the repurchase intention of products [Ranjbarian, Sanayei and Kaboli, 2012], which is naturally a pursuit for brands. Based on these proven facts is perceived quality a 3nd endpoint for this research.

To test the perceived quality two 7-point likert scales will be used. The participants are asked to rate the packaging designs on the questions:

This packaging is poor- excellent
This packaging has a very poor quality - good quality

Aesthetic attractiveness

Aesthetic attractiveness measures the degree to which a person views something as being visually attractive [Bell, Holbroek and Solomon, 1991]. Oxford dictionary defines aesthetic as; the understanding of beautiful things and attractiveness as the quality of being pleasant to look at or experience. For this research I defined aesthetic attractiveness as the visual attractiveness towards a product based on how pleasant something looks.

The attractiveness of a packaging design has a strong influence on a purchase choice. For this research it is interesting to see how the attractiveness judgement is for the standardised packaging since this has an influence on the consumer behaviour.

To test the aesthetic attractiveness the participants are asked to score the packaging designs on 4 four 7-point likert scales with the anchors:

The packaging of this product is very
Unattractive - attractive
Ugly - beautiful
Displeasing - pleasing
Poor looking - nice looking

Perceived environmentally friendliness
The perceived sustainable friendliness is an individual's judgement or evaluation on the sustainability of a product or phenomenon. [Chang, 2011].

Since a goal of the standardised packaging is to become more sustainable, it is interesting to see if the perceived sustainable friendliness increases when a standardised packaging is used. Therefore the perceived environmentally friendliness is chosen as an endpoint for this research.

To assess the perceived environment friendliness the following questions are asked:
This packaging is friendly for the environment.
This is a good example of an envi ronmental friendly packaging.

The participants are asked to evaluate these questions on a 7-point likert scale ranging from strongly disagree to strongly agree.

Manipulation checks

To ensure the effectiveness of the manipulations in the research, manipulation checks were conducted. The aim is to verify if participants interpret and understand the packaging correctly. Therefore, each participant was asked to assess the extent to which they perceive the packaging as a 'reusable package' for the non-standardized categories and as a 'standardised package' for the standardised options.

By employing these manipulation checks, the validity of the manipulations can be validated, ensuring that participants perceive the packaging in the intended manner. This enables reliable conclusions to be drawn about the effects of the packaging on participants' perception and preferences.

Hypotheses

Standardisation and purchase intention
The appearance of a product has a direct impact on consumers' purchase intentions [Ko et al., 2013]. According to studies, using green packaging can help to lessen the negative effects that packaging has on the environment. Today's consumers want to make sustainable choices that will help the environment [BND,2023]. The sustainability benefit of standardisation is made evident by pointing out that it allows for reuse, sharing, and the usage for more products. Standardising packaging as a result assures customers that they are helping the environment by buying products which are standardised and a better perceived value is produced by the standardised packaging. Perceived value positively corresponds with consumer purchase intention, according to research [Gan & Wang, 2017], therefore the first hypothesis for both milk and laundry detergent is;

H1: Standardised packaging has a positive effect on the purchase intention of milk and laundry detergent compared to unstandardised packaging.

Providing information about product reparability, sustainability and durability effectively influences consumers to choose more durable items. Although this research was aimed at longer durability products, [European Commission, 2018] I do expect that the more information about sustainability is given to the consumer, the more effect this has on a better purchase behaviour. For both milk and laundry detergent the extra marketing is focussed on the sustainable aspect of this packaging resulting in:

H2: Standardised+ packaging has a positive effect on the purchase intention of milk and laundry detergent compared to unstandardised packaging

S*tandardisation and brand image*
The environment is often discredited nowadays, and as consumers become more aware of the social and environmental impact of their consumption, they are demanding more ethical product alternatives. [Shaw, Deirdre and Shiu and Edward, 2000] Research suggests that the total sensory experience of a brand (including the packaging) creates an image in the minds of consumers that can inspire loyalty, build trust and enhance recognition [McClure et al., 2004]. Therefore, if a product's packaging is to successfully persuade customers to buy the product, it is also crucial to consider how well the consumer's self-image aligns with that of the brand, particularly if they are socially and environmentally conscious. It is proven that sustainable packaging has an effect on the brand image. [Purnama, 2019]. Therefore, if companies make adjustments to their packaging in order to promote sustainability, consumers will perceive the company in a more positive light, and the packaging itself will play a role in improving a positive brand image. For both milk and laundry detergent is the packaging adjusted for sustainability reasons and thus:

H3: Standardised packaging has a positive effect on the brand image compared to unstandardised packaging

Research conducted [Alamsyah et al., 2018] shows that green advertising can directly enhance a positive brand image. Making use of the QR-codes on the packaging is a way of green marketing. [Ellitan, 2021] has proven that green advertising will positively affect the brand image, since the standardised + packaging for both product categories makes use of green advertising and promotes the sustainable aspect of the product it is expected that:

H4: Standardised+ packaging has a positive effect on the brand image

compared to standardised packaging

Standardisation and perceived quality
According to research by Zeithaml (1998), when customers are unable to judge a product's value based on its intrinsic value, they instead use extrinsic values. At the time of purchase, the packaging is therefore crucial in the value assessment. When evaluating the products, materials and shapes are important. When standardising the products, consumers will have a harder time differentiating between different brands when evaluating the quality of the products because there are no distinctions established in the products' forms and materials.

As said, the material of the packaging has a significant impact on how quality is perceived. However, despite both the unstandardised and standardised bottles being made of glass, I anticipate that the perceived quality will be higher in the standardised models due to the harmony and uniformity the bottles show. The use of consistent shape and style in the standardised models creates a visual cohesiveness that is visually appealing and contributes to a higher perceived quality.

Since glass is often associated with higher quality products [chapter history], I expect the perceived quality of milk to increase in the standardised packaging. The standardised models, with their uniform appearance, contribute to a sense of harmony and coherence. This can enhance the visual appeal as our eyes tend to appreciate symmetry and balance [Hübner & Thömmes, 2019]. The visually pleasing and aesthetically aligned design of the standardised models is expected to have a significant impact on how consumers perceive the quality of the packaging.

On the other hand, for detergent, the standardised packaging still utilizes plastic material, offering no material-based advantage and no differentiation between different brands.

As a result, I expect that the perceived quality of laundry detergent will not increase with standardised packaging. But I do expect that the perceived quality of milk will increase based on the material of the packaging.

H5: Standardised packaging of milk has a positive effect on the perceived quality compared to unstandardised packaging

However, the standardised+ marketing can react to this lack of distinctions in the packages of laundry detergent and differentiate themselves through both the commercials via the QR-codes and direct consumer communication regarding the quality of the content of the products. So, I anticipate that for laundry detergent standardised+ marketing will increase the perceived quality, and thus:

H6: Standardised+ packaging of laundry detergent has a positive effect on perceived quality compared to standardised packaging

Standardisation and aesthetic attractiveness
Size, shape, and colour all have an impact on how appealing something is to the eye [Raghubir & Greenleaf, 2006]. Given that standardisation significantly reduces variability in colours, shapes, and sizes, I expect that for detergents the standardised packaging will lose some of their aesthetic appeal. I do not anticipate this difference to be significant because not wholly new designs or colours are used, only less variation.

For the milk packaging, on the other hand, I expect the aesthetic appeal to increase due to the switch to glass bottles that have a minimalist and fresh look. It will also make elderly responders nostalgic, which I anticipate would enhance aesthetic attractiveness.

H7: Standardised packaging of milk has a positive effect on the aesthetic attractiveness compared to unstandardised packaging

Because I expect that people will initially judge the aesthetic attractiveness on physical elements such as size, shape and colour of the packaging and not immediately on the online marketing elements I do not expect that the marketing clips make any significant difference in the judgement of the aesthetic appeal. I thus expect the hypotheses for standardised+ packaging to stay the same as for standardised packaging.

Standardisation and perceived environmental friendliness

By prominently highlighting the importance of reuse in the packaging design and appealing to people's innate desire to make a positive environmental impact [BND,2023], it is anticipated that the perceived environmental friendliness of the packaging will be greatly enhanced. This emphasis on reuse aligns with consumers' aspirations to contribute to sustainability and is likely to positively influence their perception of the packaging's eco-friendliness.
By highlighting the sustainable practice of reuse and appealing to consumers' desire to make environmentally conscious choices, it is hypothesized that the perceived environmental friendliness of the packaging for both product categories will be positively influenced, leading to a greater positive perception of the overall sustainability of the product.

H8: standardised packaging has a positive effect on the perceived environmental friendliness compared to unstandardised packaging

For standardised + I expect the perceived environmental friendliness to increase way for both product categories, especially since the advertisement emphasises how much better this packaging is and how much is saved by reusing the same packaging. However the gap in perceived environmental friendliness between the two models may not be significant.The message conveyed in the advertisement regarding the environmental benefits of the standardised + packaging can influence consumers' perceptions and attitudes towards sustainability. By emphasizing how much is saved through reuse and the reduction of waste, consumers may associate the standardised + model with responsible consumption and a reduced carbon footprint.

It is important to note that the difference in perceived environmental friendliness between the standardised and standardised + models may not be significant. While the standardised + model may have a slight advantage due to its explicit messaging about sustainability, the standardised model already incorporates environmental considerations by using reusable packaging.

Research outlines

Discover

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The purpose of part 2 is to collect information from the consumers point of view via interviews. The knowledge gained from these interviews and the research study is merged in this section to form principles and recommendations that are built upon in the other sections. These results serve as the foundation for choosing and supporting the categories for the remainder of the study, and form the take-aways for the design principles.

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Deliver

In this chapter, the results are presented, discussed, and used to answer the research question. Additionally, conclusions, discussions, and recommendations based on the results are provided.

Method

164 adults from the Netherlands completed the study (M age = 45.9, 43.6% male and 56.4% female). In the beginning, all participants were presented with a set of open-ended questions regarding the standardisation of packaging.Then, they were randomly assigned to one of the 3 conditions in a 3-cell (unstandardised, standardised, standardised+) between subjects design. Participants saw a scenario and packaging design for milk and laundry detergent, packaged either in general packaging, standardised design or standardised+ packaging. They were asked to rate the purchase intention, brand image, perceived quality, aesthetic attractiveness and perceived environmentally friendliness on a 2 item 7-point scale (e.g “This packaging is friendly for the environment”, 1= strongly disagree ; 7= strongly agree ; table). After rating the 5 endpoints, participants completed the manipulation checks. Finally, they reported their age, gender and preferred way of grocery shopping. See appendix [5] for the survey setup.

Results

Descriptive statistics

This paragraph summarises the results from the descriptive statistics of the used variables. Each variable was tested separately for descriptive statistics, shown in Table 1. Descriptive statistics and one-way ANOVA are used for the variables to ensure that the mean and standard deviation can be tested for the different conditions. To start with interpreting the results only the complete cases per category are selected. The incomplete cases are the missing cases. This ensures that no incomplete cases participate in the study. 164 respondents participated in the study, however 49 participants did not complete the questions for milk and 54 participants did not complete the questions for laundry detergent. The high percentages of missing values may be caused because people found the questionnaire too long and therefore decided to stop. The respondents who did not finish the questionnaire were removed from the data set; 115 respondents are included for the study of milk packaging and 110 respondents are included for the study of laundry detergent packaging.

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
MPURCHASE	Unstandardised	43	5,1860	1,40728	,21461	4,7529	5,6191	2,00	7,00
	Standardised	41	5,5854	1,08980	,17020	5,2414	5,9293	3,00	7,00
	Standardised+	37	5,6937	1,09256	,17962	5,3294	6,0580	3,00	7,00
	Total	121	5,4766	1,22310	,11119	5,2564	5,6967	2,00	7,00
LDPURCHASEINTENTION	Unstandardised	39	5,0598	1,30870	,20956	4,6356	5,4841	2,00	7,00
	Standardised	37	5,4865	1,33933	,22018	5,0399	5,9330	2,00	7,00
	Standardised+	35	5,5238	1,35107	,22837	5,0597	5,9879	1,67	7,00
	Total	111	5,3483	1,33741	,12694	5,0968	5,5999	1,67	7,00

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
MBRANDIMAGE	Unstandardised	43	4,2093	1,59865	,24379	3,7173	4,7013	2,00	7,00
	Standardised	41	4,4797	1,54749	,24168	3,9912	4,9681	1,67	7,00
	Standardised+	37	4,1081	1,73036	,28447	3,5312	4,6850	1,00	7,00
	Total	121	4,2700	1,61722	,14702	3,9789	4,5611	1,00	7,00
LDBRANDIMAGE	Unstandardised	39	4,6496	1,51397	,24243	4,1588	5,1403	1,67	7,00
	Standardised	38	4,4561	1,56620	,25407	3,9413	4,9709	2,00	7,00
	Standardised+	35	4,5429	1,45765	,24639	4,0421	5,0436	1,00	7,00
	Total	112	4,5506	1,50322	,14204	4,2691	4,8321	1,00	7,00

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
MPERCEIVEDQ	Unstandardised	43	4,7326	1,31994	,20129	4,3263	5,1388	2,00	7,00
	Standardised	41	5,1829	1,18193	,18459	4,8099	5,5560	3,00	7,00
	Standardised+	37	4,8919	1,30243	,21412	4,4576	5,3261	3,00	7,00
	Total	121	4,9339	1,27302	,11573	4,7047	5,1630	2,00	7,00
LDPERCEIVEDQ	Unstandardised	38	4,9079	1,33990	,21736	4,4675	5,3483	2,50	7,00

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
MAESTHETICATT	Unstandardised	42	4,3333	1,20804	,18640	3,9569	4,7098	1,00	6,75
	Standardised	40	4,7250	1,20336	,19027	4,3401	5,1099	2,00	7,00
	Standardised+	37	4,6014	1,44273	,23718	4,1203	5,0824	1,00	7,00
	Total	119	4,5483	1,28398	,11770	4,3152	4,7814	1,00	7,00
LDAESTHETICA	Unstandardised	38	4,6908	1,32598	,21510	4,2550	5,1266	1,50	7,00
	Standardised	38	4,6974	1,12279	,18214	4,3283	5,0664	2,25	7,00
	Standardised+	34	4,8456	1,18228	,20276	4,4331	5,2581	2,75	7,00
	Total	110	4,7409	1,20536	,11493	4,5131	4,9687	1,50	7,00

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
MENVIRONMENTALF	Unstandardised	41	5,7317	1,40578	,21955	5,2880	6,1754	2,50	7,00
	Standardised	40	6,1000	1,38305	,21868	6,6577	6,5423	1,50	7,00
	Standardised+	37	5,9595	1,27136	,20901	5,5356	6,3834	2,00	7,00
	Total	118	5,9280	1,35444	,12469	5,6810	6,1749	1,50	7,00
LDENVIRONMENTALF	Unstandardised	38	4,8421	1,80130	,29221	4,2500	5,4342	1,50	7,00
	Standardised	38	5,6053	1,53851	,24958	5,0996	6,1110	1,50	7,00
	Standardised+	34	5,6029	1,55105	,26600	5,0618	6,1441	2,00	7,00
	Total	110	5,3409	1,66305	,15857	5,0266	5,6552	1,50	7,00

Figure 26: Descripitve statistics

All variables have a mean above the average and none of them have a very high standard deviation. It is noteworthy to see that both milk and laundry detergent have the lowest mean for the variable “brand image” in the list.
The one-way ANOVA descriptive analysis shows the variables under different packaging conditions, as presented in Appendix [6]. In these analyses, it can be observed that regardless of the packaging condition, all variables have a mean above the average. For almost all variables related to milk, the “standardized” condition has the highest mean. Only for the variabele purchase intention, has the standardised+ design the hightest mean. As for laundry detergent, the variables “purchase intention,” “perceived quality,” and “aesthetic attractiveness,” have the highest mean for the “standardised+” condition. However, for the variable “brand image,” the “unstandardised” condition scores the highest mean. And for the variabele “perceived environmental friendliness” the standardised packaging scores highest.

Cronbach’s alpha

In this study, I asked 1 or more questions per variable to ensure the consistency of participants’ answers. To use these questions for each variable, it is important to check if they have indeed measured the same construct. By calculating Cronbach’s alpha, one can determine the degree of interrelatedness among the items in a scale. A high alpha value (typically above 0.7) indicates that the items are strongly related and provide a reliable measurement of the underlying construct. Cronbach’s alpha was calculated (see Appendix [9]), and for all variables and conditions, the Cronbach’s alpha value exceeds 0.70, indicating that the measurements are interrelated and the reliability is high.

Asssumptions

A one-way ANOVA (Analysis of Variance) test is a statistical analysis used to determine if there is a significant difference between the means of three or more independent groups, as in the case of this study [unstandardized, standardized, and standardized+].
To ensure the validity of the results obtained, the assumptions for a one-way ANOVA are checked. The “Test of Homogeneity of Variances” assesses whether the condition of equal variances across the different groups is met. The one-way ANOVA results indicate that the p-value based on the mean is higher than 0.05 ($p > 0.05$), as shown in Appendix [10] Therefore, the conclusion is that the variances of the different groups are equal.

The One-Sample Kolmogorov-Smirnov Test determines if the sample of data comes from a population with a specific distribution. The sample does not come from a specified population ($p < 0.05$). The population is normally distributed, see Appendix [6]. The homogeneity of variances test shows no statistically significant difference between the variances of two or more groups. Thus, the groups are homogeneous in the variance of the variables being measured. This shows that the variability between the groups is not significantly different, meaning that the groups are not significantly different in terms of the amount of variability in the measured variable. According to these tests, assumptions for the one-way ANOVA are checked.

Testing the hypotheses

In this paragraph, the statistical analyses are described. In this study, the variables were tested using one-way ANOVA and post hoc tests. These analyses were performed for the dependent variables: purchase intention, brand image, perceived quality, aesthetic attractiveness, and perceived environmental friendliness, with the independent variable being packaging design [unstandardised, standardised, and standardised+. The effect of the three different packaging types on the five endpoints was tested using a one-way ANOVA to examine whether there is a difference in packaging labels among the three groups. A post hoc test was conducted afterward to determine how these groups differ. The tests were performed separately for both product categories because different outcomes were expected. In the following paragraph, the results for each dependent variable will be discussed for both product categories, starting with milk and then laundry detergent. See appendix [10] for all the results.

In order to ensure the validity of our manipulation, the answers to the manipulation check were carefully examined. Only the answers that met the predetermined criteria for the correct interpretation of the manipulation were included.

Purchase intention

Milk

ANOVA

MPURCHASE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6,578	2	3,289	2,162	,120
Within Groups	170,385	112	1,521		
Total	176,962	114			

There is no significant difference in the purchase intentions among the three different packaging types (F (2, 114) = 2.162; p = 0.120). Please see Appendix [10] for more details.

The unstandardised packaging has the lowest mean (M = 5.13), while the standardised+ packaging has the highest mean (M = 5.69).

Laundry detergent

ANOVA

LDPURCHASEINTENTION

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5,343	2	2,671	1,480	,232
Within Groups	191,307	106	1,805		
Total	196,650	108			

There is no significant difference in the purchase intention for the three different packaging types (F (2, 109) = 1.480; p = 0.232). Please see Appendix [10] for more details. The means show that unstandardised packaging has the lowest mean (M = 5.04), while the standardised+ packaging has the highest mean (M = 5.53).

Hypothesis:

Since there is no significant difference for both products, we cannot accept the hypothesis.

Brand image

Milk

ANOVA

MBRANDIMAGE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,531	2	1,265	,486	,616
Within Groups	291,705	112	2,605		
Total	294,236	114			

There is no significant difference in the brand image for the three different packaging types (F (2, 114) = 0.486; p = 0.616). Please refer to Appendix [10] for more details. The means show that the standardised+ packaging has the lowest mean (M = 4.076), while the standardised packaging has the highest mean (M = 4.44).

Laundry detergent

ANOVA

LDBRANDIMAGE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,703	2	,351	,153	,859
Within Groups	246,352	107	2,302		
Total	247,055	109			

There is no significant difference in the brand image for the three different packaging types (F (2, 109) = 0.153; p = 0.859). Please refer to Appendix [10] for more details. The means show that the standardised design is the least preferred in terms of brand image, with a mean of (M = 4.46), while the unstandardised packaging scores the highest with (M = 4.64).

Hypothesis:
Again there is no significant difference meaning that we can not use numbers to draw conclusions.

Perceived quality

Milk

ANOVA

MPERCEIVEDQ

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4,135	2	2,067	1,249	,291
Within Groups	185,309	112	1,655		
Total	189,443	114			

There is no significant difference in the perceived quality for the three different packaging types (F (2, 114) = 1.249; p = 0.291). Please refer to Appendix [10] for more details. The means show that the unstandardised packaging has the lowest score in perceived quality (M = 4.76), while the standardised packaging has the highest score (M = 5.19).

Laundry detergent

ANOVA

LDPERCEIVEDQ

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,048	2	,024	,015	,985
Within Groups	172,006	107	1,608		
Total	172,055	109			

There is no significant difference in the perceived quality for the three different packaging types (F (2, 109) = 0.015; p = 0.985). Please refer to Appendix [10] for more details. The means show that the unstandardised packaging has the lowest score in perceived quality (M = 4.91), while the standardised+ packaging has the highest score (M = 4.96).

Hypothesis
Since there is no significant difference, neither H5 nor H6 can be accepted.

Aesthetic Attractiveness

Milk

ANOVA

MAESTHETICATT

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3,320	2	1,660	1,007	,369
Within Groups	184,698	112	1,649		
Total	188,018	114			

There is no significant difference in aesthetic attractiveness for the three different packaging types (F (2, 114) = 1.007; p = 0.369). Please refer to Appendix [10] for more details. The means show that the unstandardised design has the lowest mean (M = 4.32) and the standardised packaging design has the highest mean (M = 4.73).

Laundry detergent

ANOVA

LDPERCEIVEDQ

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,048	2	,024	,015	,985
Within Groups	172,006	107	1,608		
Total	172,055	109			

There is no significant difference in aesthetic attractiveness for the three different packaging types (F (2, 109) = 0.183; p = 0.833). Please refer to Appendix [10] for more details. The means show that the unstandardised packaging has the lowest mean (M = 4.69) and the standardised+ packaging has the highest mean (M = 4.85).

Hypothesis
Again H7 cannot be accepted due to the lack of significance.

Perceived environmental friendliness

Milk

ANOVA

MENVIRONMENTALF

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3,036	2	1,518	,810	,448
Within Groups	209,929	112	1,874		
Total	212,965	114			

There is no significant difference in perceived environmental friendliness for the three different packaging types (F (2, 114) 0.810; p = 0.448). Please refer to Appendix [10] for more details. The means show that the unstandardised packaging has the lowest mean (M = 5.71), and the standardised packaging has the highest mean (M = 6.10).

Laundry detergent

ANOVA

LDENVIRONMENTALF

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14,445	2	7,222	2,692	,072
Within Groups	287,021	107	2,682		
Total	301,466	109			

There is no significant difference in perceived environmental friendliness for the three different packaging types (F (2, 109) = 2.692; p = 0.072). Please refer to Appendix [10] for more details. The means show that the unstandardised packaging has the lowest mean (M = 4.84), and the standardised packaging has the highest mean (M = 5.61).

Hypothesis:

For the variable perceived environmental friendliness, there is no significant difference for both products, so H8 cannot be accepted.

However, the significance of laundry detergent (0.072) is very close to the significance threshold (0.05), which could argue for the presence of a significant difference. This difference may arise from the fact that the appearance of laundry detergent bottles does not change significantly compared to the current bottles, but in this case, they are being reused. For consumers, the difference in packaging may not be significant, but the feeling of making an impact through reuse is significant. Hence, they perceive these bottles as significantly sustainable.

Conclusion results

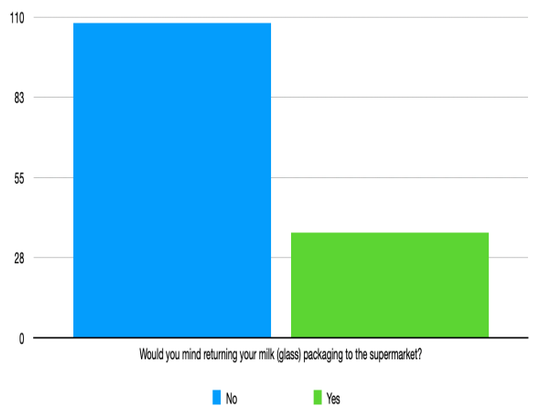
In general, the results obtained from the analysis showed positive outcomes, even though no statistical significance was found. The results indicate that consumers do not seem to be significantly influenced by the visual appearance of the packaging. This suggests that, from both an environmental perspective and consumer judgment, there is no strong reason to not transit to standardisation of packaging. So while the absence of statistical significance may initially appear underwhelming, the results provide valuable insights suggesting that packaging standardisation is a viable option. By leveraging the benefits of standardised packaging, companies can effectively balance environmental concerns and consumer preferences, ultimately driving efficiency, reducing waste, and aligning with sustainable practices.

Result open questions

All the results for the endpoints are not significant, which means I cannot accept the hypotheses based on these results. However, for this study, I also asked open-ended questions with the purpose of drawing conclusions even if the numerical data is not significant. The next paragraph will present the results of the open-ended questions.

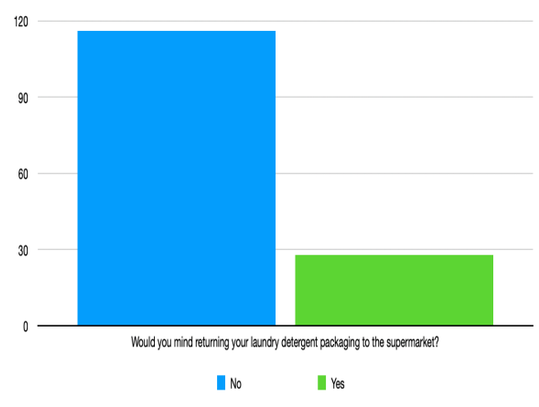
1 - Based on the explanation, what is your first thought on returnable packaging?
Almost all the responses were positive and enthusiastic. Only a few answers expressed some doubts about how it would work in practice. However, none of the answers were entirely negative or disapproving

2 - Would you mind returning your milk packaging (glass) to the supermarket?



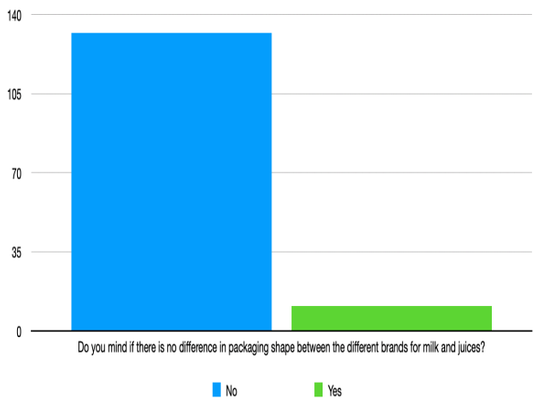
Out of the open-ended responses, only 10 participants provided a negative answer. These participants identified issues with the collection and return process as a concern.

3 - Would you mind returning your laundry detergent packaging to the supermarket?



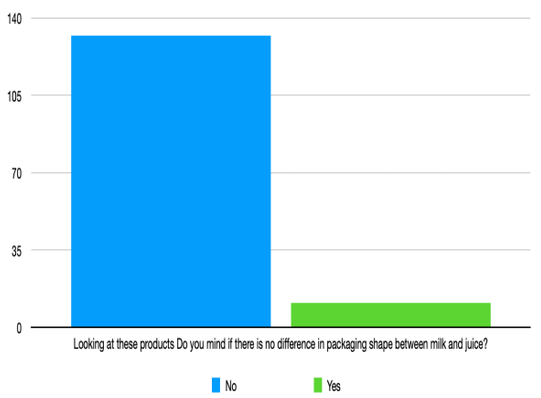
For laundry detergent, the responses were almost identical to those mentioned above. The participants who expressed a negative opinion found the process of returning the products to be a hassle.

4 - Looking at these products. Do you mind if there is no difference in packaging shape between milk and juice?



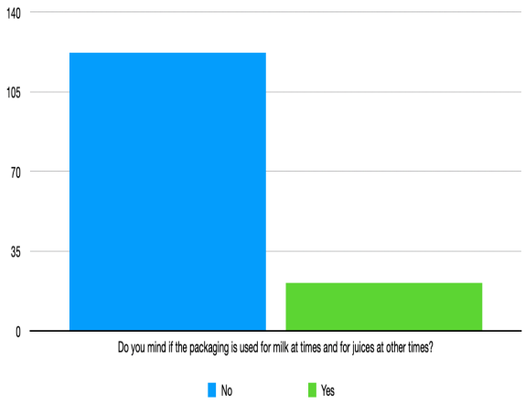
For this question, all 8 negative responses were related to concerns and hesitations about contamination.

5 - Do you mind if there is no difference in packaging shape between the different brands for milk and juices?



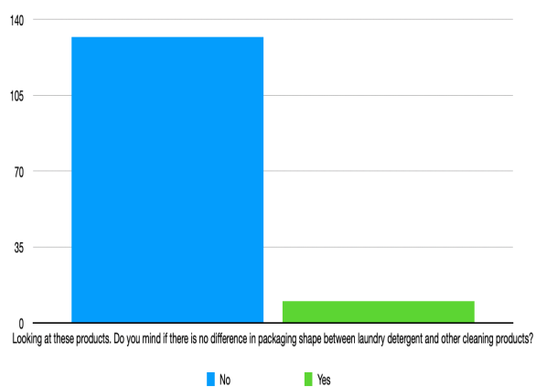
There were only a few negative responses, which were related to the fact that the difference between the products is not easily and quickly noticeable anymore.

6 - Do you mind if the packaging is used for milk at times and for juice at other times?



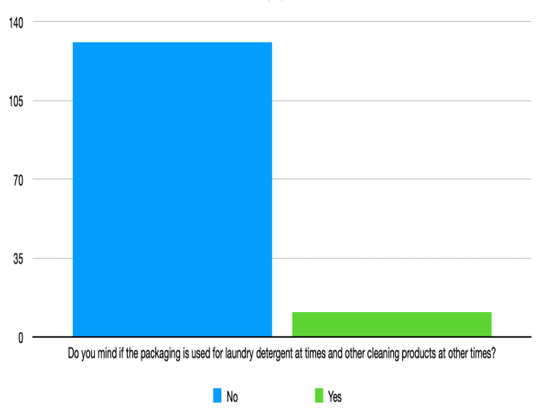
In the few negative responses, some expressed concerns about the potential impact on taste, while others had hesitations regarding hygiene and possible contamination.

7 - Looking at these products. Do you mind if there is no difference in packaging shape between laundry detergent and other cleaning products?



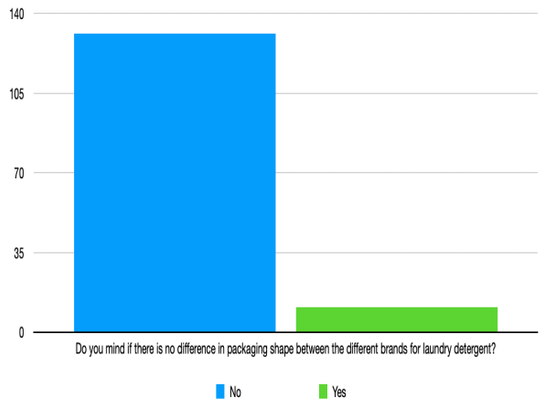
For this question, there were very few negative responses. Only a few participants expressed their hesitations, fearing that they might end up purchasing or using the wrong products due to the reduced difference in packaging.

8 - Do you mind if the packaging is used for laundry detergent at times and other cleaning products at other times?



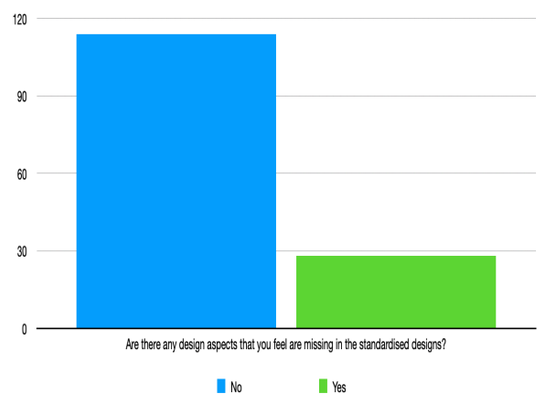
The only negative responses were all related to concerns about whether the packaging would be cleaned properly.

9 - Do you mind if there is no difference in packaging shape between the different brand for laundry detergent?



There were only 8 negative responses, but they all revolved around the fear of using the wrong product.

10 - Are there any design aspects that you feel are missing in the standardised designs?



Many suggestions were related to the colour of the cap. For example, to differentiate between laundry detergent and other cleaning products or to highlight brand colours for brand recognition. For milk, it was proposed

to use different cap colours to indicate the difference between skimmed, semi-skimmed, and whole milk more quickly. Other suggestions were for laundry detergent and other cleaning products to make a difference in size to make them easier to recognize.

Conclusion results open questions

Based on the results of the open-ended questions, it is evident that almost all participants express a positive attitude towards standardisation, the design, and the reuse models. These responses provide further support for the notion of moving towards standardszation. While a few participants express some doubts regarding the cleaning aspect and offer suggestions for design improvements, these concerns do not pose critical arguments that hinder the possibility of standardisation. Consequently, it can be concluded that standardisation of supermarket products is indeed a viable and advantageous idea. The overwhelming positive attitude expressed by the participants strenghtens the perception that standardisation is well-received and holds potential benefits.

Limitations of the stimuli

The study's findings should be interpreted in light of several limitations associated with the stimuli used. Firstly, the design difference between the standardised and standardised+ models was relatively small. The subtle variations in design elements may not have been substantial enough to elicit significant differences in participant responses.

Furthermore, the marketing video for the standardised+ model incorporated selected elements based on research insights. However, it is important to note that the information presented in the video may not have aligned with the specific information preferences of all participants. Consequently, the impact of the video on participants' perceptions and preferences might have been reduced for individuals who did not find the included information personally relevant or appealing.

Another limitation concerns the duration of the video itself. Given its relatively short length, it is possible that the video may not have had an immediate and profound impact that was intended. The compactness of the video may have limited its ability to fully convey the desired message or leave a lasting impression on participants.

Additionally, it is worth noting that the study only showcased one additional marketing option for one brand. As a result, it may not have been explicitly clear that the standardised+ model served as a unique opportunity for brands to set themselves apart.This limited perspective on marketing options may have influenced participants' perceptions and may not fully capture the breadth of possibilities available.

Recommendations for the stimuli

These limitations can be addressed in future research by implementing the following approaches. Firstly, conducting a study that includes multiple variations of standardised and standardised+ designs would allow for a more comprehensive examination of design preferences. By presenting participants with a range of options and measuring differences in their preferences, researchers can gain deeper insights into the specific design elements that resonate most with consumers.

To address the limitations regarding the marketing video, future studies can incorporate multiple videos or alternative marketing strategies. By exposing participants to a variety of marketing approaches, they can become more familiar with the concept of additional marketing options and make more informed judgments about their preferences and desirability for different product categories.

By integrating these suggestions into future research, a more comprehensive understanding of standardisation can be achieved. This would involve examining various design options, considering perspectives beyond the consumer, and exploring a wider range of marketing possibilities. Ultimately, these advancements would contribute to a more nuanced understanding of the potential benefits and challenges associated with standardisation in the context of consumer preferences and marketing effectiveness.

Conclusion and discussion

The aim of this research was to investigate the consumer response to the sustainability of supermarket product packaging. The research question was:

Could consumers still have a positive purchase intention, brand image, perceived quality, aesthetic attractiveness, and perceived environmental friendliness when standardizing the packaging of FMCGs, by designing a packaging that is reduced to its original function of protection, and where its marketing elements are moved to online communication channels?

The lack of significant differences observed in the study implies that no conclusive conclusions can be drawn based on these findings. However these figures hold deeper meaning and significance beyond their initial appearance.The lack of significant differences also indicates that consumers do not strongly oppose standardisation and the implementation of standardisation is unlikely to have a substantial negative impact on consumer behavior in terms of product purchase.

This finding represents a positive move towards standardisation, providing reassurance to brands that it will not have a significant negative impact on consumer purchasing behavior. In fact, upon examining the descriptive analysis, it becomes apparent that the standardised designs often achieve the highest mean scores, indicating a favorable response from participants.

Furthermore, the responses from the open-ended questions also demonstrate the positive attitude of participants towards standardisation and reuse. However, it is crucial to acknowledge that these answers represent participants' expectations

or what they claim they would do. It is worth noting that a gap exists between what consumers say they will do and what they actually do in practice.

While the findings indicate promising prospects for standardisation, future research should consider bridging the intention-behavior gap by incorporating observational and behavioral measures. By capturing actual consumer behavior, a more comprehensive understanding of the impact of standardisation on consumer preferences and choices can be gained. From the analysis of the open-ended questions, it is evident that the responses overwhelmingly support the adoption of returnable and standardised packaging. Based on these findings, it can be concluded that standardisation and the use of returnable packaging would be beneficial for both product categories.

For milk, design recommendations could include considering the use of coloured caps to facilitate differentiation between different types of products could be beneficial. For example, red for whole milk, blue for semi-skimmed milk, (and orange for orange juice). Hygiene should also be well ensured in the case of standardisation and pooling.

For laundry detergent, the sharing among different products is also convincingly positive. Colours of the cap could play a crucial role here as well in meeting consumer preferences. In this product category, there are slightly more participants against the use of multiple products, but even this accounts for only 8.4%.

Based on the findings of these studies, it can be concluded that standardising the product packaging has a positive impact on purchase intention, brand image, perceived quality, aesthetic attractiveness, and perceived environmental friendliness. For milk, it may not be necessary to shift the marketing elements to online channels, as the existing packaging design seems to effectively communicate the product information and attract consumers. However, for laundry detergent, it could be beneficial to explore the possibility of moving the marketing elements to online channels to enhance the overall effectiveness of the packaging.

Limitations of the research

Several limitations should be taken into consideration when interpreting the findings of this study. Firstly, the sample consisted solely of Dutch participants, which may limit the generalisability of the results to other cultural or geographical contexts. Additionally, it is worth noting that the Dutch population, on average, tends to have a high level of education and some awareness of environmental issues. Therefore, the attitudes and behaviours observed in this study may not fully represent populations with different educational backgrounds or levels of exposure to sustainability initiatives. Secondly, the research was conducted online, relying on self-reported data and participants' imaginative responses. While this approach helped to maintain consistency in stimuli presentation, it may have missed out on deeper insights that could have been gained through real-world observations or in-depth conversations. These additional methods could have provided valuable perspectives on potential obstacles and design ideas that are not captured exclusively through online interactions.

Recommendations for further research

In this study, the focus was on capturing consumer opinions and willingness towards reuse and standardisation of packaging. However, to gain a more comprehensive understanding of the transition process, it is recommended to explore additional research viewpoints.

Firstly, investigating the supply chain and business perspective would provide valuable insights. Understanding how the transition towards standardisation would unfold, the roles and responsibilities of different stakeholders involved, and the necessary organisational arrangements are essential aspects to consider. This analysis would shed light on the feasibility and practicality of implementing standardised packaging in the industry.

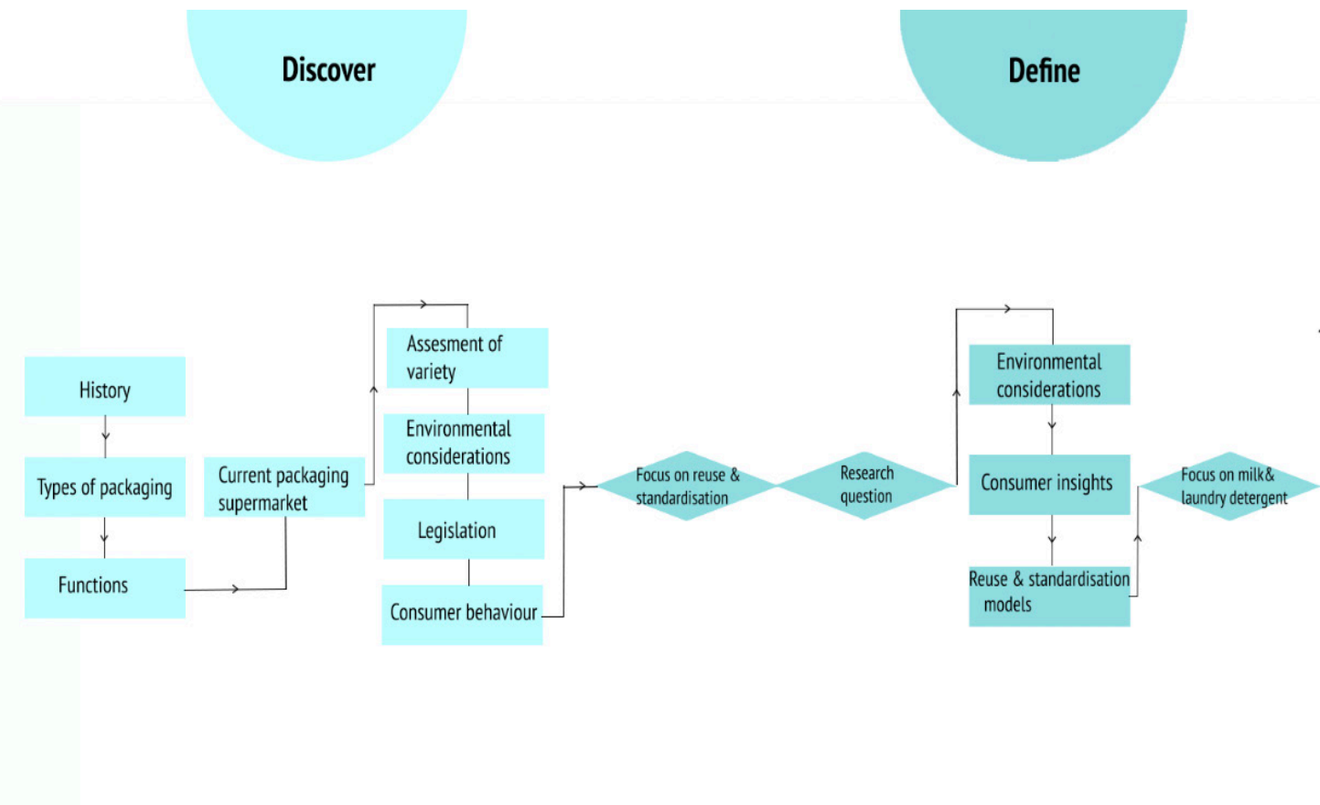
Furthermore, delving into the production time and feasibility of adopting standardised packaging materials, such as glass, is crucial. Assessing the production rates and capacities of different materials would help determine the viability of scaling up production to meet the demands of standardised packaging. Additionally, quantifying any potential constraints or bottlenecks in the production process would contribute to a more accurate assessment.

It is also recommended to conduct an environmental impact assessment to evaluate the potential benefits of standardisation. This assessment would compare the environmental impact of current packaging practices with the projected impact of standardised packaging. By quantifying resource conservation, waste reduction, and carbon footprint, we can better understand the environmental advantages of transitioning to standardised packaging.

In conclusion, future research should explore the supply chain dynamics, analyse production time and feasibility, and conduct an environmental impact assessment. By addressing these areas, a more comprehensive understanding of the transition towards standardisation can be achieved, incorporating both consumer perspectives and the practical aspects of implementation.

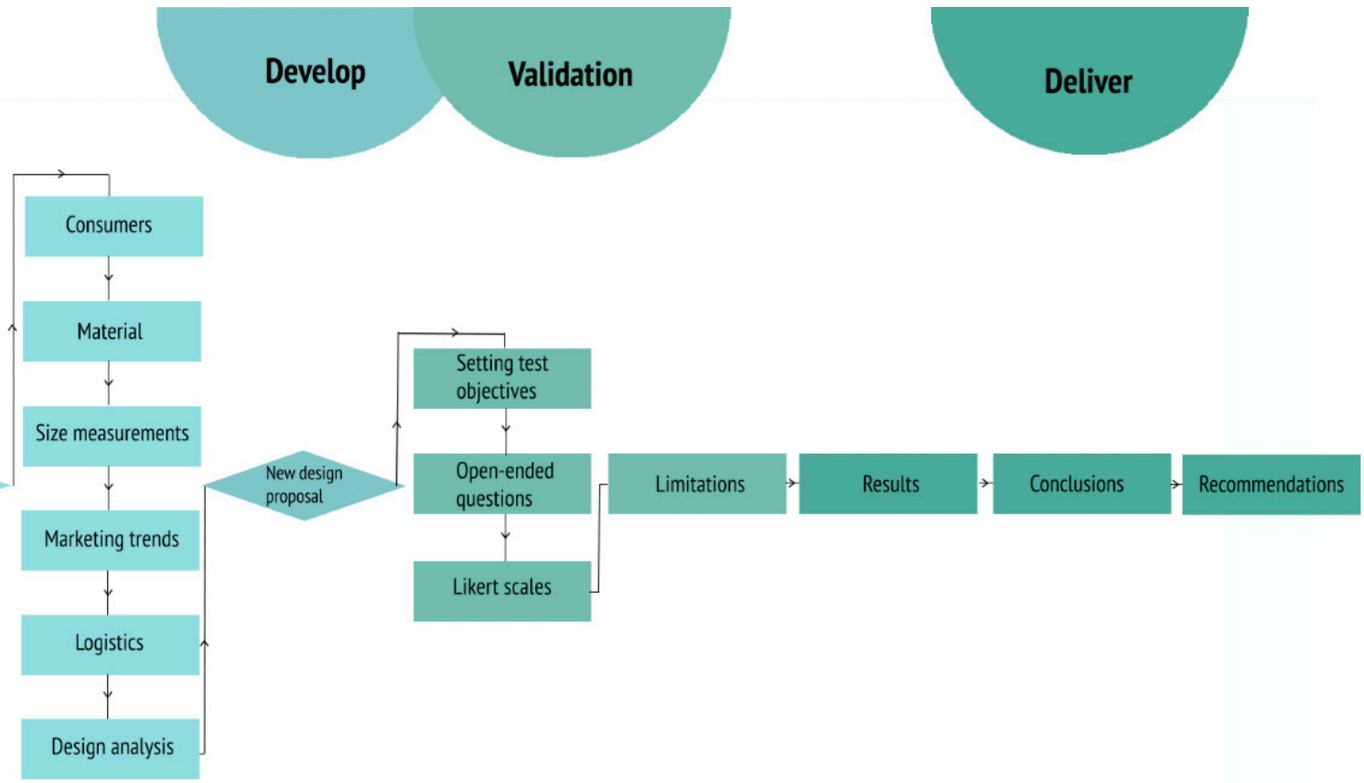
Process overview

In the following process overview, I have outlined the essential stages of the research, providing a comprehensive understanding of the research flow. The diagram includes brief explanations for each step, but for a more in-depth exploration of each stage, please refer to the respective sections within the document.



Goal	Gaining an overview of the topic	Getting an impression of the variation	Gaining an understanding of the problem associated with packaging	Converging project scope		Broadening knowledge of reuse and standardization (R&S)	Converging project scope
Method	Online literature research	Field reseach	Online literature research	Field reseach		Online literature research & Consumer interviews	Analyse research & desires consumers
Conclusion	Increased variety of packaging due to changing food culture, competition, and expanding markets	There is a wide range of packaging in terms of shape, color, and size. However, there is a recurring form within each product category.	Many packages use inexpensive materials.The numbers regarding plastic packaging waste call for change. Legislation is shifting its Focus towards reuse and recycling. Consumer behavior regarding reuse exhibits a one-way mentality	Reuse is the best option, and standardization acts as a catalyst for reuse.	"Could consumers still have a positive purchase intention, brand image, perceived quality , aesthetic attractiveness and perceived environmental friendliness when standardising the packaging...	R&S contribute to sustainability and the circular economy. Consumersare willing to embrace R&S. Systems for R&S already exist and are feasible.	Focus on scope of R&S, narrowed down to two product categories for deeper insights
Take away	Consumers adapt to what is being offered. Companies continue to evolve to attract attention.	Brands are constantly striving to differentiate themselvesfrom other brands in their packaging approach.	Reuse is a positive change for the environment. Change needs to come from higher authorities.	Reuse and standardization are the focus. Consumer and brand perspectives need to be considered in these decisions and changes.	...of FMCGs, by designing a packagingthat is reduced to its original function of protection, and where its marketing elements are moved to online communication channels?"	Consumers need assistance in making the transition to reuse.Not all products are equally receptive for R&S. .Reuse should be made simple for consumers.	Focus on Milk and Laundry detergent

Figure 27: process overview



Delve into aspects for design	Creation of new packaging design	Testing the effect of standardisation	Take a critical look at the research	Use data	Answer research question	Setting the next step of this research
Online literature research & field research	Analysis & sketching	Measurement analysis& mixed experiment		SPSS, analysis and group open-ended responses.	Analyse data and purpose of the research.	Analyse conclusions and limitations
See chapter 'develop' for all conclusions in depth		Testing on variables: purchase intention, brand image,perceived quality, aesthetic attractiveness, perceived environmental friendliness.	In the design of the different groups, here are some minor differences that may not be immediately evident, which can influence the results.		No significant difference was found, indicating that standardization is possible. The open-ended responses were overwhelmingly positive towards R&S	Analyse and investigate from a logistics/supply chain/business perspective. Analyse the designs in real life for preferences and functionality.
Standardization of packaging is feasible with current desiresand capabilities. For optimalresults, collaboration is necessary.			The results of the study can be influenced by these minor differences. To make these differences clearer in future research, it is recommended to focus more specifically on the design differences and its effects.		Standardization of supermarket products is viewed positively by consumers.	

Personal reflection

Throughout this project, one of my main learning objectives was to develop my research skills and enhance my proficiency in documenting the research process. The advantage of working on a research in this project twice allowed me to gain valuable insights and learn from my previous experiences. I noticed significant improvements in setting up a research, conducting data analysis, and presenting my findings. The guidance and expertise provided by my supervisors played a crucial role in this progress. Their feedback and support helped me refine my research approach, overcome challenges, and improve my writing style.

Another important learning goal for me was to deepen my understanding of materials and regulations in the context of sustainable packaging. This research project provided me with an opportunity to explore these aspects, enabling me to broaden my knowledge and gain insights. Through extensive literature research, interviews with industry experts, and the analysis of relevant regulations, I expanded my understanding of material properties, recycling processes, and environmental considerations. Although the focus was on two specific product categories, I realise that there is still much more to learn in this ever-evolving field. Engaging in conversations with an expert in the field during the interview phase enriched my understanding and exposed me to new perspectives that I had not considered before.

One aspect that I continually need to be mindful of is effectively sharing my progress and ideas with others. In this project, I recognised moments where I became so immersed in my own thoughts that I unintentionally failed to communicate and involve others in my progress and ideas. This serves as a valuable lesson and a reminder for me to actively engage with my surroundings and ensure communication. It is essential for me to remember that sharing insights with others helps to get everyone on the same page and can lead to richer perspectives and outcomes. In the future, I will strive to keep everyone on the same page by actively sharing my thoughts and aligning with others.

Overall, this project has been a great learning experience, enabling me to grow both professionally and personally. And I look back on this project as a big learning experience. I am deeply grateful for the guidance, support, and opportunities provided by my supervisors and the research participants. I am excited to continue my journey of learning and exploration in the pursuit of sustainable solutions and making a positive impact in the field of packaging and sustainability.

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Appendix [1] - Interview consent from

You are being invited to participate in a research study titled 'redesign the packaging of fast moving consumer goods'. This study is being done by Tine Hiemink from the TU Delft.

The purpose of this research study is to get insight into the role of packaging of fast moving consumer goods on the purchasing behaviour of consumers, and the knowledge and willingness to reuse and standardise packaging and will take you approximately 60 minutes to complete. The data will be used to establish criteria for this research and to use for a new design proposal. We will be asking you to answer the open question and to speak your thinking steps out loud when you see the images.

As with any online activity the risk of a breach is always possible. To the best of our ability your answers in this study will remain confidential. We will minimise any risks by using my own phone and laptop to record and write the interviews. The names won't be mentioned during the research, and the audio recordings are only accessible by me. I save the data on my phone and laptop which I can only enter via passwords.

Your participation in this study is entirely voluntary and you can withdraw at any time. You are free to omit any questions. If you feel unsure about your answers afterwards, they can be removed from the survey up to 2 weeks after the interview.

My corresponding Responsible Researcher is Lise Mappin, email: L.B.M.Mappin@tudelft.nl

Explicit Consent points

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
A: GENERAL AGREEMENT – RESEARCH GOALS, PARTICIPANT TASKS AND VOLUNTARY PARTICIPATION		
1. I have read and understood the study information dated [06/03/2023], or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	☐	☐
2. I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a	☐	☐
3. I understand that taking part in the study involves:	☐	☐
• [illegible]		
4. I understand that the study will end June 2023		
B: POTENTIAL RISKS OF PARTICIPATING (INCLUDING DATA PROTECTION)		
5. I understand that taking part in the study also involves collecting specific personally identifiable information (PII) and associated personally identifiable research data (PIRD) with the potential risk of my identity being revealed.	☐	☐
• [illegible], • [illegible]		
6. I understand that the following steps will be taken to minimise the threat of a data breach, and protect my identity in the event of such a breach:	☐	☐
I will take care of the data by saving it on a [illegible]		

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
7. I understand that personal information collected about me that can identify me, such as my name or where I live, will not be shared beyond the study team.	☐	☐
8. I understand that the (identifiable) personal data I provide will be destroyed after 5	☐	☐
C: RESEARCH PUBLICATION, DISSEMINATION AND APPLICATION		
9. I understand that after the research study the de-identified information I provide will be used for the graduation report.	☐	☐

Signatures

_____	_____	_____
Name of participant	Signature	Date

I, as legal representative, have witnessed the accurate reading of the consent form with the potential participant and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

_____	_____	_____
Name of witness	Signature	Date

I, as researcher, have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

Line Hietink_____	_____	_____
Researcher name	Signature	Date

Study contact details for further information: [Line Hietink, 0640022270, l.hietink@gmail.com]

Appendix [2] - Interview consumer expectations

Round 1 - general packaging

Goal: general conversations about packaging. Get a feeling for how consumers look at packaging

To start: Describe briefly what fast moving consumer goods are and tell them to imagine that they are to do their groceries. Show pictures of grocery shelves [figure 1 appendix]

Then ask general question
- You are in front of these shelves, which one strikes on you? What product would you buy, and why?
- Are you often influenced by the packaging of goods? How?
- Are there special elements in the packaging that plays an important role for your buying decision?
- Do you sometimes compare packages? Which elements do you compare?
- What comes to mind when looking at the packaging of fast moving consumer goods?

Show picture of comparable packages and ask [Figure 2 appendix]
- Which one has your preference, and why?
- Which elements do you compare?
- What makes you buy one of these products?
- Show pictures of 2 packages and ask [2 single products from figure 2]
- Which product would you buy and why?
- Which elements do attract your attention?
- What (elements) do you compare?
- Do you like the packaging?
- Does the packaging helps in choosing one of the products?
- Or what lacks this packaging why you won't buy it?
- What is your overall impression of the packages?

Round 2 - Standardisation

Goal: Get insights on how consumers think about standardisation, and how well this term is known already.

To start: Drop the word standardisation for supermarket products and ask
- What comes to mind?
- Does it spark somehow?

If needed : Describe what is meant with standardisation and show picture of standardised packaging [figure 3]
- What now comes to mind?

Definition used for standardisation= Simplifying a package in terms of the same shape and size in order to be able to use the package for multiple products.

Show pictures of standardised packaging next to the 'normal' packaging? [figure 4]

- What is your first thought when seeing both products?
- Would you buy the standardised?
- What is the reaction?
- For which of these products would you buy standardised packaging?
- Which elements should be included in the standardised packaging?
- How could other marketing compensate for standardised packaging?

Now that they know what standardised packaging is. Show pictures of other products [figure 5]

- Ask if they would like a standardised packaging for this product type?
- Why not? What should be included?

Show different materials for standardised products and ask which material is preferred. [figure 6 & 7]

Round 3 - Reuse models

Goal: Get insights on how consumers think about reuse of FMCG's

To start: Drop the word reuse for FMCG's and check the associations

- Do they reuse some products? which?
- Are there any conditions for reuse?

Show products and ask which one they would reuse [Figure 8]

- What is the barrier now to reuse?

Show different Scenario's for reuse [Figure 9]

Scenario 1:

- Would you buy the product in this scenario?
- Why yes/ no?
- What is missing?
- What condition should be included?
- For which product would this scenario work?

Scenario 2:

- Would you buy the product in this scenario?
- Why yes/ no?
- What is missing?
- What condition should be included?
- For which product?
- Let them create a proposal for reuse of a product

help them think of all steps: buy , use , cleaning , reuse

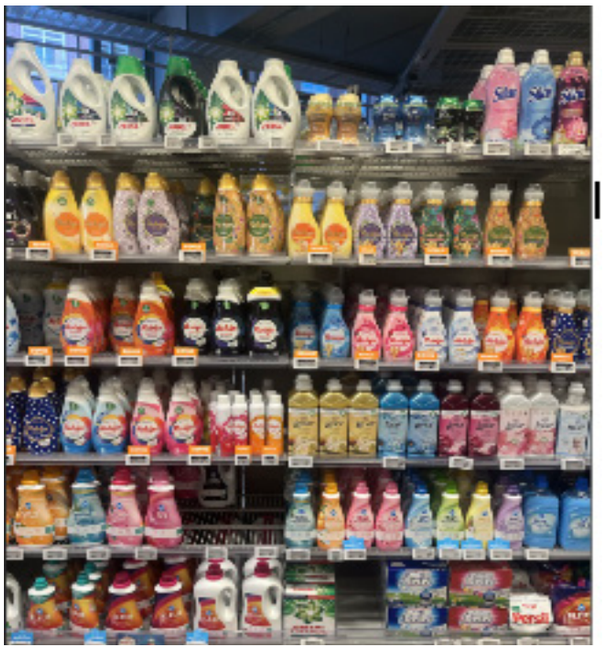


Figure 1

Figure 2

Figure 3

FIgure 4

FIgure 5

Figure 6

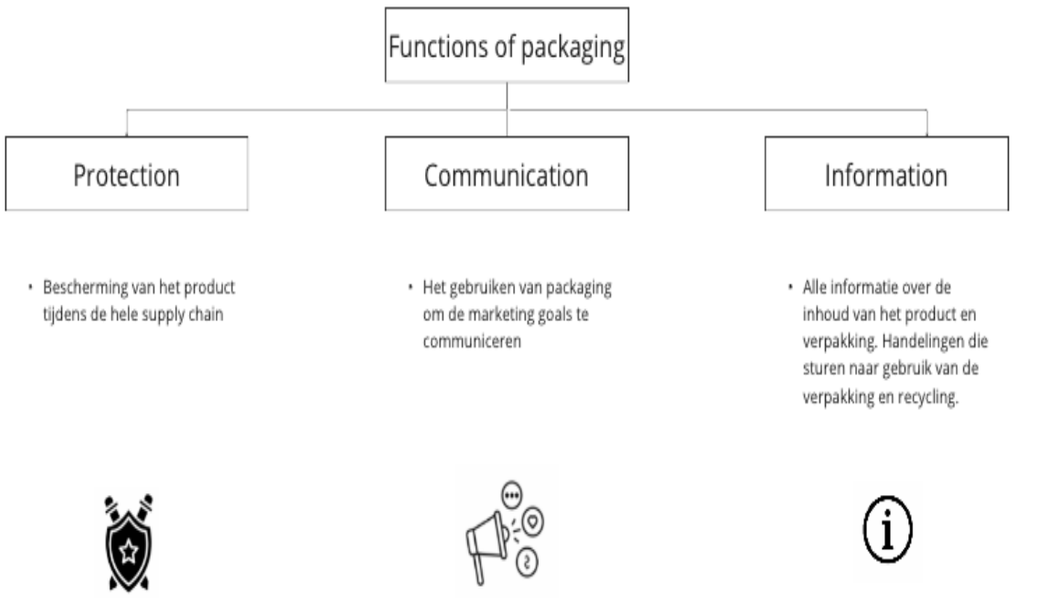
FIgure 7

FIgure 8

Property	Own	Shared
Product / assertive	Product	Assitive
Cleaning	Self cleaning procedure	company cleans
Recovery responsibility	Self	Company
Recovery	after 1x recovery	after >1 recovery

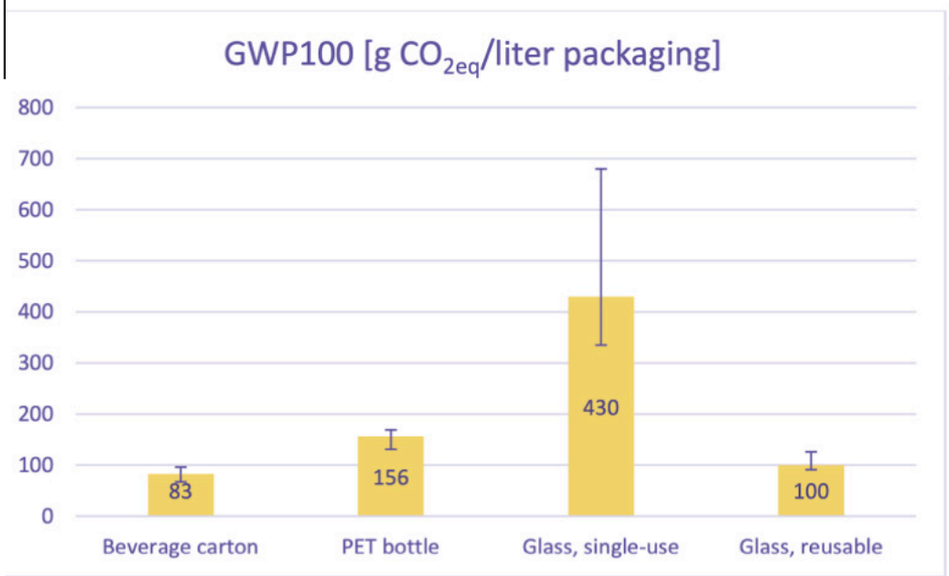
Figure 9

Appendix [3] - Analysis packaging milk and detergent



Appendix [4] - LCA Milk and Laundry detergent

Milk:



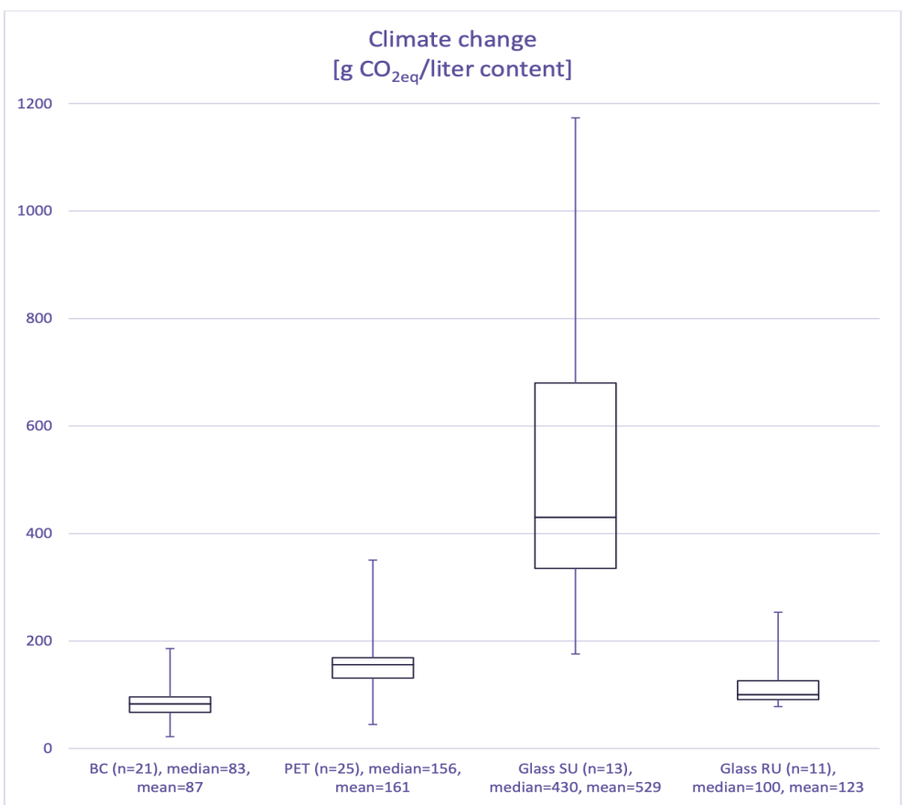


Figure 1: Box plot chart for LCA meta-analysis (BC: beverage carton, Glass SU/RU: glass single use/reusable)

Laundry detergent:

Figure 3 shows the contribution analysis of each packaging system in four phases; material production, intermediate processes, transportation, and end-of-life.

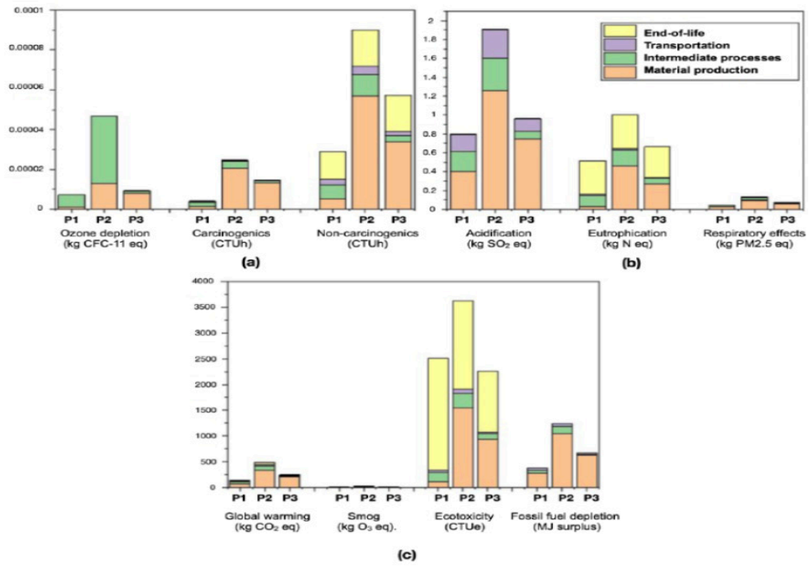


Figure 3. Results of impact categories from LCIA using TRACI 2.1. The letter at the bottom of each impact category column represents the different scenarios: (P1, Conventional pourable detergent bottle; P2, PET container with pods; P3, flexible pouch with pods). Each graph shows three to four categorical results. Graph (**a**) shows results of ozone depletion, carcinogenics, and non-carcinogenics impact categories. Graph (**b**) shows results of acidification, eutrophication, and respiratory effects impact categories. Graph (**c**) shows results of global warming, smog, ecotoxicity, and fossil fuel depletion impact categories.

Appendix [5] - survey setup

Consent form

Dear participant,

Thank you for your time and effort. You are being invited to participate in a research study titled 'Repack the packaging of fast moving consumer goods'. This study is being done by Line Hietink from the TU Delft.

The purpose of this research study is to gain insight and knowledge on the opinion of consumers on new product packaging designs for fast moving consumer goods and will take you approximately 10 minutes to complete. The data will be used to draw conclusions for the acceptance of reusable packaging systems. We will be asking you to answer question by rating 7 point likert-scales and some open questions. The questions are all accompanied by images and use scenario's.

As with any online activity the risk of a breach is always possible. To the best of our ability your answers in this study will remain confidential. The survey is completed anonymously, any personal data (sexe, age and grocery behaviour) will be safely stored with in the data storage on a TU Delft repository. The names won't be mentioned during the research, and the data is only accessible by me.

Your participation in this study is entirely voluntary and you can withdraw at any time. You are free to omit any questions. If you feel unsure about your answers afterwards, they can be removed from the survey up to 2 weeks after the survey. My corresponding Responsible Researcher is Lise Magnier, email: L.B.M.Magnier@tudelft.nl

I consent to participate in this research project.

- ○ Agree
- ○ Disagree

Open vragen

For the next questions, I'm interested in your opinion on returnable and standardised packaging of fast moving consumer goods, focussing on food and non-food products you buy in the supermarket.

Returnable packaging refers to a form of reusable packaging where the consumer returns the empty packaging, which is subsequently cleaned and refilled, enabling it to be utilized repeatedly by various customers.

Please note that all the images used in this questionnaire are personally created prototype designs and do not represent actual existing products.

Based on the explanation. What is your first thought on returnable packaging?

Would you mind returning your milk packaging (glass) to the supermarket?

- ○ [ ] Yes, because:
- ○ No

Would you mind returning your laundry detergent packaging to the supermarket?

- ○ [ ] Yes, because:
- ○ No

Do you mind if there is no difference in packaging shape between the different brands for milk and juices?

- ○ [ ] Yes, because
- ○ No

Do you mind if the packaging is used for milk at times and for juice at other times?

- ○ [ ] Yes, because
- ○ No

Looking at these products. Do you mind if there is no difference in packaging shape between laundry detergent and other cleaning products?

- ○ [ ] Yes, because
- ○ No

Standardised packaging means that the shape and size of packaging is the same for all products within one product category. When packaging is standardised the packaging can potentially be shared between brands and even serve for other product types. The goal of standardisation is to improve the efficiency of reuse systems.

Looking at these products. Do you mind if there is no difference in packaging shape between the packaging of milk and juice?

- ○ [ ] Yes, because
- ○ No

Do you mind if the packaging is used for laundry detergent at times and for other cleaning products at other times?

- ○ [ ] Yes, because
- ○ No

Do you mind if there is no difference in packaging shape between the different brands for laundry detergent and other cleaning products?

- ○ [ ] Yes, because
- ○ No

Are there any branding aspects that you feel are missing in the standardised design of these products?

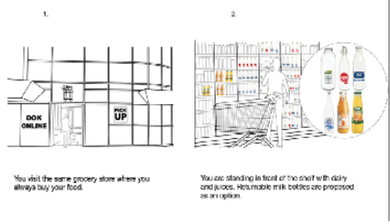
- ○ Yes, I miss [ ]
- ○ No

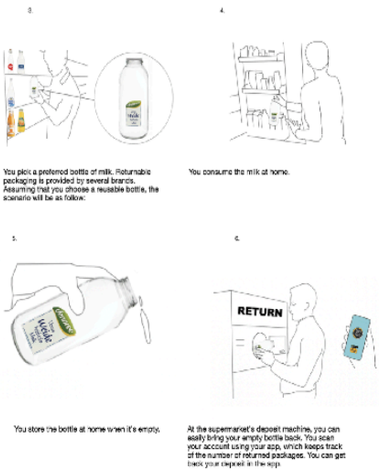
Unstandardised

For the next questions you get to see a scenario in which you have the possibility to choose a bottle milk sold in a returnable packaging. In returnable packaging systems companies repeatedly clean and refill the packaging with products. **Note that these products are NOT in standardised packaging.** You will answer the questions of this survey as if you were in this situation.

NB you will only be able to access the next page of the questionnaire after 30 seconds to ensure that you've had enough time to evaluate the scenario.

Please carefully evaluate the situation presented below. Imagine you are going to the supermarket to buy milk.





Based on the scenario showed. I would buy this product

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

Based on the scenario showed. If I was planning to buy milk, I would choose this product

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

Based on the scenario showed. If a friend was looking for milk, I would advise him or her to purchase this product

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

Looking at this packaging...

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

- This packaging makes me feel connected to this brand ○
- This packaging would make me stay with this brand ○
- This packaging would make me feel satisfied with this brand ○

7.

In the questions that follow, we will be referring to this package.

This product has very

Poor quality — Good quality

1 2 3 4 5 6 7

This product is very

Poor — Excellent

1 2 3 4 5 6 7

Displeasing — Pleasing

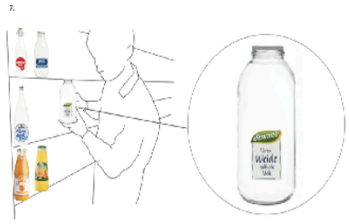
1 2 3 4 5 6 7

The packaging of this product is very

Poor looking — Nice looking

1 2 3 4 5 6 7

7.



In the questions that follow, we will be referring to this package.

This packaging is friendly for the environment

Once a week
Every two weeks
Every month
Never

You will now again see a scenario and packaging design for laundry detergent. Please look closely to the scenario and design and answer the questions. You will answer the questions of this survey as if you were in this situation.

NB you will only be able to access the next page of the questionnaire after 30 seconds to ensure that you've had enough time to evaluate the scenario.

Please carefully evaluate the situation presented below. Imagine you are going to the supermarket to buy laundry detergent.

7.

In the questions that follow, we will be referring to this package.

The packaging of this product is very

Unattractive — Attractive

1 2 3 4 5 6 7

The packaging of this product is very

Ugly — Beautiful

1 2 3 4 5 6 7

The packaging of this product is very

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

This is a good example of an environmentally friendly packaging

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

On a scale of 1-7, to what extent do you perceive this packaging as reusable?

Not reusable — Reusable

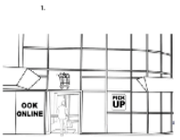
1 2 3 4 5 6 7

Yes

How often do you buy milk?

Daily
2-3 times a week

1.



You visit the same grocery store where you always buy your food.

2.

You are standing in front of the shelf with laundry detergents and other cleaning products. Refillmatic detergent bottles are proposed as an option.

3.

You pick a preferred bottle of laundry detergent. Returnable packaging is provided by several brands. Assuming that you choose a reusable bottle, the scenario will be as follow:

4.

You use the detergent at home.

5.

You store the bottle at home when it's empty.

5.

At the supermarket's deposit machine, you can easily bring your empty bottle back. You scan your account using your app, which keeps track of the number of returned packages. You can get back your deposit in the app.

7.

In the questions that follow, we will be referring to this package.

Based on the scenario showed. I would buy this product

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

Based on the scenario showed. If I was planning to buy detergent, I would choose this product

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

Based on the scenario showed. If a friend was looking for detergent, I would advise him or her to purchase this product

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

7.

In the questions that follow, we will be referring to this package.

Looking at this packaging...

	Strongly disagree						Strongly agree
	1	2	3	4	5	6	7
This packaging makes me feel connected to this brand	○						
This packaging would make me stay with this brand	○						
This packaging would make me feel satisfied with this brand	○						

7.

In the questions that follow, we will be referring to this package.

This product has very

Poor quality — Good quality

1 2 3 4 5 6 7

This product is very

Poor — Excellent

1 2 3 4 5 6 7

7.

In the questions that follow, we will be referring to this package.

The packaging of this product is very

Unattractive — Attractive

1 2 3 4 5 6 7

The packaging of this product is very

Ugly — Beautiful

1 2 3 4 5 6 7

The packaging of this product is very

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

Based on the scenario showed. If a friend was looking for milk, I would advise him or her to purchase this product

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

7.

In the questions that follow, we will be referring to this package.

- ○ Every two weeks
- ○ Every month
- ○ Never

Standardised

For the next questions you get to see a scenario in which you have the possibility to choose a bottle milk sold in a standardised returnable packaging. In returnable packaging systems companies repeatedly clean and refill the packaging with products. Standardised means that within a product category all packages have the same size and dimensions. When packaging is standardised the packaging can potentially be shared between brands and even serve for other product types. A good example of standardised packaging are the beer bottles. These bottles are reusable through a returnable system, where companies take responsibility for cleaning and refilling the products. You will answer the questions of this survey as if you were in this situation.

NB you will only be able to access the next page of the questionnaire after 30 seconds to ensure that you've had enough time to evaluate the scenario.

Displeasing — Pleasing

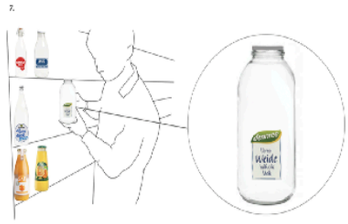
1 2 3 4 5 6 7

The packaging of this product is very

Poor looking — Nice looking

1 2 3 4 5 6 7

7.



In the questions that follow, we will be referring to this package.

This packaging is friendly for the environment

- ○ 2-3 times a week
- ○ Once a week
- ○ Every two weeks
- ○ Every month
- ○ Never

Standardised +

For the next questions you get to see a scenario in which you have the possibility to choose a bottle milk sold in a returnable standardised packaging. In returnable packaging systems companies repeatedly clean and refill the packaging with products. Standardised means that within a product category all packages have the same size and dimensions. When packaging is standardised the packaging can potentially be shared between brands and even serve for other product types. A good example of standardised packaging are the beer bottles. These bottles are reusable through a returnable system, where companies take responsibility for cleaning and refilling the products. You will answer the questions of this survey as if you were in this situation.

NB you will only be able to access the next page of the questionnaire after 30 seconds to ensure that you've had enough time to evaluate the scenario.

Please carefully evaluate the situation presented below. Imagine you are going to the supermarket to buy milk.

1.

You visit the same grocery store where you always buy your food.

2.

You are standing in front of the shelf with dairy and juices. Returnable milk bottles are proposed as an option.

3.

You pick a preferred bottle of milk. The packages are all standardised. Meaning that all the dairy products and juices, regardless of the brand, have the same packaging shape and size. Assuming that you choose a standardised bottle, the scenario will be as follow:

4.

You consume the milk at home.

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

This is a good example of an environmentally friendly packaging

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

On a scale of 1-7, to what extent do you perceive this packaging as reusable?

Not reusable — Reusable

1 2 3 4 5 6 7

Yes

How often do you buy milk?

- ○ Daily
- ○ 2-3 times a week

7.

In the questions that follow, we will be referring to this package.

This product has very

Poor quality — Good quality

1 2 3 4 5 6 7

This product is very

Poor — Excellent

1 2 3 4 5 6 7

In the questions that follow, we will be referring to this package.

The packaging of this product is very

Unattractive						Attractive
	2	3	4	5	6	7

The packaging of this product is very

Ugly						Beautiful
	2	3	4	5	6	7

The packaging of this product is very

Displeasing						Pleasing
	2	3	4	5	6	7

The packaging of this product is very

Poor looking						Nice looking
	2	3	4	5	6	7

In the questions that follow, we will be referring to this package.

This packaging is friendly for the environment

Strongly disagree						Strongly agree
	2	3	4	5	6	7

This is a good example of an environmentally friendly packaging

Strongly disagree						Strongly agree
	2	3	4	5	6	7

On a scale of 1-7, to what extent do you perceive this packaging as standardised?

Strongly disagree	Somewhat disagree		Neither agree nor disagree		Somewhat agree	Strongly agree
1	2	3	4	5	6	7

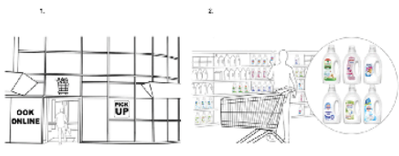
How often do you buy Milk?

- Daily
- 2-3 times a week
- Once a week
- Every two weeks
- Every month
- Never

You will now again see a scenario and packaging design for laundry detergent. Please look closely to the scenario and design and answer the questions. You will answer the questions of this survey as if you were in this situation.

NB you will only be able to access the next page of the questionnaire after 30 seconds to ensure that you've had enough time to evaluate the scenario.

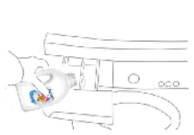
Please carefully evaluate the situation presented below. Imagine you are going to the supermarket to buy. laundry detergent.



You visit the same grocery store where you always buy your food.

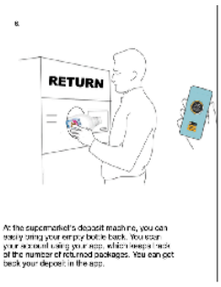
You are standing in front of the shelf with laundry detergents and other cleaning products. Returnable detergent bottles are proposed as an option.

You pick a preferred bottle of laundry detergent. The packages are all standardised. Meaning that all detergents and cleaning products, regardless of the brand, have the same packaging shape and size. Assuming that you choose a standardised bottle, the scenario will be as follow.



The detergent is used at home.

You store the bottle at home when it is empty.



At the supermarket's deposit machine, you can easily bring your empty bottle back. You scan your account using your app, which keeps track of the number of returned packages. You can get back your deposit in the app.

In the questions that follow, we will be referring to this package.

Based on the scenario showed. I would buy this product

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

Based on the scenario showed. If I was planning to buy detergent I would choose this product

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

Based on the scenario showed. If a friend was looking for detergent, I would advise him or her to purchase this product

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

In the questions that follow, we will be referring to this package.

Looking at this packaging...

	Strongly disagree 1	2	3	4	5	6	Strongly agree 7
This packaging makes me feel connected to this brand	○						
This packaging would make me stay with this brand	○						
This packaging would make me feel satisfied with this brand	○						

In the questions that follow, we will be referring to this package.

Looking at this packaging...

	Strongly disagree 1	2	3	4	5	6	Strongly agree 7
This packaging makes me feel connected to this brand	○						
This packaging would make me stay with this brand	○						
This packaging would make me feel satisfied with this brand	○						

In the questions that follow, we will be referring to this package.

The packaging of this product is very

Unattractive 1 2 3 4 5 6 Attractive 7

The packaging of this product is very

Ugly 1 2 3 4 5 6 Beautiful 7

The packaging of this product is very

Strongly disagree 1 2 3 4 5 6 Strongly agree 7

This is a good example of an environmentally friendly packaging

Strongly disagree 1 2 3 4 5 6 Strongly agree 7

On a scale of 1-7, to what extent do you perceive this packaging as standardised?

Strongly disagree 1 — Somewhat disagree 2 — 3 — Neither agree nor disagree 4 — Somewhat agree 5 — 6 — Strongly agree 7

How often do you buy laundry detergent?

- Daily
- 2-3 times a week
- Once a week
- Every two weeks
- Every month
- Never

Standardised +

For the next questions you get to see a scenario in which you have the possibility to choose a bottle milk sold in a returnable standardised packaging. In returnable packaging systems companies repeatedly clean and refill the packaging with products. Standardised means that within a product category all packages have the same size and dimensions. When packaging is standardised the packaging can potentially be shared between brands and even serve for other product types. A good example of standardised packaging are the beer bottles. These bottles are reusable through a returnable system, where companies take responsibility for cleaning and refilling the products. You will answer the questions of this survey as if you were in this situation.

NB you will only be able to access the next page of the questionnaire after 30 seconds to ensure that you've had enough time to evaluate the scenario.

Please carefully evaluate the situation presented below. Imagine that you are going to the supermarket to buy milk.

1.

You visit the same grocery store where you always buy your food.

2.

You are standing in front of the shelf with dairy and juices. Returnable milk bottles are proposed as an option.

3.

You pick a preferred bottle of milk. The packages are all standardised. Meaning that all the dairy products and juices, regardless of the brand, have the same packaging shape and size. Assuming that you choose a standardised bottle, the scenario will be as follow:

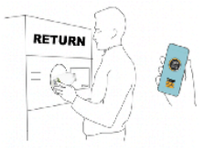
4.

You consume the milk at home.

5.

You store the bottle at home when it's empty.

6.



At the supermarket a deposit machine, you can easily bring your empty bottle back. You scan your account using your app, which keeps track of the number of returned packages. You can get back your deposit in the app.

7.

In the questions that follow, we will be referring to this package.

(Scan the QR code) and watch this:

Reclame Denree

SCAN ME

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Based on the scenario showed. If I was planning to buy milk, I would choose this product

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Based on the scenario showed. If a friend was looking for milk, I would advise him or her to purchase this product

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Based on the scenario showed. I would buy this product

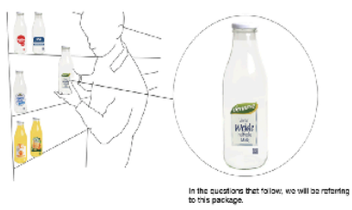
7.

In the questions that follow, we will be referring to this package.

Looking at this packaging...

	Strongly disagree 1	2	3	4	5	6	7 Strongly agree
This packaging makes me feel connected to this brand							
This packaging would make me stay with this brand							
This packaging would make me feel satisfied with this brand							

7.



In the questions that follow, we will be referring to this package.

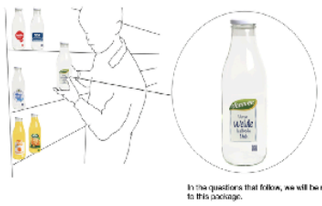
This product has very

Poor quality 1 2 3 4 5 6 7 Good quality

This product is very

Poor 1 2 3 4 5 6 7 Excellent

7.



In the questions that follow, we will be referring to this package.

The packaging of this product is very

Unattractive — Attractive

1 2 3 4 5 6 7

The packaging of this product is very

Ugly — Beautiful

1 2 3 4 5 6 7

The packaging of this product is very

Displeasing — Pleasing

1 2 3 4 5 6 7

The packaging of this product is very

Poor looking — Nice looking

1 2 3 4 5 6 7

7.

In the questions that follow, we will be referring to this package.

This packaging is friendly for the environment

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

This is a good example of an environmentally friendly packaging

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

On a scale of 1-7, to what extent do you perceive this packaging as standardised?

Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
1	2	3	5	6	7

How often do you buy Milk?

- Daily
- 2-3 times a week
- Once a week
- Every two weeks
- Every month
- Never

You will now again see a scenario and packaging design for laundry detergent. Please look closely to the scenario and design and answer the questions. You will answer the questions of this survey as if you were in this situation.

NB you will only be able to access the next page of the questionnaire after 30 seconds to ensure that you've had enough time to evaluate the scenario.

Please carefully evaluate the situation presented below. Imagine you are going to the supermarket to buy laundry detergent.

1.

You visit the same grocery store where you always buy your food.

2.

You are standing in front of the shelf with laundry detergents and other cleaning products. Returnable detergent bottles are proposed as an option.

3.

You pick a preferred bottle of laundry detergent. The packages are all standardised. Meaning that all detergents and cleaning products, regardless of the brand, have the same packaging shape and size. Assuming that you'd chose a standardised bottle, the scenario will be as follow:

4.

The detergent is used at home.

5.

You store the bottle at home when it's empty.

6.

At the supermarket's deposit machine, you can easily bring your empty bottle back. You scan your account using your app, which keeps track of the number of returned packages. You can get back your deposit in the app.

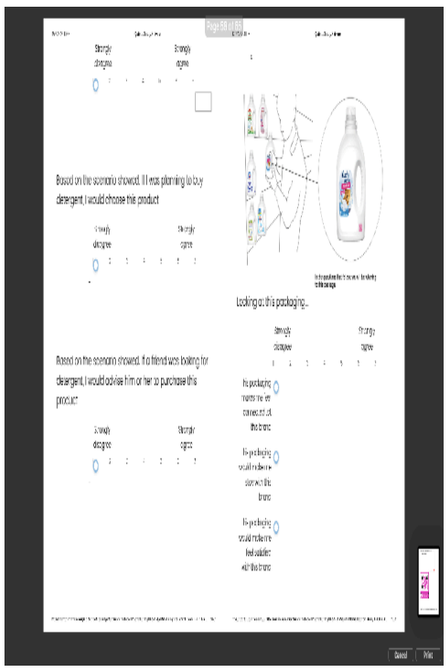
7.

In the questions that follow, we will be referring to this package.

(Scan the QR code) and watch this:

Reclame kuschelweich

SCAN ME



Based on the scenario showed. I would buy this product

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Based on the scenario showed. If I was planning to buy detergent, I would choose this product

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Based on the scenario showed. If a friend was looking for detergent, I would advise him or her to purchase this product

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

In the questions that follow, we will be referring to this package.

Looking at this packaging...

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

This packaging makes me feel connected tot this brand

This packaging would make me stay with this brand

This packaging would make me feel satisfied with this brand

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Based on the scenario showed. If I was planning to buy detergent, I would choose this product

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Based on the scenario showed. If a friend was looking for detergent, I would advise him or her to purchase this product

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This packaging would make me stay with this brand

This packaging would make me feel satisfied with this brand

In the questions that follow, we will be referring to this package.

This product has very

Poor quality — Good quality

1 2 3 4 5 6 7

This product is very

Poor — Excellent

1 2 3 4 5 6 7

The packaging of this product is very

Displeasing — Pleasing

1 2 3 4 5 6 7

The packaging of this product is very

Poor looking — Nice looking

1 2 3 4 5 6 7

On a scale of 1-7, to what extent do you perceive this packaging as standardised?

Strongly disagree — Somewhat disagree — Neither agree nor disagree — Somewhat agree — Strongly agree

1 2 3 4 5 6 7

How often do you buy laundry detergent?

- Daily
- 2 3 times a week
- Once a week
- Every two weeks
- Every month
- Never

General questions

What is your gender identity?

- Male

The packaging of this product is very

Displeasing — Pleasing

1 2 3 4 5 6 7

The packaging of this product is very

Poor looking — Nice looking

1 2 3 4 5 6 7

In the questions that follow, we will be referring to this package.

This packaging is friendly for the environment

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

This is a good example of an environmentally friendly packaging

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

- Female
- Non-binary / third gender
- Prefer not to say

What is your age?

What is your preferred way of grocery shopping?

- Online
- Physical store

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Appendix [6] - Descripitve analysis

Descriptives

MPURCHASE

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Unstandardised	40	5,1333	1,44569	,22858	4,6710	5,5957	2,00	7,00
Standardised	40	5,5750	1,10164	,17418	5,2227	5,9273	3,00	7,00
Standardised+	35	5,6857	1,10537	,18684	5,3060	6,0654	3,00	7,00
Total	115	5,4551	1,24591	,11618	5,2249	5,6852	2,00	7,00

Descriptives

MBRANDIMAGE

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Unstandardised	40	4,2333	1,61757	,25576	3,7160	4,7507	2,00	7,00
Standardised	40	4,4417	1,54770	,24471	3,9467	4,9366	1,67	7,00
Standardised+	35	4,0762	1,68245	,28439	3,4982	4,6541	1,00	7,00
Total	115	4,2580	1,60655	,14981	3,9612	4,5547	1,00	7,00

Descriptives

MPERCEIVEDQ

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Unstandardised	40	4,7625	1,35395	,21408	4,3295	5,1955	2,00	7,00
Standardised	40	5,1875	1,19662	,18920	4,8048	5,5702	3,00	7,00
Standardised+	35	4,8286	1,30577	,22072	4,3800	5,2771	3,00	7,00
Total	115	4,9304	1,28910	,12021	4,6923	5,1686	2,00	7,00

Descriptives

MAESTHETICATT

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Unstandardised	40	4,3188	1,22080	,19302	3,9283	4,7092	1,00	6,75
Standardised	40	4,7250	1,20336	,19027	4,3401	5,1099	2,00	7,00
Standardised+	35	4,5500	1,43588	,24271	4,0568	5,0432	1,00	7,00
Total	115	4,5304	1,28424	,11976	4,2932	4,7677	1,00	7,00

Descriptives

MENVIRONMENTALF

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Unstandardised	40	5,7125	1,41823	,22424	5,2589	6,1661	2,50	7,00
Standardised	40	6,1000	1,38305	,21868	5,6577	6,5423	1,50	7,00
Standardised+	35	5,9429	1,29349	,21864	5,4985	6,3872	2,00	7,00
Total	115	5,9174	1,36679	,12745	5,6649	6,1699	1,50	7,00

Descriptives

URCHASEINTENTION

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maxim
					Lower Bound	Upper Bound		
andardised	38	5,0439	1,32241	,21452	4,6092	5,4785	2,00	
dardised	37	5,4865	1,33933	,22018	5,0399	5,9330	2,00	
dardised+	34	5,5294	1,37098	,23512	5,0511	6,0078	1,67	
	109	5,3456	1,34938	,12925	5,0894	5,6018	1,67	

Descriptives

LDBRANDIMAGE

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Unstandardised	38	4,6404	1,53318	,24871	4,1364	5,1443	1,67	7,00
Standardised	38	4,4561	1,56620	,25407	3,9413	4,9709	2,00	7,00
Standardised+	34	4,5980	1,44199	,24730	4,0949	5,1012	1,00	7,00
Total	110	4,5636	1,50551	,14354	4,2791	4,8481	1,00	7,00

Descriptives

LDPERCEIVEDQ

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Unstandardised	38	4,9079	1,33990	,21736	4,4675	5,3483	2,50	7,00
Standardised	38	4,9474	1,28814	,20896	4,5240	5,3708	2,00	7,00
Standardised+	34	4,9559	1,15711	,19844	4,5521	5,3596	3,00	7,00
Total	110	4,9364	1,25638	,11979	4,6989	5,1738	2,00	7,00

Descriptives

LDAESTHETICA

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Unstandardised	38	4,6908	1,32598	,21510	4,2550	5,1266	1,50	7,00
Standardised	38	4,6974	1,12279	,18214	4,3283	5,0664	2,25	7,00
Standardised+	34	4,8456	1,18228	,20276	4,4331	5,2581	2,75	7,00
Total	110	4,7409	1,20536	,11493	4,5131	4,9687	1,50	7,00

Descriptives

LDENVIRONMENTALF

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Unstandardised	38	4,8421	1,80130	,29221	4,2500	5,4342	1,50	7,00
Standardised	38	5,6053	1,53851	,24958	5,0996	6,1110	1,50	7,00
Standardised+	34	5,6029	1,55105	,26600	5,0618	6,1441	2,00	7,00
Total	110	5,3409	1,66305	,15857	5,0266	5,6552	1,50	7,00

Appendix [7] - Kolmogorov Smirnov

One-Sample Kolmogorov-Smirnov Test

			GROUP
N			121
Normal Parameters[a,b]	Mean		1,9504
	Std. Deviation		,81498
Most Extreme Differences	Absolute		,234
	Positive		,234
	Negative		-,207
Test Statistic			,234
Asymp. Sig. (2-tailed)[c]			<,001
Monte Carlo Sig. (2-tailed)[d]	Sig.		,000
	99% Confidence Interval	Lower Bound	,000
		Upper Bound	,000

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 1335104164.

Appendix [8] - Homoenity of variances

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
MPURCHASE	Based on Mean	2,259	2	112	,109
	Based on Median	1,689	2	112	,189
	Based on Median and with adjusted df	1,689	2	103,573	,190
	Based on trimmed mean	2,111	2	112	,126

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
MBRANDIMAGE	Based on Mean	,055	2	112	,947
	Based on Median	,053	2	112	,948
	Based on Median and with adjusted df	,053	2	110,767	,948
	Based on trimmed mean	,053	2	112	,948

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
MPERCEIVEDQ	Based on Mean	,484	2	112	,617
	Based on Median	,473	2	112	,625
	Based on Median and with adjusted df	,473	2	111,265	,625
	Based on trimmed mean	,475	2	112	,623

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
MAESTHETICATT	Based on Mean	,478	2	112	,621
	Based on Median	,437	2	112	,647
	Based on Median and with adjusted df	,437	2	108,550	,647
	Based on trimmed mean	,509	2	112	,603

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
MENVIRONMENTALF	Based on Mean	,800	2	112	,452
	Based on Median	,668	2	112	,515
	Based on Median and with adjusted df	,668	2	100,920	,515
	Based on trimmed mean	,828	2	112	,439

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
LDPURCHASEINTENTION	Based on Mean	,024	2	106	,976
	Based on Median	,156	2	106	,856
	Based on Median and with adjusted df	,156	2	97,259	,856
	Based on trimmed mean	,071	2	106	,932

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
LDBRANDIMAGE	Based on Mean	,151	2	107	,860
	Based on Median	,117	2	107	,890
	Based on Median and with adjusted df	,117	2	106,232	,890
	Based on trimmed mean	,148	2	107	,862

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
LDPERCEIVEDQ	Based on Mean	,257	2	107	,774
	Based on Median	,222	2	107	,801
	Based on Median and with adjusted df	,222	2	103,405	,801
	Based on trimmed mean	,253	2	107	,777

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
LDAESTHETICA	Based on Mean	,579	2	107	,562
	Based on Median	,546	2	107	,581
	Based on Median and with adjusted df	,546	2	104,732	,581
	Based on trimmed mean	,553	2	107	,577

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
LDENVIRONMENTALF	Based on Mean	,558	2	107	,574
	Based on Median	,679	2	107	,509
	Based on Median and with adjusted df	,679	2	106,297	,509
	Based on trimmed mean	,579	2	107	,562

Appendix [9] - Crohnbach's alpha

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,878	,894	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,838	,836	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,926	,927	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,842	,842	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,927	,927	2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,897	,898	2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,946	,948	4

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,938	,941	4

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,971	,971	2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,934	,940	2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,917	,918	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,900	,917	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,932	,936	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,959	,959	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,782	,784	2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,976	,978	2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,950	,950	4

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,970	,972	4

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,848	,848	2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,958	,959	2

Purchase intention

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,954	,957	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,911	,910	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,943	,944	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,961	,961	2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,887	,887	2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,966	,968	4

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,949	,950	4

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,961	,965	2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,943	,943	2

Appendix [10] - One way ANOVA

ANOVA

MPURCHASE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6,578	2	3,289	2,162	,120
Within Groups	170,385	112	1,521		
Total	176,962	114			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
MPURCHASE	Eta-squared	,037	,000	,116
	Epsilon-squared	,020	-,018	,100
	Omega-squared Fixed-effect	,020	-,018	,099
	Omega-squared Random-effect	,010	-,009	,052

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

ANOVA

MBRANDIMAGE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,531	2	1,265	,486	,616
Within Groups	291,705	112	2,605		
Total	294,236	114			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
MBRANDIMAGE	Eta-squared	,009	,000	,056
	Epsilon-squared	-,009	-,018	,040
	Omega-squared Fixed-effect	-,009	-,018	,039
	Omega-squared Random-effect	-,004	-,009	,020

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

ANOVA

MPERCEIVEDQ

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4,135	2	2,067	1,249	,291
Within Groups	185,309	112	1,655		
Total	189,443	114			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
MPERCEIVEDQ	Eta-squared	,022	,000	,088
	Epsilon-squared	,004	-,018	,072
	Omega-squared Fixed-effect	,004	-,018	,071
	Omega-squared Random-effect	,002	-,009	,037

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

ANOVA

MAESTHETICATT

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3,320	2	1,660	1,007	,369
Within Groups	184,698	112	1,649		
Total	188,018	114			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
MAESTHETICATT	Eta-squared	,018	,000	,079
	Epsilon-squared	,000	-,018	,063
	Omega-squared Fixed-effect	,000	-,018	,062
	Omega-squared Random-effect	,000	-,009	,032

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

ANOVA

MENVIRONMENTALF

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3,036	2	1,518	,810	,448
Within Groups	209,929	112	1,874		
Total	212,965	114			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
MENVIRONMENTALF	Eta-squared	,014	,000	,071
	Epsilon-squared	-,003	-,018	,055
	Omega-squared Fixed-effect	-,003	-,018	,054
	Omega-squared Random-effect	-,002	-,009	,028

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

ANOVA

LDPURCHASEINTENTION

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5,343	2	2,671	1,480	,232
Within Groups	191,307	106	1,805		
Total	196,650	108			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
LDPURCHASEINTENTION	Eta-squared	,027	,000	,100
	Epsilon-squared	,009	-,019	,083
	Omega-squared Fixed-effect	,009	-,019	,083
	Omega-squared Random-effect	,004	-,009	,043

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

ANOVA

LDBRANDIMAGE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,703	2	,351	,153	,859
Within Groups	246,352	107	2,302		
Total	247,055	109			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
LDBRANDIMAGE	Eta-squared	,003	,000	,033
	Epsilon-squared	-,016	-,019	,015
	Omega-squared Fixed-effect	-,016	-,019	,015
	Omega-squared Random-effect	-,008	-,009	,007

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

ANOVA

LDPERCEIVEDQ

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,048	2	,024	,015	,985
Within Groups	172,006	107	1,608		
Total	172,055	109			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
LDPERCEIVEDQ	Eta-squared	,000	,000	,000
	Epsilon-squared	-,018	-,019	-,019
	Omega-squared Fixed-effect	-,018	-,019	-,019
	Omega-squared Random-effect	-,009	-,009	-,009

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

ANOVA

LDAESTHETICA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,540	2	,270	,183	,833
Within Groups	157,826	107	1,475		
Total	158,366	109			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
LDAESTHETICA	Eta-squared	,003	,000	,036
	Epsilon-squared	-,015	-,019	,018
	Omega-squared Fixed-effect	-,015	-,019	,018
	Omega-squared Random-effect	-,007	-,009	,009

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

ANOVA

LDENVIRONMENTALF

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14,445	2	7,222	2,692	,072
Within Groups	287,021	107	2,682		
Total	301,466	109			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval Lower	Upper
LDENVIRONMENTALF	Eta-squared	,048	,000	,135
	Epsilon-squared	,030	-,019	,119
	Omega-squared Fixed-effect	,030	-,019	,118
	Omega-squared Random-effect	,015	-,009	,062

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.